

ELECTRICAL FOUNDED 1872 REVIEW

Vol. CXXXVI. No. 3513

MARCH 23, 1945

9d. WEEKLY



Electrical Review Photo

L. S. E. motors for BOILER HOUSE AUXILIARIES

L.S.E. have specialised for many years in the manufacture of motors for the exacting service demanded of power station auxiliaries. The range of machines includes the "N-S" Variable Speed A.C. motor ; large direct starting squirrel cage motors, which may be of the "Trislot" high torque type when required ; and all standard types.

The "EMCOL" cooling system, enabling totally enclosed machines to be made of practically any required output, is also invaluable for many boiler house applications.

(The illustration is of six 265 H.P. 422 R.P.M. 3.3 K.V. direct starting squirrel cage "EMCOL" totally enclosed vertical spindle pump motors at LITTLE BARFORD power station. Other power stations recently described in the technical Press, for which we supplied many motors, include EARLEY and LLYNFI.)



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NORWICH, MANCHESTER, LONDON AND BRANCHES

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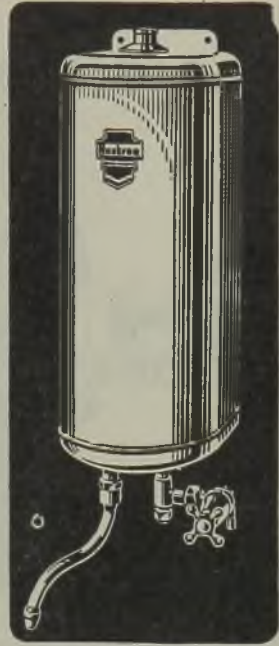


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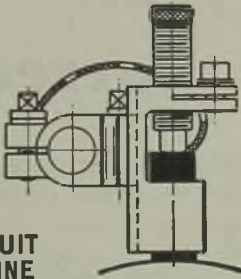
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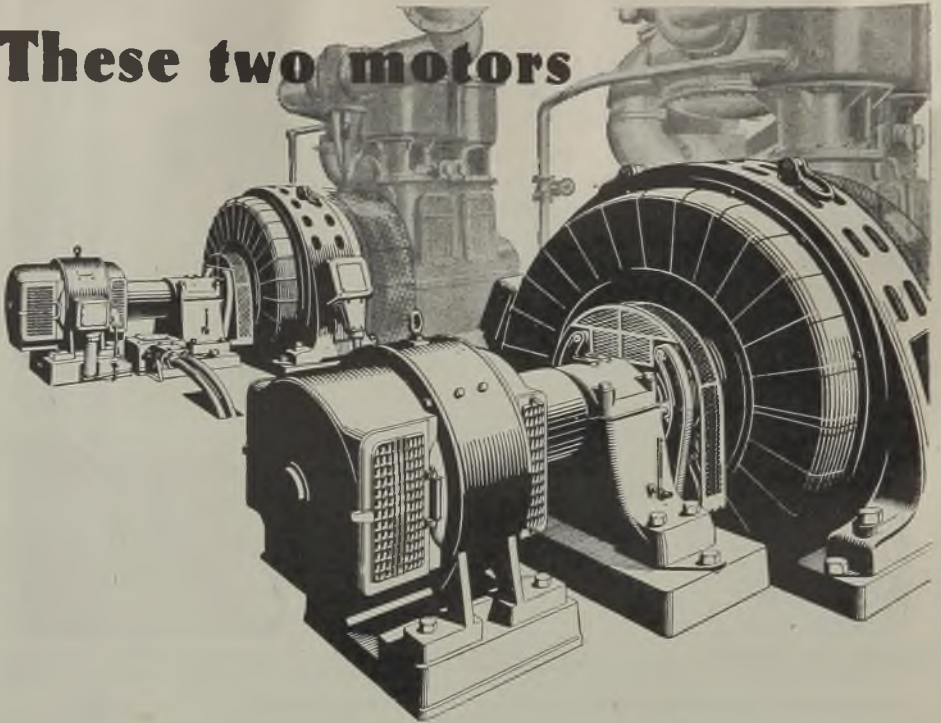
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These two motors



saved £500 a year by P.F. correction.

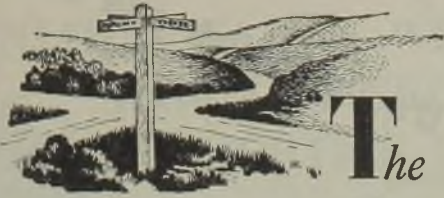
Two needs existed in a large forge. First, equipment was required to maintain the overall power factor at an economical figure. Second, motors were required to drive two large compressors. By ordering two 560 H.P. Crompton Auto-Synchronous Motors the forge satisfied both needs. The motors provide highly

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A7/43



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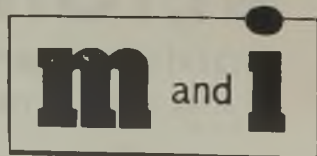
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Messrs. Volt and Amp, Mr. and Mrs. Watt and their relatives in the Electrical family are constantly getting disgruntled because these Micanite and Insulators people will keep them in their place. Every time they try to do a bit of quiet shorting or tracking they come up against a piece of Mica or Micanite or Paxolin or Panilax or Empire tape. It's all very distressing for Messrs. Volt and Amp etc., but it's highly approved by electrical Manufacturers who must keep electricity in its place.

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BENJAMIN LIGHTING DATA 12

BENJAMIN HAVE A WIDE RANGE OF SUPPLEMENTARY LIGHTING UNITS



1



3



7



5

Supplementary lighting can be applied from near or from a distance according to the circumstances. There are local lighting reflectors, either Extensive (1), or Intensive (2) to be mounted on pendants, or there are 45° (3), or 90° types (4) to be mounted in positions where they will not cause glare in the eyes of others. Local reflectors are fitted on adjustable brackets (5) which can be rigidly locked in any desired position.

From a distance the Intensolux (6) throws a fairly narrow beam of light. It can often be placed high up out of the way. The miniature Intensolux (7) used with low voltage auto lamps gives a small circle of light from a shorter range.

The illustrations are of filament reflectors, fluorescent tubular lighting often requires the use of supplementary units also.



2



4



6

★ This is sheet No.12. If you have not seen the others in the series, write for them.

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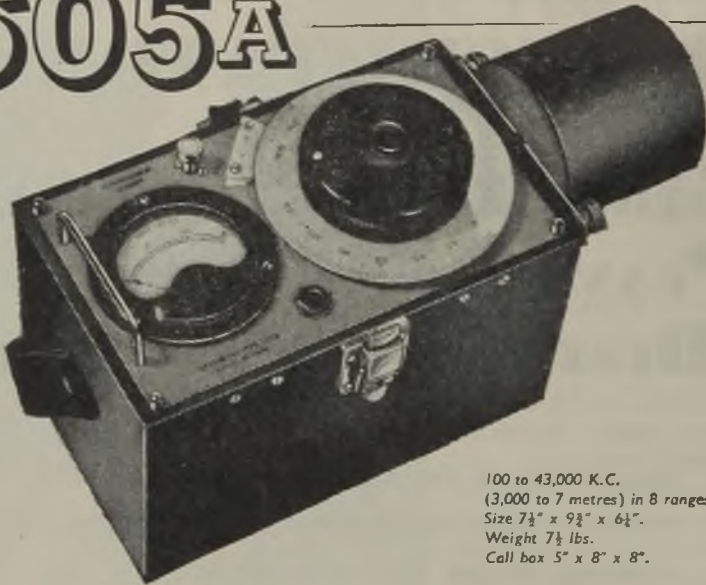
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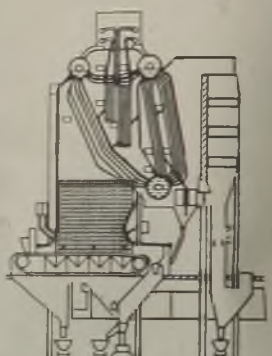
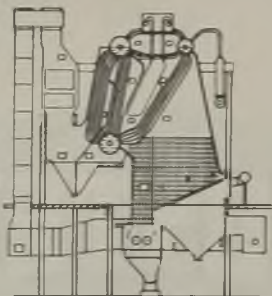
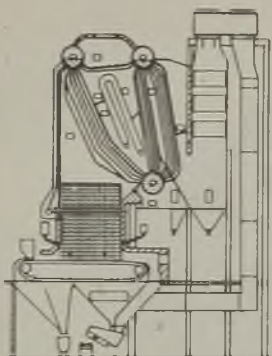


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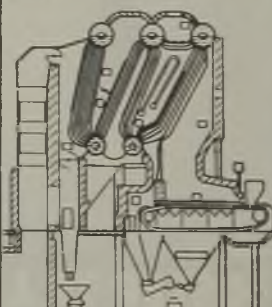
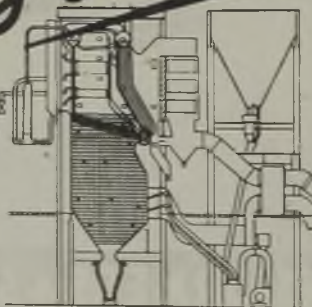
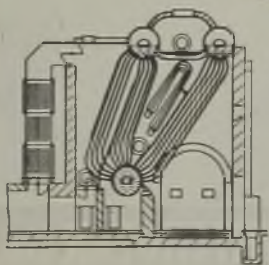
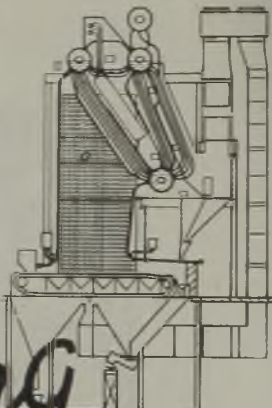
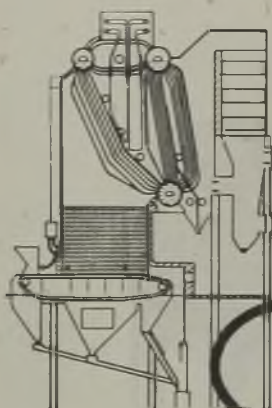
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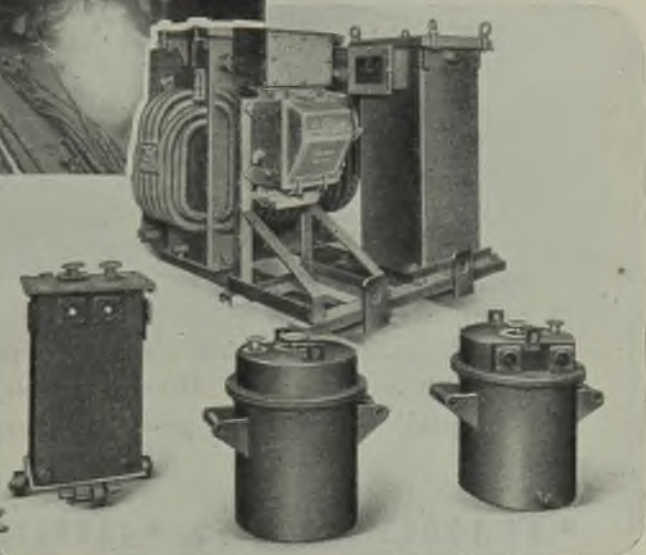


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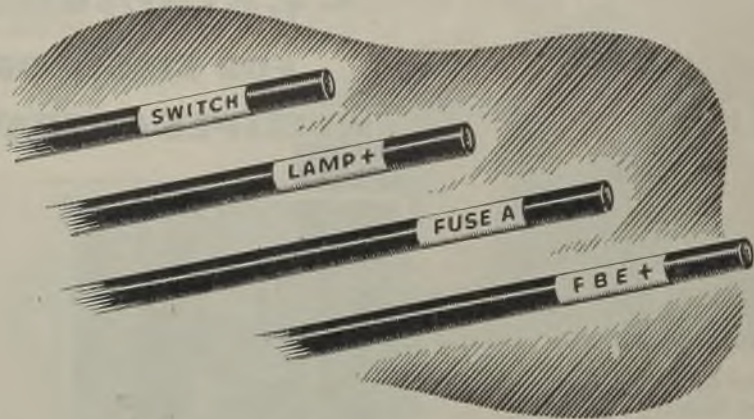
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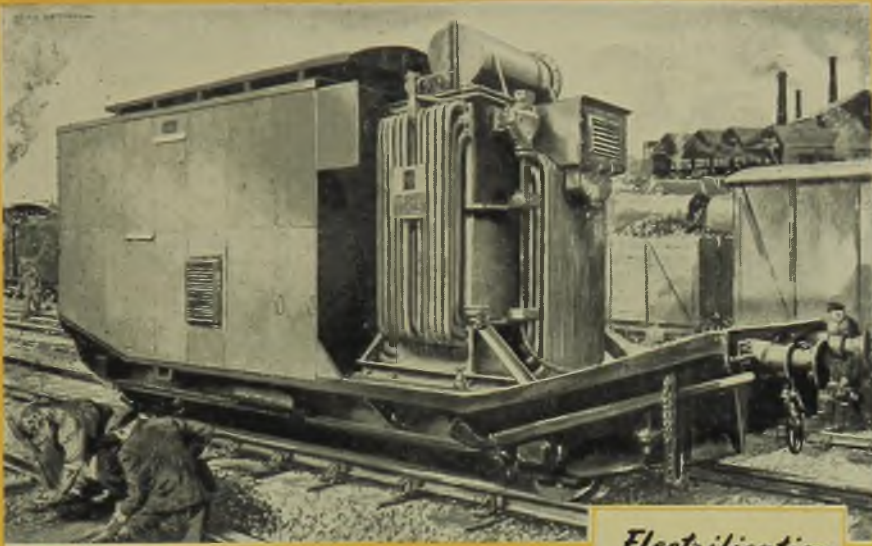
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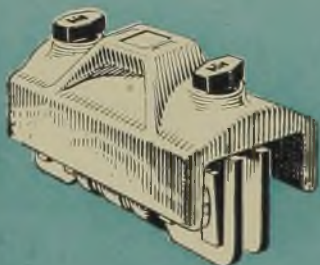
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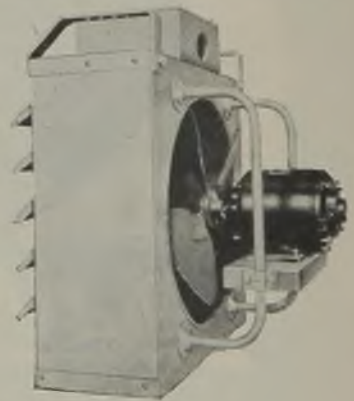

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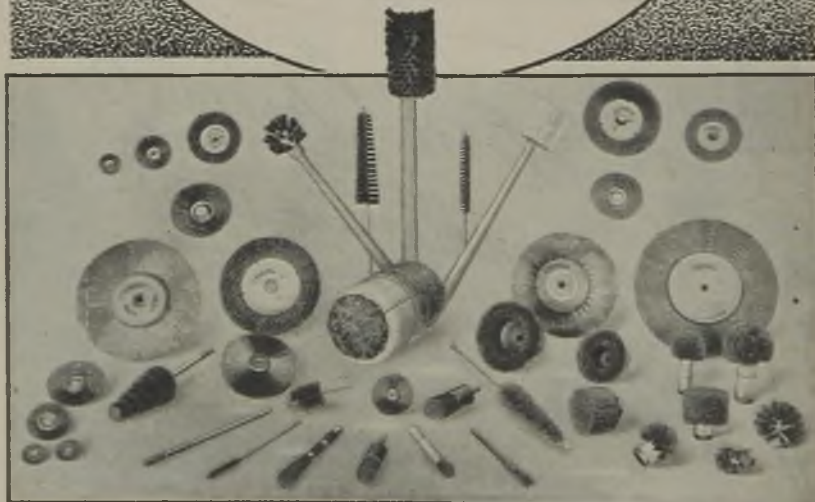
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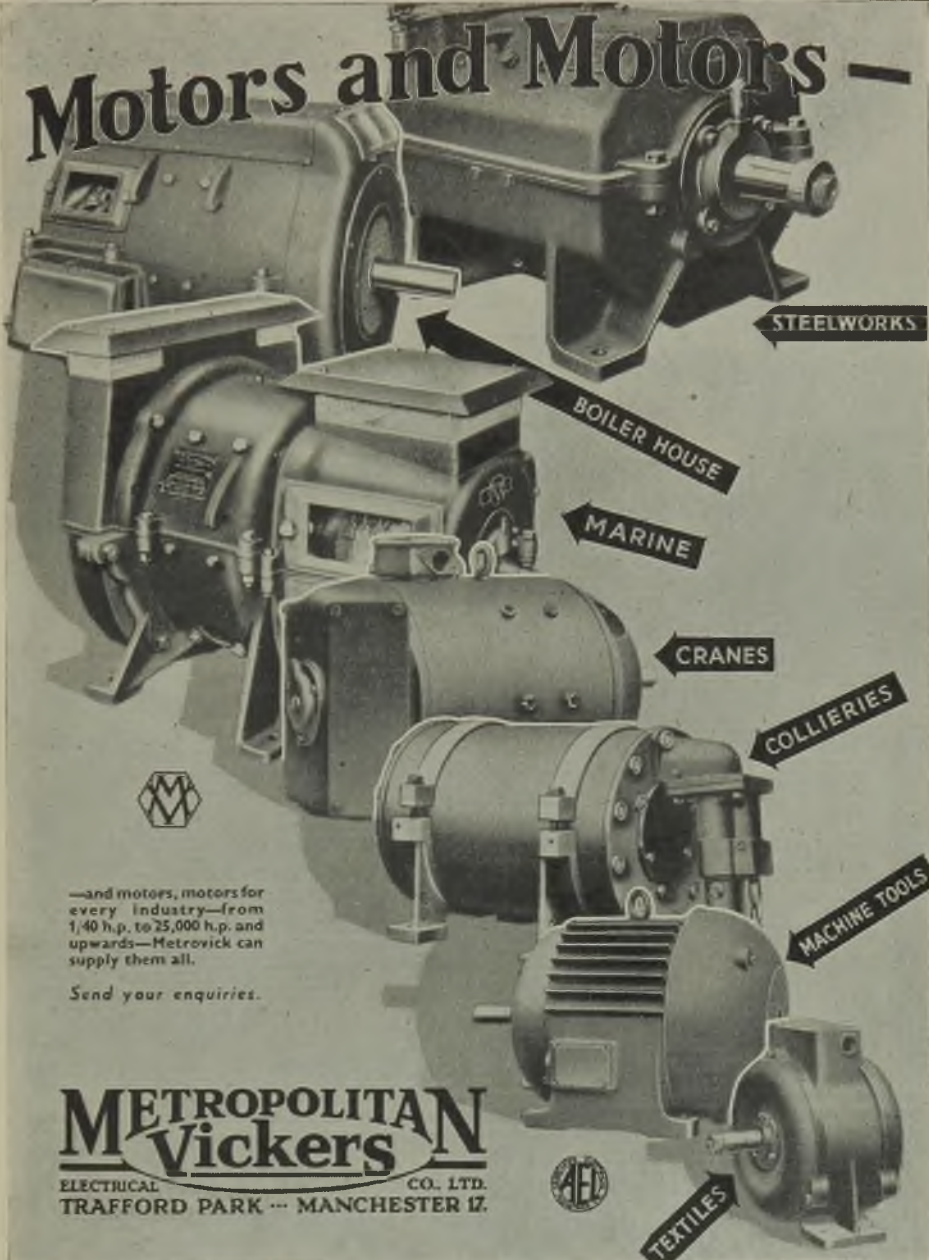
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1/A402

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MOTORS

*of inherent reliability
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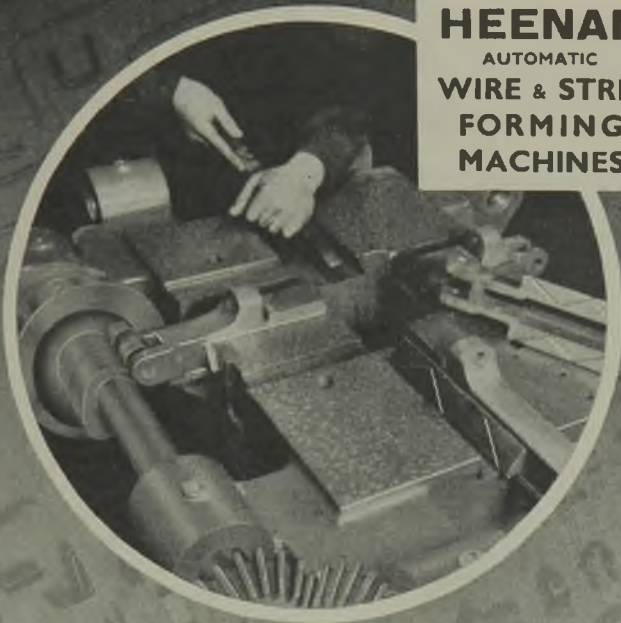
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*Serviceability with
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Particulars from :—

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SORDOVISO

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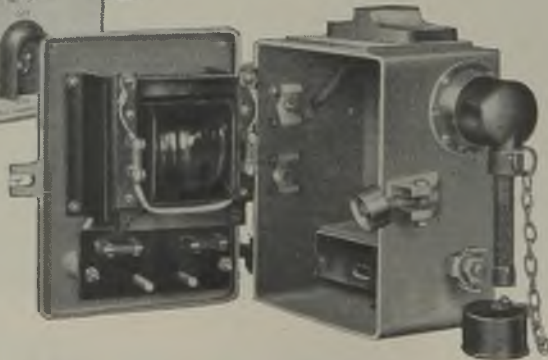
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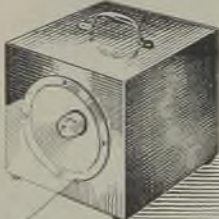
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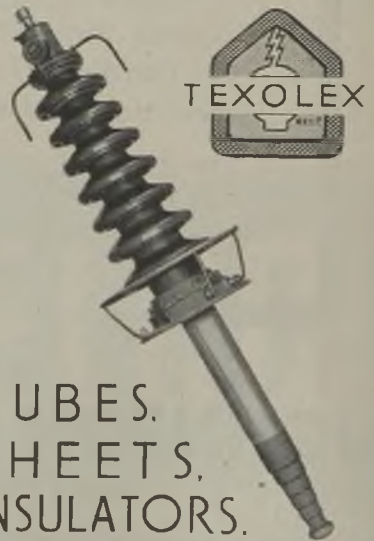
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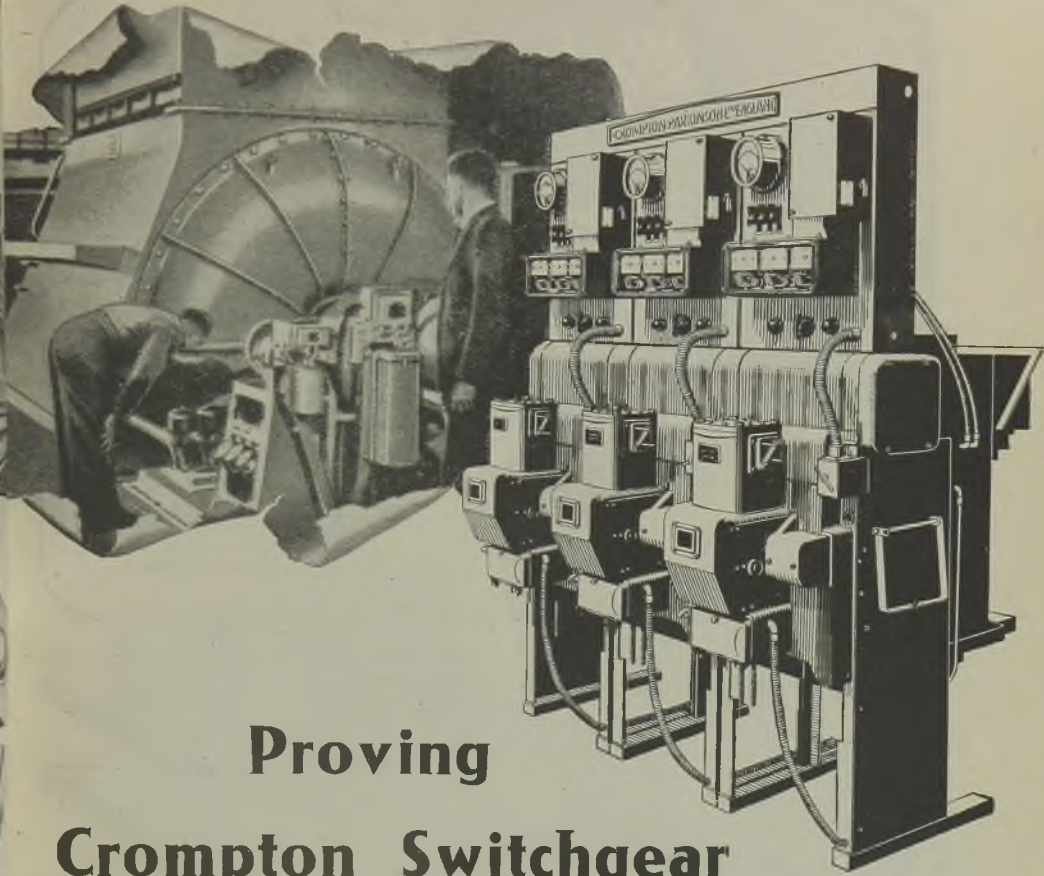
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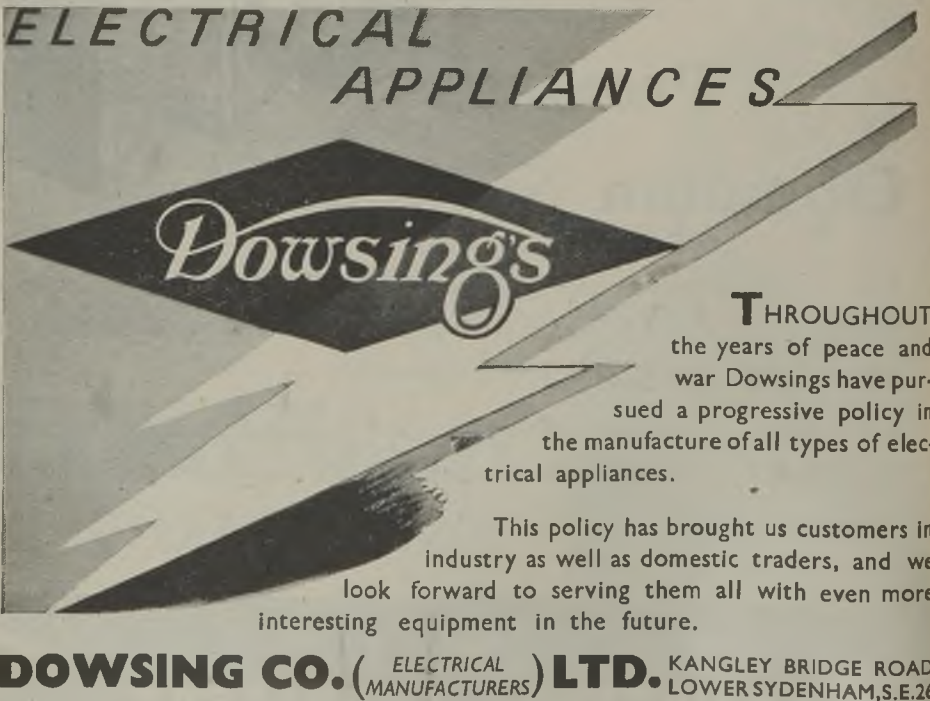
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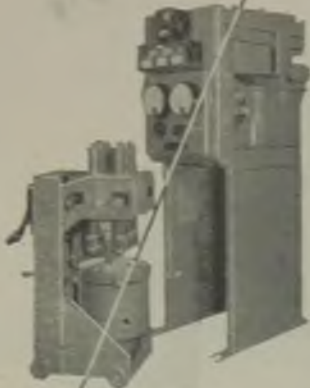
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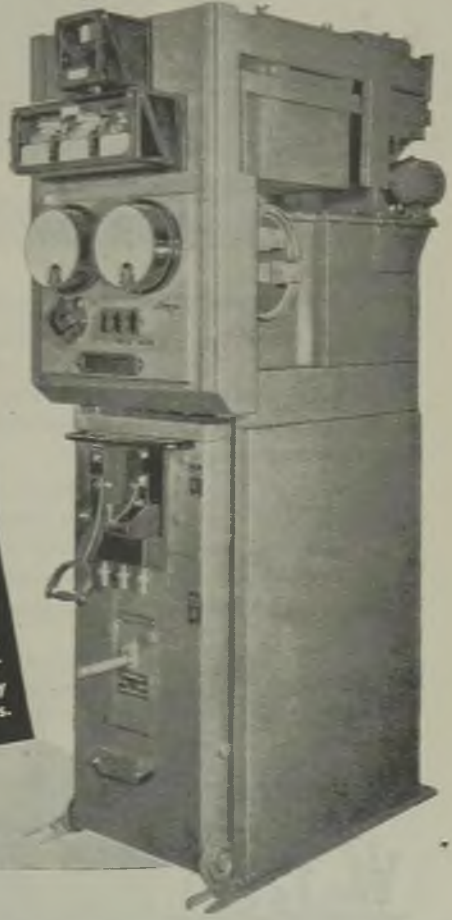
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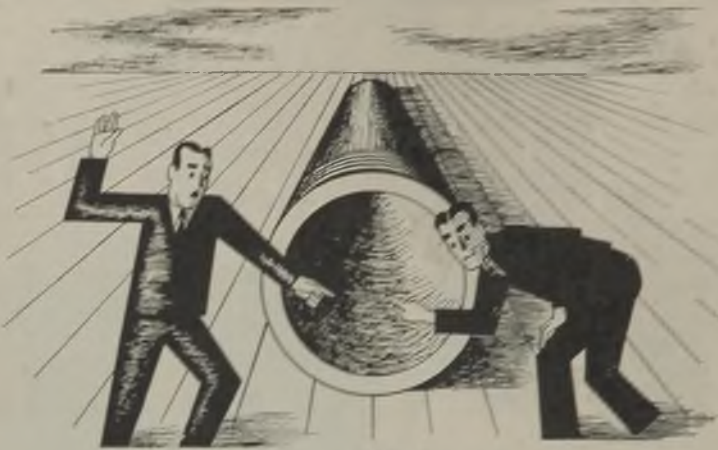
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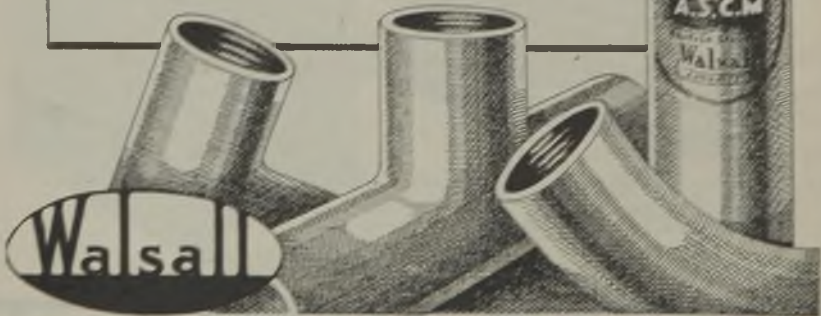
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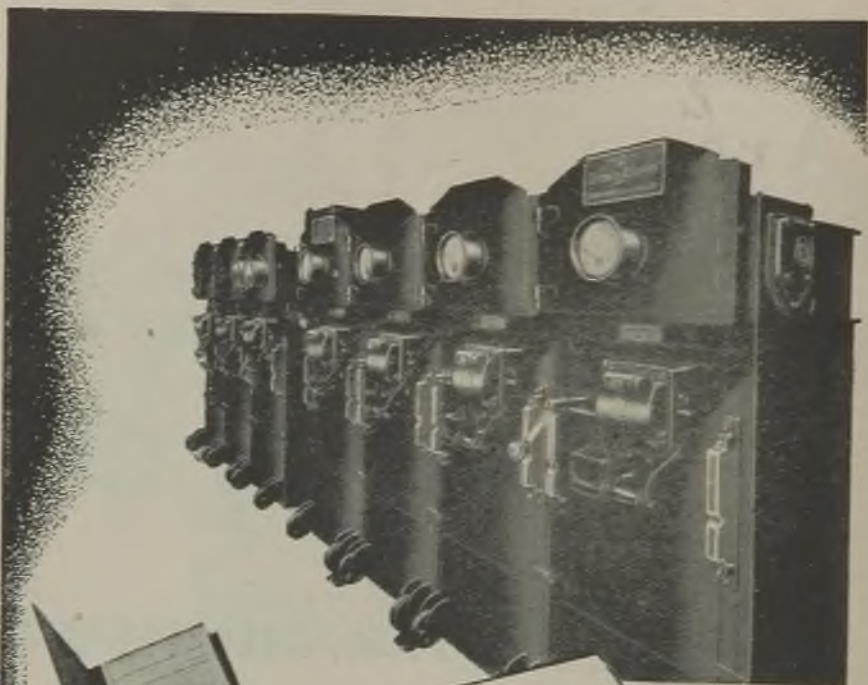


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ELECTRICAL REVIEW

March 23, 1945

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Contents :—

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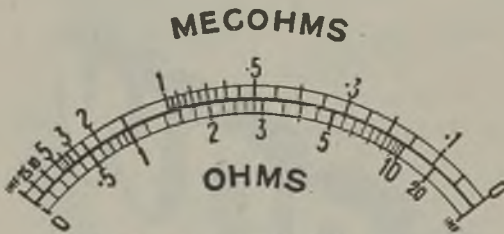
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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872



Vol. CXXXVI. No. 3513.

MARCH 23, 1945

9d. WEEKLY

E.D.A. Looks Ahead

Preparations for Peacetime Activities

FOR the past five years or so the British Electrical Development Association has been in an anomalous position ("ridiculous" was the word used by Lord Brabazon at last Friday's annual luncheon). Formed to increase the use of electricity in all possible directions, it has had to appeal to the public to cut down consumption in factory, shop, office and home.

We suppose that this has not been an unqualified retrogression. It is all very well to tell people to use electricity but if they are too lavish they receive big bills and inevitably start talking about the tremendous expense. During the war one of E.D.A.'s functions has been to show people how to get the most out of their consumption of electricity. Some attention was given to this in peacetime but perhaps not enough. There is no reason why it should not be a principal item in E.D.A.'s post-war policy. We shall still have to compete with gas and coal, although the Ministry of Fuel and Power is to continue, and so the matter is of importance.

Post-War Houses

For the immediate present we consider that the outstanding duty of the Association is to watch what is happening with regard to services for post-war houses. There is a suspicion of reluctance on the part of the responsible Ministries to let electricity have its head, in spite of the manifest public preference for electrical methods. There may be justification for the ruling made in the case of London authorities that only a third of the first batch of tem-

porary houses can be electrically equipped in each instance. The justification is a lack of electrical appliances; E.D.A. must see that this shortage is remedied as soon as conditions allow.

A member raised this subject at the annual meeting. Mr. C. Parker (chairman) said that the position was obscure at present; it would be clearer in six months' time. He assured the questioner that the Ministry of Works could not enforce the use of gas in temporary houses without hearing from E.D.A.

Cooking and Heating Prospects

Large-scale cooking is another worthwhile development and it has made some progress during the war, under the ægis of the Joint E.D.A./B.E.A.M.A. Heavy Duty Cooking Committee. Sir Stafford Cripps testified to the benefits of electric cooking in aircraft factory canteens at the luncheon. Incidentally, he came out also as an advocate of domestic electric heating.

This leads to a consideration of another application—or rather range of applications—industrial heating. The Council's report showed that there is a great deal of interest among a variety of prospective users of electricity for this purpose—a variety extending, as Mr. J. W. J. Townley pointed out, from malt roasting to crematoria. Crop-drying was one application mentioned in the report, indicating the lively interest in electrical methods which has been growing up among the farming community during the war.

Sir Stafford Cripps called for cheaper electricity and cheaper appliances. The

electricity supply industry has done its best (and a very good best, as Lord Brabazon stated) to produce cheap energy, but expensive and inferior coal is undoing the work of the past fruitful years. As regards appliances, here too the industry is largely in the hands of others—it cannot dictate the price of labour and materials. It can, however, by the efficient production in quantity of fewer types of well-designed equipment attain lower unit costs and thus offer the customer good value for his money. If E.D.A. builds up the demand the electrical manufacturers can be relied upon to deliver the goods.

THE Bill for the con-
Fuel and Power tinuance of the Ministry of Fuel and Power passed the committee stage and received a third reading last week. Captain Duncan unsuccessfully moved two amendments. The first was to remove electricity from the scope of the Ministry and place it in the care of the Minister of Transport. Captain Duncan's object was possibly, as Mr. Shinwell suggested, to guard electricity against probable ill effects of "co-ordination" but we doubt whether the reversion of electricity to the Ministry of Transport would be very appropriate. It may be considered by some to be unfortunate, but there seems to be no question that if there is a Ministry of Fuel and Power that is the only proper home for the Electricity Commission. The other amendment sought to limit the life of the Ministry to December 31st, 1948, unless Parliament determined otherwise. If the Ministry does not justify its existence it may end before then.

Common-Diagram Control THERE was much of novelty in the control system described last week by Messrs. W. Kidd and E.M.S. McWhirter (who made a good combination of supply and manufacturing experience) in the paper presented before the I.E.E. Transmission Section, so it properly came in for criticism—but criticism of a healthy kind designed to elicit further details and to test the extent to which the methods found successful by the authors would be generally applicable. The claim for reliability of modern telephone-type control accessories being accepted by those taking part in the discussion, the main

item for argument became one of economics. This aspect would clearly require elaborate investigations in each case, but the time would be well spent.

Is or Ize Is the British Standards Institution guilty of individualistic deviation from its own principles by spelling "standardisation" with a second "s" instead of a "z," as the *Standards Review* half fears? We believe not. It is true that words of Greek origin should, on strict etymological grounds, employ the z, but so many words of like-sounding termination come from other linguistic sources that more than common classical erudition is required to avoid the solecism of using a z in their case also. The modern tendency, despite authoritative exceptions, is to adopt the French way of playing for safety by using s in every case.

Textiles SOME advantages may be snatched from the increase in fuel costs, Mr. E. Lunn pointed out in his chairman's address to the I.E.E. North-Midland Centre, if development staffs of electricity supply undertakings take the opportunity of locating inefficient private plants in textile factories with a view to approaching the owners in regard to improving power supplies. Mill owners are now more alive to the possibilities of savings in this way than they were when coal accounted for less than 1 per cent. of the total expenses of a yard of finished cloth—an era that presumably corresponded with that in which the price of slack was 3s. 3d. per ton, from which it has risen to ten times that amount.

Better Loading REMARKABLE improvement in the efficiency of use of generating plant in the United States is indicated in a recent statement by Mr. C. W. Kellogg, president of the Edison Electric Institute. He said that while from 1939 to 1944 the plant capacity had increased by only 28 per cent. the annual output had risen by 83 per cent. This improvement has been due, no doubt, to the great amount of linking-up of hitherto independent systems. In this country the grid had already done this before the war and consequently there was not so great a scope. All the same the Central Board has shown that the load factor rose from 36 per cent. in 1939 to 50 per cent. in 1942 and it was still 48 per cent. in 1943.

Future Development

E.D.A.'s Post-War Plans

REMARKABLE evidence of the strong position occupied in this country's life by the British Electrical Development

that the grid had been established; it had enabled the vast bulk of the supply to be given from existing power stations. It had been necessary to build only two new emergency stations. He doubted whether the supply of equipment to the Forces could have been kept up without the grid. Those responsible for the running of the system had had a most difficult time owing to the shortage of plant and labour but they had kept the supply going in ever-increasing volume with a negligible number of breakdowns.

Members of E.D.A. had been particularly concerned in this work and the British electrical industry had also done a great job for our Russian allies.

In aircraft factories he had seen the great use made of electric power but he was also impressed by the equipment in the canteens. Sir

Stafford said that he himself used only electricity for heating. During the war people had become more electrically-minded and the field to be opened up afterwards was tremendous. Women now knew and appreciated electricity—it was no longer a slightly dangerous mystery. He hoped that the industry would be able to give employment to women electricians.

The results achieved would depend on the



Above: Mr. C. Parker (chairman, E.D.A. Council) and Sir Stafford Cripps. Right: Sir Harry Railing, President I.E.E. and Mr. W. S. Morrison

Association nowadays was afforded by the presence of a number of members of H.M. Government at the annual luncheon on Friday last at the Connaught Rooms. Lord Brabazon of Tara, the President, took the chair and the principal guest was Sir Stafford Cripps, Minister of Aircraft Production. About 600 were present.

There was only one toast, apart from that of "The King." It was "The British Electrical Development Association" and in proposing it SIR STAFFORD CRIPPS said that the Association's silver jubilee marked a span between two world wars which had seen a great development in the use of electricity. Those responsible for the production of the machines of war knew what was owed to electricity. Few of those outside were aware of the great contribution made by the electricity supply industry to the war effort. Power had been supplied to all the new factories even when they were situated in remote spots.

In this respect it had been most fortunate



Lord Brabazon with Mr. T. E. Thomas (L.P.T.B.)

degree to which electricity and electrical appliances could be cheapened. The industry must remember that theirs was no longer a luxury or semi-luxury market. What was



Mr. C. G. Morley New (Electricity Commission) and Mr. J. W. Beauchamp (E.D.A.'s first director)

needed was mass production on the most modern lines to give us a sound home market on which to base competitive exports. We had a world-wide reputation for the heavier classes of electrical machinery and goods; he hoped that the same would be achieved for the lighter equipment. Sir Stafford concluded by saying that E.D.A. would play an important part in the economic strength and stability of the country.

LORD BRABAZON, in thanking Sir Stafford Cripps, referred to the practical ability of Sir Stafford "the only Cabinet Minister with a slide rule on his desk." He went on to say that great as E.D.A. had become people still did not know it well enough; he had been accused of mixing with one of those Greek partisan

Cheap electricity was most desirable but here the question of coal came in. E.D.A. was not concerned with the question of the control of the industry but it was interested in the price and quality of coal. The flat rate increase in price was totally inequitable. While the price of domestic coal had thus been increased by 50 per cent. the electricity supply undertakings, which used inferior coal, had had their fuel costs doubled. At the same time quality had deteriorated. He insisted that coal must not only be black—it must burn. The electricity supply industry had a remarkable record in the improvement of efficiency; whereas in 1917 it took 3 lb. of coal to generate a unit it now required less than a pound.

We had to raise the consumption of electricity per head of population. At present E.D.A. which existed to encourage the use of electricity was in the ridiculous position of having to urge economy and the appliances which it advocated could not be obtained. But there would be an enormous field for



Mr. H. J. Randall (City of London Co.), Mr. J. R. Jones (Hammersmith) and the Town Clerk of Hammersmith



Mr. C. N. Bancroft and Councillor W. Jones (Pontypridd) with Mr. T. R. Evans (Rhondda)

the Association's work when things became a little less controlled.

Politicians naturally inclined towards gas—it was their principal stock in trade but he hoped that those M.P.'s present would be galvanised into action, charged with victuals and electricity.

Annual Meeting

After the luncheon Lord Brabazon presided at the twenty-fifth annual meeting and Mr. CLARENCE PARKER (chairman of Council) presented the accounts for the past year. He said that the great increase in expenditure—from £56,093 to £95,056 was mainly due to advertising. £7,500 had been spent on a

groups! The Association was remarkable in being a thoroughly united body within the electrical industry.

film on post-war housing. There had been additional public relations work and heavy expenditure upon photographs for exhibition purposes. The revenue amounted to £95,367 representing about 70 per cent. of the full basis, as compared with 44 per cent. in 1943. The motion for the adoption of the accounts was seconded by Mr. J. R. JONES and carried.

Mr. Parker then moved the adoption of the report saying that the increased size of this denoted much greater activity. They had begun to prepare for the post-war period: their policy was to secure the greatest co-ordination and co-operation within the industry; to represent the industry as a unit; and to maintain and inform public opinion. He claimed that they had secured better relationships with the public and they now had greater support from the supply industry than ever before. The prospects for E.D.A. and the supply industry were never better. Mr. F. NEWAY seconded the motion and Mr. F. S. NAYLOR, referring to the subject of uniform welding tariffs, said that it had been ruled that this was not a matter with which E.D.A. was competent to deal. The Area Committees needed guidance on this point. Mr. Parker said that it was in order to consider a uniform basis for tariffs but not actual figures. Mr. Naylor was understood to agree with this.

Mr. J. W. J. TOWNLEY said that for years the Association had been too closely identified with domestic uses. He was therefore glad to see the paragraph in the report relating to industrial heating. He asked the Council to give particular attention to this and to prepare brochures and data sheets for circulation to supply undertakings.

Mr. Parker said that they were doing their best to get the necessary staff for this work.

Mr. E. E. JOLLY raised the question of future domestic science training and Mr. Parker said that E.D.A. intended to have a closer concern in the issue of diplomas by the Electrical Association for Women.

Mr. A. W. BARHAM asked what steps were being taken to ensure for electricity a fair field and no favour in new houses. Another member said that the inability to obtain appliances had militated against use of electricity in temporary houses. He asked if there was any prospect of further supplies. Mr. Parker said that war requirements had to come first. The position was obscure and it would be six months before they could see clearly in this matter. But the Ministry of Works could not enforce the use of gas without trouble from E.D.A. The report was adopted.

Mr. Parker announced that Lord Brabazon had consented to act as president for a third year and said that



Mr. H. Nimmo (Electricity Commission) and Sir George Nelson (English Electric Co.)



Mr. F. B. Duncan (chairman, Radio Industry Council) and Mr. R. C. Norris

Sir William Beveridge, K.C.B., M.P., and Capt. J. M. Donaldson, M.C., M.I.E.E. had been elected vice-presidents.

Mr. E. E. HOADLEY proposed a vote of thanks to Lord Brabazon which was seconded by Capt. J. M. DONALDSON. After Lord Brabazon had responded, BRIG.-GEN. R. F. LEGGE proposed a vote of thanks to Mr. Parker and Mr. H. F. CARPENTER seconded. Mr. Parker in responding said that he was leaving two unsolved problems to his successor in



Messrs. A. H. Young (Edmundsons), C. Rodgers (B.E.M.A.) and A. F. Berry

the chair—the future make-up of the Council and the Association's future policy. Mr. C. D. TAITE voiced the Council's thanks to the officials of all E.D.A. Committees to the technical press to which he paid a special tribute.

Annual Report

Most of the subjects referred to in the report for the past year have already received attention in the *Electrical Review*. The accession of eight new members is recorded and reference is made to the national publicity campaign on "Electric Kitchens for Low Cost Post-War Homes" of which the electric kitchens at the London Building Centre were an important part. A good press was secured for these. There was a considerable volume of national press advertising and the special trade and professional announcements were revived in a

rural electrification, rural water supplies, standard service unit, domestic appliance testing, the equipment of training colleges, and A.T.S. vocational training.

Mention is made of the Joint E.D.A. Manufacturers' Committee which has been



Mr. and Mrs. H. Bentham and Mr. J. B. M. Gubbins

established and is meeting regularly to consider matters of mutual concern in which co-operation promises to defeat delay and misunderstanding, and promote more rapid development. On short-term problems good results have already followed joint action but the cumulative benefits to be obtained when co-operation is visualised as part of a long-term policy are, in the Council's opinion, incalculable.

A great deal of initiative has been displayed by the Area Committees each of which issues its own annual report. The Council mentions a number of activities of these Committees, among them being the arrange-



Mr. W. G. Turner (Southampton), Alderman A. Baynton (Canterbury) and Alderman J. R. Cairns and Mr. R. G. Widgery (Dover)

wide variety of journals. Local advertising was also stimulated.

The films "Too Easy" and "Cooking for the Million" were circulated but there was a delay in the production of the post-war housing film "Their Invisible Inheritance." A further series of films is being prepared which will have a more general public appeal.

Several paragraphs in the report show that the Association has tackled the post-war housing prospects in several directions. Other subjects referred to include

cooking, interchangeability of cooker parts, electric kettles and utensils (efforts to secure greater supplies), commercial cooking, school kitchens, industrial heating, public lighting,

ment of local exhibitions; demonstrations and training courses for women members of the Forces, Red Cross units, etc.; and co-operation with architects' and other associa-



Councillor J. E. Hughes, Alderman V. Burrows and Mr. P. Bregazzi (St. Helens) with Councillor McAuliffe and Mr. E. E. Jolly (Bethnal Green)

tions. Special reference is made to the South-East and East England (Greater London) Area report on the welding load.

An appendix gives an account of the past year's work of the Electrical Association for Women, particularly in the educational sphere, including the award of electrical housecraft certificates and demonstrators'



Messrs. A. E. Marson, Secretary, and C. J. Hornsby, Assistant Secretary, Electricity Commission

diplomas. The report shows the branches to be in active operation. The national campaigns—food and cookery, fuel economy and "Make Do and Mend" continue to receive support and ingenious methods have been adopted by branches to bring them before the public.

Area Luncheons

North-West England and North Wales

ON March 13th the North-West England and North Wales Area of E.D.A. held its annual luncheon at the Midland Hotel, Manchester. Mr. R. H. Harral (Blackburn) presided and the many guests included Mr. Tom Smith, Parliamentary Secretary to the Ministry of Fuel and Power and Mr. Clarence Parker, chairman of the E.D.A. Council.

MR. TOM SMITH said that the way the electricity supply industry had come through the "blitz" was not due to good luck; it was the result of hard work, forethought and wise planning. Referring to the production of electrical plant (he is chairman of the Heavy Electrical Plant Committee), Mr. Smith said that while the customer had some say in the matter of deliveries the Government wanted to see the work so spread over the country as to ensure the maximum employment for the greatest number of people.

MR. C. PARKER said that if developments were to be on the right lines there should be a partnership between the industry and the Ministry of Fuel and Power. There should be a national policy in regard to taking supplies to rural areas, Government help in standardisation of voltages, and planning to secure the most efficient usage of fuel resources. In whatever locations new industries were set up, adequate power should be available to them. So far as E.D.A. was concerned, Mr. Parker said that

its policy would need to be directed towards decentralisation so that a good deal of the work now done in London, would be undertaken in the areas.

MR. R. H. HARRAL and MR. H. N. GRUNDY, O.B.E., Regional Controller, Board of Trade, also spoke.

At the annual meeting of the Area Committee, which followed the luncheon, Mr. H. Metcalfe (Bacup) was elected chairman and Mr. G. A. Robertson (Preston) deputy chairman. The membership in the area remains at 76; approaches have been made to non-member undertakings to join.

For many months the North-West Area has co-operated with the Mid-East England Area in investigating a standard service unit. The essential features of a unit to meet the needs of consumers in small and medium sized houses have been agreed upon.

Mid-East England

Addressing members of the Mid-East England Area of the Association at the annual luncheon at Leeds last week Mr. Alfred C. Bossom said that he believed in the enterprise of the individual but if the industry did not provide cheap electricity in rural areas public opinion would force Parliament to take action. He said that electricity supplies were being provided in rural areas in Dumfriesshire without any charge for the initial work, and with a low, uniform rate for the service, and he did not see why this should not be done in the rest of the country. Mr. Bossom also urged the industry to standardise voltages, and not to wait until the Minister of Fuel and Power made an Order.

The Lord Mayor of Leeds (Alderman C. V. Walker), who gave members of the Association a civic welcome, spoke of the importance of leaving the housewife scope for individuality in her home. He also thought that every municipal house should have a fireplace where smokeless fuel could be burned.

Other speakers included Mr. Clarence Parker, chairman of the E.D.A. Council; Mr. A. G. Connell, chairman of the Area Committee, who presided; Mr. F. Newey, who succeeds Mr. Parker as chairman of the E.D.A. Council; and Councillor N. S. Barber, chairman of the Halifax Electricity Committee.

Carlisle Extension Payments

LAST week the Carlisle City Council reached a conclusion in the discussions which have been proceeding regarding extra payments to the borough electrical engineer (Mr. C. W. Salt who recently retired) and other officials in respect of the work in connection with the power station extensions. The total extra remuneration is £17,000 of which Mr. Salt receives £7,490. The point was raised whether these payments ranked for purposes of superannuation and the Council has been advised by counsel that they do. At last week's meeting Alderman J. R. Potts, chairman of the Electricity Committee, stated that the payments had been made for "a great job of work" and had the Central Electricity Board's approval. Councillor Potts concluded by saying that the payments and the additional pensions would not cost the ratepayers a farthing.

CORRESPONDENCE

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

Railway Electrification

REGARDING the suggestion made by Mr. E. R. Wilkinson, as reported in your issue of March 16th, that the Government should appoint a panel of experts to review the Weir Report on Railway Electrification, there are those who advocate postponement of electrification on the ground that there will be so much urgent work to be tackled immediately after the war and that steam services can be improved in the meantime. Any delay, however, would be a mistake. Money spent on improving steam haulage would not ultimately be recouped.

Apart from the generally recognised major sources of economy due to electrification, very large savings in the aggregate would come from incidental items. Thus there would be only a small fraction of the present expenditure by the railway companies on painting and cleaning rolling stock, stations, signal cabins and all gear close to the line, while the saving to the public both as travellers and as owners or occupiers of property near the permanent way would be no less great, to say nothing of the effect on health. The mingled effects of steam, acid fumes and cylinder oil are accepted to-day almost without a murmur, because they are mistakenly regarded as inevitable.

Another incidental but heavy loss in the year's total (say, twice a day per freight locomotive) arises from the frequent necessity for backing heavy goods trains on to a lay by to allow passenger traffic to pass. Draught ceases, the fire is checked and the fire tubes are coated with non-conducting filth, which lowers boiler efficiency for the rest of the trip. The safety valve will lift a few times and, on restarting, cylinders must be blown through and heavy condensation endured for a mile or more with an acceleration period of possibly four miles, considerably increasing the journey time. For one hundred trains per annum held up for ten minutes twice a day, the idle capital would be not less than £600,000. If only half this amount were saved it would pay 3 per cent. on £1 million. Electric haulage would allow heavy goods trains to attain full speed within a few moments of starting, keep well in front of all but fast non-stop passenger traffic and earn interest on the capital involved at twice the rate of steam haulage.

A further example of the kind of incidental advantage of railway electrification that is apt to be overlooked is provided by the reduction in maintenance of tunnel ventilators

situated on hill tops as well as of the tunnels themselves in foul atmospheres. Such advantages are not always fully recognised but they are very real and have very considerable monetary value.

Sheffield.

W. T. WARDALE.

Meter Readers' Status

THE question of the status of the meter reader, recently commented on in your columns, naturally brings into sharper focus the rest of the meter department and its personnel.

Whilst, no doubt, a case could be made out for the meter reader, as your correspondent so ably attempted, what about the status of the meter room from which, apparently, the meter readers are to get their recruits? This is the back-room of the whole of the electricity department and like other famous back-room boys, its personnel is far from the glare of publicity, with the resultant consequences of inadequate status, salaries, etc.

In spite of the general lifting of the standard of the work, necessary to operate the 1936 Meters Act, the operating staffs have not benefited to the slightest degree. In fact those working on the N.J.I.C. schedule, behind which the majority of companies and corporations apparently prefer to hide, are 5s. per week worse off than their counterparts on the installation side. Being numerically few, as all specialists are, their numbers are not sufficient to cause the trade union leaders any qualms and thus they are left to meditate and wonder at their misfortune.

Perhaps, as your correspondent desires, the best way out of the dilemma will be to apply for a meter reader's job and leave the back-room for the glare of publicity with its resultant financial rewards.

ONE OF THE FEW.

YOUR correspondent A. E. Izant supports the suggestion that the meter reader is the link between consumer and supply authority. It is common practice for both electricity and gas supply authorities to issue printed instructions on meter cards and other documents asking consumers to report any irregularities and, further, a good many undertakings furnish meter readers with special forms on which to make written reports to be attended to by the appropriate department.

The reason why meter readers are the lowest paid, is simply that it is technically the lowest job in the industry; to-day meter

reading is being efficiently done by women all over the country. It would be interesting to know if your correspondent can tell us what proportion of meter readers possess just one of the qualifications he mentions, viz., the ability to answer any technical question

concerning the supply and installation that the consumer may put to him.

No, meter readers are paid according to the qualifications necessary for the duty performed, which is simply to read meters.

Hastings.

F. H. BUTLER.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT Derby last week a presentation was made to Mr. James F. Driver to commemorate his twenty-five years' service as honorary secretary of the East Midlands Sub-Centre of the I.E.E. The presentation, made by the chairman, Mr. A. Brookes, took the form of a refrigerator from the members and an album of portraits of the past chairmen from the past chairmen. Mr. Driver was chairman of the Sub-Centre for 1928-29.

Mr. G. E. Moore, A.M.I.E.E., superintendent of the test and meter department of the Sunderland Corporation electricity undertaking, is this year's president of the Electrical Power Engineers' Association. Mr. Moore, who is also vice-chairman of the National Joint Board of Employers and Members of Staff (Electricity Supply Industry), has been an extensive contributor to the technical Press. It is interesting to recall that his first article—written in 1919 while he was still in the Army—was contributed to the *Electrical Review*, the subject being "Electricity and Kinematography." In 1931 he read an I.E.E. paper (with Mr. E. Fawssett) on "Maintenance of Large-capacity AC Meters" and last November he submitted to the Measurements Section a paper on "Plan-



Mr. G. E. Moore

ning the Future Electricity Meter," which he repeated last January before the Scottish Centre in Edinburgh.

Before going to Sunderland in 1930 Mr. Moore had held appointments with the Cambridge and Paul Instrument Co. (test room, Muswell Hill works) and from 1921 to 1930 with the Newcastle-on-Tyne and associated companies (now the North-Eastern Electric Supply Co.) with whom he held the post of assistant engineer in the testing department under Mr. E. Fawssett. During the last war he served in the A.S.C. as an electrician, abroad in the R.W.F. and later in the R.E. under Capt. (now Sir Lawrence) Bragg.

Mr. N. Hunter, who has just been appointed general manager and engineer of the Stockton-on-Tees Corporation Electricity Department, is a full member of the Institution of Electrical Engineers, not an associate member as stated in our issue of March 9th.

Representing the International Brotherhood of Electrical Workers Mrs. J. O'C. Parker recently toured Scottish shipyard and in-

dustrial plants with a delegation of American women trade unionists. A return visit to America of trade unionists has been arranged and Mrs. Jean Brodie is to represent the E.T.U.

Mr. A. G. Guthrie and Mr. R. P. Willcox have been appointed directors of J. & E. Hall, Ltd.

Mr. M. Burningham has been appointed chairman and managing director of Keith Blackman, Ltd., to succeed Mr. George Keith who died recently. Mr. A. L. Ayton becomes secretary.

Mr. T. W. Dann, A.M.I.E.E., chief engineering assistant to the Poplar Borough Council Electricity Department, who as announced in our last issue has been appointed as deputy borough electrical engineer at Tunbridge Wells, was educated at the Liverpool Collegiate School and Liverpool University where he obtained the B.Eng. (Honours) and M.Eng. degrees. He was granted the David Rew Scholarship for post-graduate research under Prof. E. W. Marchant.

Between 1919 and 1925 he served with Campbell & Isherwood, Bootle; Cammell Laird & Co., Ltd., Birkenhead; the White Star Alkali Co., Ltd., Bootle; and the English Electric Co., Ltd., Preston. Then, after acting as chief assistant to the head of the switchgear development department of the General Electric Co., Ltd., at Witton for four years, he became personal technical assistant to the managing director and engineer of the Northampton Electric Light & Power Co., Ltd. He has been chief engineering assistant at Poplar since 1941.

Mr. H. C. H. Armstead, B.Sc. Hons. (London), has recently relinquished his appointment as Mint Master and Superintendent of Stamps to the Government of Hyderabad, Deccan, and has assumed the post of chief electrical engineer to the Government, in charge of city and district electrification and of telephones.

Mr. Armstead, who was born in London in 1903, received his education and training at the Royal Naval Colleges at Osborne and Dartmouth, the City and Guilds Engineering College, South Kensington, and with Leyland Motors, Ltd. In 1925 he was appointed assistant engineer with the Bombay Electric Supply & Tramways Co., Ltd., and from 1929 to 1931 he served with Highfield and Roger Smith, consulting engineers, in a similar capacity. He



Mr. T. W. Dann

was then for two years on the technical staff of the Central Electricity Board (Central England District) before taking up the position in 1933, of Deputy Director of H.E.H. The Nizam's Electricity Department, Hyderabad, and of Mint Workshops. Since 1935 he has been Director of the Department and of Mint Workshops, also holding the appointments of Mint Master and Superintendent of Stamps to the Government. Mr. Armstead is a member of the Institution of Electrical and Mechanical Engineers, and associate member of the Institution of Civil Engineers.

Mr. C. A. Cameron Brown, who has been with the Electrical Research Association for the past seven years and before that was at the Institute of Agricultural Engineering, Oxford, has joined Edmundsons Electricity Corporation, Ltd. Mr. Cameron Brown will superintend the Corporation's rural development scheme, which is estimated to cost £15 million in the first five post-war years, and his services will be at the disposal of all the associated companies which are individually responsible for development in their own areas.

Mr. A. J. Staines who has served for the past eighteen years with the Metropolitan-Vickers Electrical Co., Ltd., is taking up an executive position with Newey & Eyre, Ltd., electrical wholesalers and general engineering suppliers, Birmingham. He joined Metrovick Supplies, Ltd., in Charing Cross Road, in May, 1927, in the Export Department, and after moving to Bush House for a short period was transferred to Birmingham as an outside representative in 1932.

Obituary

Mr. P. W. Paget, the last survivor of the group of wireless pioneers—Marconi, Kemp and Paget—who heard the first transatlantic wireless signal in December, 1901, has died at his home in Essex. Mr. Paget, who was seventy-two, joined the Marconi Company in 1898, a year after its incorporation, and went with Marconi and Mr. G. S. Kemp to Newfoundland in December, 1901, to establish the receiving station for the experiments which were to prove the possibility of transatlantic wireless communication. Mr. Paget retired in July, 1938.

Mr. G. V. Boys.—We regret to report the death, on March 15th, of Mr. Geoffrey Vernon Boys at the age of fifty-one. Mr. Boys, who had been secretary of the Institution of Naval Architects for about ten years was educated at Marlborough and Trinity College, Cambridge, taking honours in mathematics and physical science. He served with the Royal Engineers during the last war and later was demonstrator in mathematics and mechanics at the Imperial College of Science and Technology. Subsequently he joined Kennedy and Donkin as a senior assistant. For some time during the present war he acted as personal assistant to the Director of Naval Construction but had to relinquish this appointment through illness. Mr. Boys was a member of the Institutions of Electrical and Mechanical Engineers.

Mr. G. A. Harries.—We learn with regret that Mr. Gwynne C. Harries, works manager and mechanical engineer to Santon, Ltd., collapsed and died on March 14th after taking part in a football match. He was forty years of age.

New Books

Radio Technique. By A. G. Mills. Pp. 170; figs. 301. Chapman & Hall, Ltd., 37-39, Essex Street, W.C.2. Price 12s. 6d.

Being a teacher of radio engineering, and intending the book for students, the author states that he has endeavoured to present a concise collection of material not previously gathered together in one volume, and this is indeed the impression one gets on examining the book. In 170 pages one could not hope to present anything but a rather scrappy collection of information on the wide subject of radio technique, particularly as about 50 pages are devoted to fundamental magnetism and electricity. As a result, a "chapter" on thermionic emission occupies under two pages. Another chapter, on the valve as a maintainer of oscillations, devotes 2½ pages to this subject, then changes its mind and deals with the propagation of wireless waves in the remaining two pages. It would be easy to quote other examples, such as the fact that frequency modulation is dismissed in about half a dozen words as it is "little used in this country." The author has endeavoured to get too much into too small a compass.—W.E.M.

Radio Receivers and Transmitters. By S. W. Amos, B.Sc., A.M.Brit.I.R.E., and F. W. Kellaway, B.Sc. Pp. 281; figs. 150 and 8 plates. Chapman & Hall. Price 21s.

The authors state that the book is intended to bridge the gap between pure science and applied radio, which, they claim, has not previously been attempted. Some elementary knowledge of electricity, radio and mathematics on the part of the reader is assumed. As might be expected, the emphasis in the book is on the receiving side, transmitters being covered in a final chapter of 28 pages. Although amplitude-modulated systems naturally occupy the bulk of the volume, frequency-modulation is briefly treated, as is also television.

Following an introductory chapter, there are chapters on inductance, capacitance and resonant circuits, and in these the authors' intention of welding theory and practice together is clearly shown. The mathematics is adequate for the student, without being so advanced as to bewilder the average reader. Successive sections deal with propagation and aerials, valves, AF amplification, detection, output stages, loudspeakers, negative feedback, RF and IF amplification, oscillators and superheterodyne receivers for amplitude and frequency modulation and television. The last chapter, as mentioned earlier, deals with transmitters. There are eight short appendices, mainly concerned with the solution of typical differential equations.

It is stated that S. W. Amos was responsible for the engineering, while F. W. Kellaway supplied the mathematical knowledge. The blending of the two has been very smooth and successful, and the result does largely achieve what the authors set out to do.—W.E.M.

Books Received

Factory Organisation and Management. By N. F. T. Saunders, B.Sc., M.I.E.E. Pp. 163. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, London, W.C.2. Price 10s. 6d.

Instrument Errors

Effects of Temperature Changes

A PAPER which MR. G. F. TAGG (English Electric Co., Ltd.) submitted to the Measurements Section of the Institution of Electrical Engineers last Friday reviews instrument errors caused by normal changes of temperature and outlines the more common methods of compensating for them.

The paper first describes briefly the five main sources of error due to changes in resistance, flux in permanent magnets, magnetic properties of iron and steel, elasticity of springs and other means of suspension necessary for torque control; physical expansion and contraction are not considered, being usually small. An account then follows of the best means of compensation in each case respectively for ammeters, voltmeters, millivoltmeters, wattmeters and instruments operated by rectifiers and thermocouples.

Most indicating and recording instruments are subject to some of the five main errors and some to all of them. In some cases an error due to one cause may tend to cancel out another from a different source, but such compensation is very seldom complete, so there is generally a residual temperature effect that needs additional correction.

A large part of the paper is concerned with the last-mentioned aspect of the subject, it being pointed out that moving-coil instruments operating in conjunction with copper-oxide rectifiers, generally of the bridge type, for measuring AC quantities are subject to errors which are additional to the usual ones, so making it difficult to compensate completely. In general a satisfactory voltmeter of this kind cannot be made with a bridge rectifier for a range of less than 0 to 10 V, or by using a circuit that reduces the number of rectifier arms in series from two to one for a 0 to 5 V range.

Discussion

In opening the discussion MR. W. PHILLIPS (Elliott Bros., London, Ltd.) said that while changes due to physical expansion and contraction might be so small as to be generally negligible, that was not necessarily true for dynamometer instruments. Thermal lag was important when a compensating device was used. The Campbell compensator was mounted between the limbs of the magnet so that it was enveloped by a thermal screen and worked under the same conditions as the moving coil. The results obtained by the formulæ in the paper should be regarded only as a guide, since they took no account of the resistance of the connecting leads or of the change in the elasticity of the control springs. In precision wattmeters, the most

troublesome sources of error were self-heating and variation of the elasticity of the spring. Errors of $\frac{1}{2}$ per cent. were often met with due principally to the self-heating effect. The temperature coefficient of the low-range voltmeter could be improved by selecting a rectifier in which the leakage current was higher than usual. Apart from shunting a proportion of the flux, another method of using temperature-affected magnetic alloys was in the core of a choke coil.

MR. F. R. AXWORTHY (Everett, Edgcombe & Co.) expressed surprise that the author made no reference to induction instruments. Several interesting movements had been devised to improve their performance; examples were the MacCahan instruments in the United States and the Ockenden and Lipman movements in this country. He did not think that Swinburne's method of compensating millivoltmeters had much to recommend it and he did not agree with the author that 10 V was the lowest satisfactory range for a rectifier voltmeter. It depended of course, on the volt drop used. A satisfactory 5 V instrument could be achieved quite easily and one-volt or less by incorporating a transformer.

MR. D. C. GALL (H. Tinsley & Co.) said that the chief difficulty was to arrange compensation so that it was true during changing temperatures as well as at fixed temperatures. All the author's formulæ applied to conditions of equilibrium, which were seldom reached, particularly in instruments on aircraft or under industrial conditions. Tellurium alloys were supposed to have a very high negative temperature coefficient and might be useful.

MR. D. CONNELLY (Sangamo-Weston) asked whether the shape and size of the magnet and the springs affected the temperature coefficient. He also sought information about new alloys of the cadmium and beryllium-copper types for springs.

MR. C. L. LIPMAN (Nalder Bros. & Thompson) said that the advent in recent years of the group of nickel-aluminium-cobalt-steel permanent magnets had so improved the performance of the moving coil instrument that the designer need no longer worry about temperature errors. The position with regard to induction type instruments was not so favourable, but nevertheless, their temperature errors had been reduced to amounts which were consistent with good engineering practice. To achieve this, methods of compensation somewhat different from those described were employed. In induction instruments, the torque was proportional not only to the product of two currents, but also

to the sine of the phase-angle between their respective fluxes. One construction of induction ammeter was arranged to be electrically equivalent to a current transformer. The temperature coefficient of such an ammeter, commercially produced, was less than 0.02 per cent. of 1 deg. C.

MR. H. EASTON (Ferranti, Ltd.) thought that the most important point in the case of modern moving coil instruments, the temperature coefficient of the springs, had not received adequate attention. MR. L. B. S. GOLDS (Edmundsons Electricity Corporation) said he was sorry that self-heating errors had not been dealt with. Actual instruments very often did not work out as the author had described. MR. A. B. TOWNLEY asked if the author could give any information about the comparative performances of vacuum thermo-

couples with which it was impossible to make any temperature compensation externally.

MR. P. J. HIGGS (N.P.L.) remarked that stability of materials had not been touched upon. There was a tendency for small changes in metals to go on for months and even years. A spring material depended for its properties on being in an over-worked or drawn condition and the effect of temperature and time was of great importance when an instrument was overloaded for a time or when it was used in tropical countries.

THE AUTHOR, replying to the discussion said that errors due to the control springs were more serious in high precision instruments; they were not at all troublesome in the ordinary range of commercial switchboard instruments. There was not much information about errors due to the magnet.

Installation Contracts

Importance of Accurate Estimating

THE relationship of estimating to the economics of electrical contracting is the subject of a paper submitted by MR. W. H. BROOKS for discussion before the Association of Supervising Electrical Engineers this week. It was based on a previous contribution made at an informal meeting just before the war.

He commenced with the observation that the subject seemed never to have been fully explored, or really understood, and proceeded to remark upon tendering on insufficient information about, or knowledge of, the work to be done. He referred to bad estimating by unqualified people, as well as price cutting and the effects of excessive establishment charges.

It was said that too little time was often allowed to contractors for preparing their tenders, some architects seeming to have little real conception of the amount of work involved in pricing accurately. An explanation of how successful estimating depended upon adequate costing carried the warning that perfect cohesion must be maintained between the two departments without, as was so often wrongly assumed, collusion.

In the author's opinion tendering for wiring installation work submitted at so much per point was one of the most unsatisfactory methods of quoting and was neither fair to the client nor to the contractor himself. For any job requiring an electrical installation a definite plan showing actual positions, permissible conduit runs and ample sized mains and service arrangements should be submitted for contractors' tender; but on completion of each installation a complete record drawing should be supplied by the

contractor, which should show, in conduit foot runs, cable sizes of sub-mains; main, sub-main and fuseboard locations, and circuit arrangements as installed.

It had been the practice in recent years for tenders to take the form of "priced bills of quantities," or "scheduled prices." While the itemised quantities often gave much trouble to the estimator, the system provided the very information required for schedule pricing, in lineal foot run costs, itemised fixings, etc., and it remained only for the relative oncost and administrative costs to be proportioned to the appropriate items.

In a tabulated comparison of labour costs for different systems installed on the surface, due account is taken of the fixing in each case, demonstrating that close jointed conduit labour costs were proportionately high considering the lightness of the system, whereas copper conduit system with sweated connections was on a par with screwed welded conduit.

In conclusion the author appealed for more detail to be provided with the specifications with reference to particular features of the buildings concerned, for instance, as to the floor construction, type of ceiling where fixings are required; pre-routing for cables and conduit services, with particular attention to adequate space being provided for the main services, and a fair margin to allow for future extensions. Where reinforced concrete structures were contemplated a beam plan should be submitted to enable the conduit routes to be shown and provision made through beams and columns to avoid, as far as possible, cutting away and making good afterwards and unnecessary and detrimental bends in the conduit or other system.

Core-Balance Protection

Applications to Industrial Premises

A LARGE proportion of breakdowns of electrical apparatus is due to failure of insulation caused by current leaking through the insulation to earthed parts, such as frames of switchgear and iron cores of motors. The best form of automatic protection is one which ensures that the faulty piece of apparatus is disconnected from the circuit before severe burning occurs. In collieries, where the explosion risk is generally present, as well as in power stations and on factory main distribution switchboards, the core-balance earth-leakage relay protective system has proved effective for this purpose.

therefore at any instant is zero, which proves that when there is no fault on the lines the fluxes cancel out and no electromotive force is induced in the core-balance transformer secondary.

Any lack of balance in the loading of

The principle as

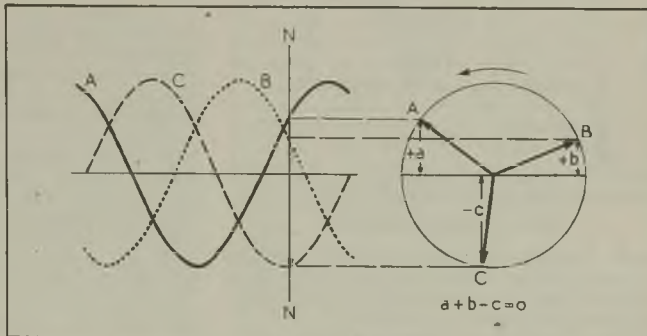


Fig. 2.—C.B.L. transformer principle

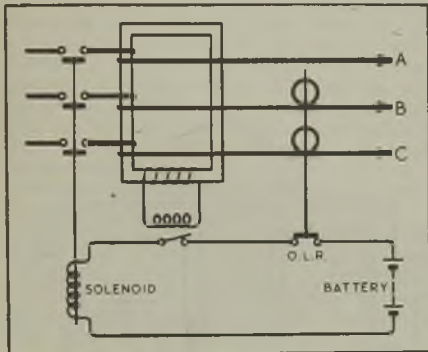


Fig. 1.—C.B.L. protection on feeder switch

applied to three-phase feeder switches is illustrated diagrammatically in Fig. 1. As each of the three lines, A, B and C, embraces a common laminated iron core, magnetic fluxes should be set up in the core by the currents. The three currents with their fluxes are displaced in time or phase as represented in Fig. 2, where the time displacement is shown to be one third of a period, or 120 electrical degrees, thus conforming to standard three-phase practice.

If we take any instant on the flux-time graphs, say NN, and project the values along to the vector diagram on the right, we find that the instantaneous value of the fluxes due to phases A B and C are + a, + b and - c. The algebraic sum of the three fluxes

separate phases will not affect the principle, because extra current delivered by one phase must return via the other two phases. As all three phases embrace the core, the balance is maintained and there is zero flux.

In Fig. 3, an earth fault is shown on phase C. The fault current returns to the star point of the supply transformer or alternator through the earth. The balance of the fluxes in the iron core of the core-balance transformer is upset, because the fault current does not return via phases A and B. A resultant flux therefore circulates in the core. This flux cuts the secondary windings, inducing an electromotive force followed by current in

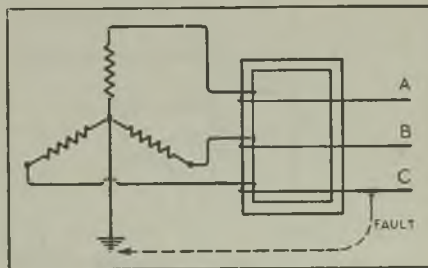


Fig. 3.—Earth fault on phase C

the secondary relay circuit. The relay coil attracts a moving armature, thus breaking the DC circuit to the main solenoid and the

circuit-breaker trips, thereby isolating the defective feeder.

Overload trip gear is incorporated in the

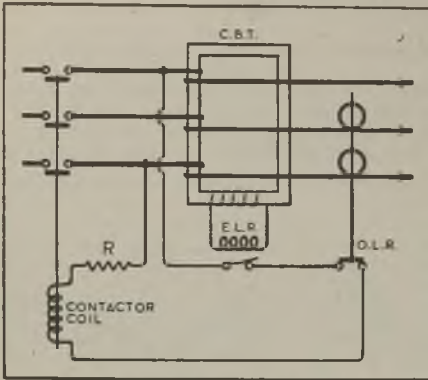


Fig. 4.—Medium switch panel

panel, the relay also being in the DC solenoid circuit. With earthed neutral supply, three overload coils are necessary, or two if earth-leakage protection is provided.

The method is applicable to smaller three-phase switch panels in which case a source of DC is unnecessary, as in Fig. 4, where R is a current-limiting resistance, E.L.R. the earth leakage relay, C.B.T. the core-balance-transformer and O.L.R. is the overload relay.

The writer recommends the fitting of core-balance leakage protection to the main switch on distribution switchboards in the various departments of a factory to protect each section against earth faults. The

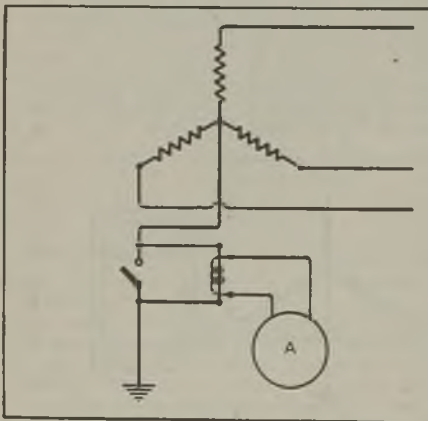


Fig. 5.—Indicator switched-in

objection that a minor fault may close down the entire department is not important, because the faulty circuit can be found immediately by first opening all the switches

on the board, closing the main switch, then closing the circuit switches one at a time. Immediately the faulty-circuit switch is closed, the main switch will trip out.

It is not always advisable to have an earth-leakage trip in the main circuit-breaker controlling the power to the works, because if it trips out, the entire factory is stopped. In many cases, it will be better to have an earth leakage indicator, and leave the leakage trips to the incoming switches on the departmental distribution switchboards.

To comply with the Regulations, leakage indication is necessary at collieries and a continuously recording instrument is desirable. A continuous record enables the engineer in charge to nip in the bud a fault before it reaches the danger point.

For small and medium sized works, the simple arrangement shown in Fig. 5 is recommended. Normally the earthing switch is closed and the instrument is inoperative. The instrument is a low-reading ammeter and may burn out if left in circuit without attendance and a heavy earth-fault current flows through the neutral-earth connection to the star-point of the transformer secondary windings. A routine can be established

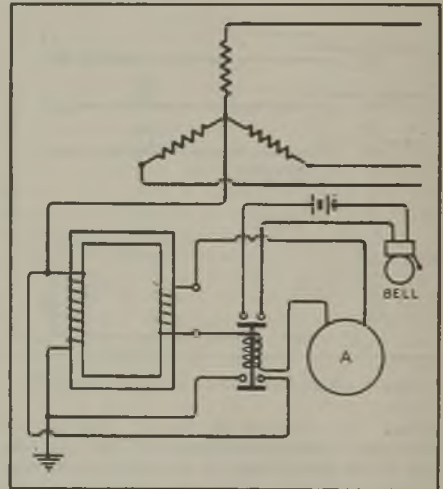


Fig. 6.—Indicator with protective relay and alarm bell

whereby the electrician opens the earthing switch at a certain time daily, preferably when most of the works circuits are loaded.

For larger installations the equipment shown diagrammatically in Fig. 6 is suitable for permanent connection in circuit on the main switchboard. The low-reading ammeter is safeguarded by the relay, which is set to operate when the fault current exceeds a certain value, at the same time giving audible warning.

Control of Supply Systems

Application of Telephone Technique

IN opening the discussion on the operational control of supply networks at the Transmission Section of the Institution of Electrical Engineers (Messrs. Kidd and McWhirter's paper on the subject was referred to last week) Mr. E. B. S. POWELL (London Power Co.) congratulated the authors on having the courage to break away from normal supervisory methods for reducing the amount of equipment necessary and, incidentally, the cost and maintenance. There was an instance of co-operation between the telephone engineer and the power engineer, which was of great assistance. The Manchester system provided the greater part of the needs of the control engineer and avoided the changing of a large number of lights all over the diagram, but it fell short with regard to one minor detail in that the control engineer had to study four or five different diagrams at the same time. Obviously the authors had not found that a disadvantage, but the system of control would be strengthened if the wall diagram could be arranged to give facilities for quick reference. He did not agree that it was necessary for the control engineers to study the geographical positions of sub-stations.

In the Manchester system a light indicated that something had taken place and where the fault was. On the London Power Co.'s system, it was all done by telephone, but it did not introduce a great deal of delay. It had, indeed, been found quite satisfactory; at the same time, he felt that a common diagram might serve a useful purpose, even in a manually operated substation, in giving correct information, which was one of the most difficult things to find out.

Question of Annual Costs

MR. D. P. SAYERS (Birmingham Electricity Department) said his principal criticism was the absence of any figures of cost. Distribution costs at Manchester were extremely high, being about double those at Birmingham. Would the supervisory system increase or reduce the present operating costs? Assuming that the installation of supervisory equipment would eliminate the necessity for manual attendance at a number of substations, then the wages of the attendants at a fully attended substation with a four-shift cycle would be about £1,000 per annum, so if the wages could be dispensed with by the installation of other equipment, it might be true to say that up to £10,000 of capital expenditure could be incurred without increasing the total annual cost of operation. But some local staff would be required for

cleaning and general maintenance of a very high order would be absolutely essential. Experience in Birmingham was that supervisory remote control based on selector relays and coded impulse signals operated fairly reliably but after a few years, in spite of careful maintenance, the gear became so unreliable that shift attendants had to be reinstated at some substations. The trouble was mainly due to sticking relays and in the authors' system there were several relays in series for every particular operation. Nothing short of 100 per cent. reliability could be tolerated. Therefore, it was very necessary that the development of this kind of equipment should not proceed too fast.

MR. C. G. CARROTHERS (Kennedy & Donkin) said that control engineers would surely appreciate a room with windows in it. He showed a sketch plan of a control room he had designed which, he said, while having some features in common with that in the paper, had a window which gave a very fine view of the system of incoming lines and the surrounding countryside.

Faith in Telephone-type Gear

MR. N. C. SMART (G.E.C., Coventry), speaking as a telecommunications engineer, expressed his satisfaction that a progressive undertaking like that at Manchester had so much faith in the operation of telephone type gear that it was prepared to use such a comparatively complex system. No doubt need be entertained as to the technical operation of the system and he asserted that its reliability had been proved during the past 10 or 15 years. It seemed a great pity to him that there was not, in this type of system, a diagram always in front of the control engineer showing the circuit breakers that were closed and those that were open, which seemed to him necessary for the satisfactory, rapid and reliable operation of the system. Such a diagram would be big, but it would do a big job and space should be made available for it. For traction systems any change in a substation with 20 circuit breakers should be indicated within 10 seconds. With four or five substations the indications should be complete within one minute, but it did not seem that the authors' system would be capable of doing that.

MR. R. FARRALL (London Transport) said that yearly cost was the only yardstick and it was necessary to consider at what sacrifice of the normal requirements of a good control scheme the saving had been made. As for reliability, he maintained that supervisory gear was not infallible. Perhaps the designers

had anticipated certain possibilities in their 10 minute storage of the signalling, but he seriously doubted whether 10 minutes would be adequate. Indeed, he indicated conditions in which it might take two hours to find out what had happened and went on to say that if it were possible for all 288 substations to shut down simultaneously the time required would be some 25 hours! If the authors were putting the scheme forward on the assumption that the great majority of the switches, once closed, would never re-open, by the nature of the system, that should have been made clear and the claims for the system reduced accordingly.

Limit of Operators' Capability

Some years' experience with this type of gear had firmly convinced him that the limit to the number of substations that could be placed under the control of one operator was the number that could be brought within range of his easy vision. When that number was exceeded, more operators must be employed. After suggesting the use of four-wire control in preference to two-wire, with the provision that either two wires could be used in an emergency for reversion to two-wire control (the additional cost on a new job being negligible), Mr. Farrall said his experience had been that the pre-selection which had been introduced by the authors was a waste of time and unnecessary. In the present stage of development, no single operation should take more than three seconds. Power engineers should make it clear to telephone engineers, who did not always appreciate the power engineer's problems, that the requirements he had indicated must be met, otherwise he feared that supervisory control would be discredited, which would be a pity because he believed it had a great future.

Ensuring Satisfactory Loading

MR. D. E. BIRD (Edmundsons) said that one of the important features was the control of the system under normal conditions, which meant satisfactory loading of the various feeders. That was not possible without supervisory indications, but he did not see provision for it in the authors' system. While he would not worry about the reliability of telephone apparatus, he would worry about the reliability of the pilots, especially if they were on overhead lines. He had been responsible for the design of a control room similar in dimensions and colour scheme to that mentioned in the paper, which the control engineers hated; they left the doors open so that they could see outside. They had a feeling of claustrophobia. What was the authors' experience at Manchester in this respect?

MR. T. R. RAYNER (Automatic Telephone & Electric Co.) expressed the view that the

last thing wanted was a common diagram system. The control engineer must be given all the information he required to enable him to decide what to do, but it would be useless to tell him that a breaker had opened in one of three substations if the latter happened to be situated on a common line.

MR. J. A. BROUGHALL (L.M.S.) said he could re-assure power engineers about the reliability of Post Office type equipment and promised to send in details of actual performance of one or two systems of which his company had 8 or 10 years' experience. The paper would be still more useful if it contained a classification of equipment defects. Perhaps a compromise between the old system and the authors' would be most likely to give the best results; it was no use obtaining information at a quicker speed than that at which the operator could assimilate it, and the common diagram had a great deal in its favour from that particular point of view.

Duplication of Transmission System

MR. B. WEBB-WARE (C.E.B.) asked if the authors, in preparing their curve which indicated that a minimum of 10 substations justified economically a common diagram, had allowed for any duplication of the transmission system in the control centre, because he had had experience of difficulty due to lack of that. His experience of telephone type apparatus for supervisory control had been highly successful, over a period of some ten years.

MR. G. A. BURNS (Automatic Telephone & Electric Co.) thought the authors had been ungenerous to supervisory control. The authors' system did not appear to make maintenance simpler. One important point that had come out in the discussion was the general acceptance of the reliability of telephone type apparatus, which was very different from the attitude taken at a previous meeting on this subject in 1935.

MR. McWHIRTER, replying to some of the points mentioned in the discussion, said it was not easy to give figures of cost for systems of this type. They varied considerably and a great deal depended on the particular conditions. The provision of a control room with windows was quite a debatable point. The authors felt there were great disadvantages in having a complete detailed diagram of the whole site network. They favoured a reduction of the amount of detail shown on the common diagram, at the same time giving the control engineer facilities for seeing the detail as and when he wanted to look at each part of the network. The pilots in Manchester were all underground and it was recognised that overhead pilots were not so reliable, but that was not a matter to be afraid of if the problem were attacked in a normal commonsense manner.

COMMERCE and INDUSTRY

Equipment for Buildings. Fuel Position in Scotland.

Goods for Building Contracts

THE Board of Trade has issued a general licence (S.R. & O. 1945 No. 245, Stationery Office, price 1d.) dated March 9th, under the Location of Retail Businesses Order.

This permits building undertakings and civil engineering undertakings, as defined in Regulation 56AB of the Defence (General) Regulations, to supply at any premises such articles of ironmongery and electrical goods (other than radio goods, electric torches and torch batteries) as are used in the course of building and civil engineering contracts, without the necessity of obtaining individual licences under the Order.

The licence is intended to avoid overlapping controls. It does not, however, absolve contractors from compliance with the provisions of Regulation 56AB; neither does it authorise the supply of any goods except those falling within the categories specified, nor the supply by sale (as distinct from supply pursuant to contracts of work, labour and materials) of any goods whatsoever.

New Vactric Factory

By arrangement with the Ministry of Aircraft Production and the Board of Trade fully equipped works of approximately 100,000 sq. ft. at Chapelhall, near Airdrie, Scotland, are being taken over by Vactric, Ltd. Arrangements have also been completed by the company for the erection within twelve months of another factory of 200,000 sq. ft. with the provision of additional area up to 600,000 sq. ft. The works will be equipped with the most modern plant for the production of Vactric vacuum cleaners, refrigerators, washing machines and kitchen units, but manufacture will also be continued at the present Elstree factory, the location in Scotland having been selected with particular regard to a large volume of export trade.

Allocation of Government Factories

It was announced by the President of the Board of Trade on Monday that nineteen Government factories had been allocated to peacetime production and would be handed over in due course. Among these factories are one at Chester to be acquired by Brookhirst Switchgear, Ltd., and one at Peterborough, in which the British Thomson-Houston Co., Ltd., will produce refrigerators.

Scottish Economy Direction

The Electricity Commissioners have informed Scottish electricity undertakings that the Regional Controller of the Ministry of Production for Scotland, under authority delegated to him by the Minister of Fuel and Power, has issued a Direction under Article 1 of the Control of Fuel (No. 3) Order, 1942, to all factories in Scotland requiring a reduction of 25 per cent. in their gas and electricity consumption. The Direction, in so far as electricity is concerned, requires that until further notice the weekly consumption of electricity shall be reduced to a

level which does not exceed an amount equal to 75 per cent. of the average weekly consumption based upon the last meter reading.

Factories have been informed that a variation of the Direction may be granted in exceptional circumstances to safeguard the most urgent categories of production and certain continuing processes, but the Direction remains operative in relation to such factories unless and until they have received a notification from the Regional Controller of the Ministry of Production or the Regional Controller of the Government Department with which they deal, that a variation or cancellation of the Direction has been allowed.

The Ministry of Fuel and Power, with the concurrence of the Board of Trade, has also made an Order directing that a 25 per cent. cut in electricity consumption should be carried out by businesses engaged in the wholesale and retail distribution of goods employing ten or more insured workers.

The necessity for this action arises from the serious situation in relation to coal production in Scotland as a result of the strike of colliery deputies, following so soon after the losses due to the recent period of exceptional weather. In consequence, coal stocks at gas works and power stations in Scotland are now so low that the Government has decided that compulsory measures for an immediate and extensive economy in the consumption of gas and electricity must be introduced.

Press and broadcast appeals are also being made urging everybody else to co-operate by voluntary savings, and special approaches are being made to cinemas by the Regional Controller in Scotland to effect economies in the consumption of electricity.

Information for Contractors

The National Federated Electrical Association has issued a further series of amending slips (H to O) for insertion in the War Emergency Supplement to the "Electrical Contractors' Year Book" and the booklet "Industrial Agreements and National Working Rules."

Referring to the Government's recent statement on holidays in 1945, the Director and Secretary of the Association (Mr. L. C. Penwill) advises his members regarding the rates to be paid for work on public holidays. He also stresses the continued necessity for the "staggering" of annual holidays and says that the Government hopes that industry will again co-operate with the Regional Boards of the Ministry of Production in securing the maximum practical degree of spread-over of holidays both within establishments and between firm and firm and district and district.

American Commercial Conditions

The Department of Overseas Trade is publishing a series of twenty-six booklets describing commercial conditions in various countries. The first, dealing with the United States, contains a brief introductory chapter reviewing the principal industrial and financial move-

ments in the period between the two wars, particularly during 1929-39 and covering labour conditions. Next the pre-war foreign trade of the United States is touched upon and it is noted—the only electrical reference—that imports from the United Kingdom of electrical machinery and apparatus were \$303,900 in 1937, \$403,400 in 1938 and \$188,900 in 1939. The next chapter relates to wartime changes in industry and agriculture and then the U.S.A. is considered as a post-war market for United Kingdom goods. It deals with representation in America and recommends the setting-up of sales organisations rather than the employment of agents. The booklet concludes by stating:—"The U.S.A. offers a rich, but not an easy, market: competition, for the consumer's dollar is intensive. 'Made in Britain' is a useful starting point in favour of the sale of United Kingdom goods but increased volume can be attained only by a combination of this initial advantage with what is most modern and effective in sales technique."

"Magicoal" Fires for Export

Two new 2-kW "Magicoal" fires intended especially for export are designed so that they can be dismantled for packing and assembled in ten minutes with unskilled labour on arrival at their destination. By this means it is possible to get six times as many fires into a



This "Magicoal" fire, when dismantled for packing, can be assembled in ten minutes

packing case, the various components fitting neatly into one another. One of the fires has five main parts and the other eight, the

assembly requiring the use of only twelve screws. Both models are finished in "Berrybronze." The makers are Berry's Electric, Ltd., 85-86, Newman Street, London, W.1.

Industrial Record

Although their business is of a very different character from that of the electrical industry, Cadbury Bros., Ltd., in a handsome publication give an account of methods which may find some broader application. This book ("Industrial Record: 1919-39," Sir Isaac Pitman & Sons, Ltd., 8s. 6d. net) shows how at Bourneville an endeavour was made to increase mechanisation and at the same time minimise the effect of this upon employees. Market research, advertising, distribution methods and employee education are among the subjects dealt with in a realistic way and the book is well illustrated with two-colour diagrams, maps, etc.

Reference is made to the power supply system. In 1919 the company generated most of its electricity by steam and producer gas engines. With the centralisation of the power

plant it was decided to generate only such amount as was produced in providing a sufficient supply of low-pressure steam and to purchase the balance from the local electricity supply authority. In the twenty years between the wars this balance increased from 600,000 to over 15 million kWh a year.

Purchase Tax on Aluminium Ware

Under the Purchase Tax (Alteration of Rates) (No. 2) Order, 1945, the purchase tax chargeable on domestic aluminium hollow-ware is reduced to 16½ per cent. of the wholesale value. The reduced rate applies only to goods which are delivered on sale, or appropriated to retail trade or similar purposes, on or after March 31st, 1945, or, in the case of imported goods, which are entered with the Customs or delivered from bonded warehouse for home consumption as the case may be, on or after March 31st, 1945.

Scottish Contractors' Year Book

The Year Book of the Electrical Contractors' Association for Scotland, 55, Frederick Street, Edinburgh (price 3s. 6d.) contains all its usual useful features. Besides the list of members, there are sections dealing with the special conditions relating to contracts in Scotland, Scottish electricity supply undertakings, electrical trade associations, holidays with pay, insurance, the approximate power required to drive various machinery, a scheme for the reinstatement of apprentices returning from the Forces, and suppliers of equipment.

Irish Electrical Imports

The Department of Industry and Commerce of Eire has recently restarted the issue of the official monthly import and export returns which had been suspended since August, 1939. From the figures now available the accompanying table of imports of electrical machinery and apparatus has been compiled. As compared

Class of Goods	1939 £	1944 £
Electric motors	49,366	10,196
Measuring instruments and apparatus	20,508	12,467
Other electrical apparatus	294,225	30,180
Vacuum cleaners	51,287	—
Dry batteries	12,237	1,822
Ditto, parts	7,691	4,817
Electric fires, kettles, irons, etc.	21,062	5,241
Cooking apparatus and parts	14,900	2,654
Electric lamps	12,808	5,260
Lighting fittings and parts	67,407	14,543
Insulated wires and cables	84,033	12,305
Telegraph and telephone apparatus	87,124	9,543
Radio receivers, complete	117,450	1,032
Ditto, partly assembled	15,993	7,592
Ditto, components and accessories	88,752	14,906
Other electrical goods and apparatus	173,756	103,432
Total ..	£1,118,599	£235,990

with 1939, last years' gross imports show a decline of £882,609, or nearly 79 per cent.

Absolute Units

The results of eight determinations of the absolute ohm and seven of the absolute ampere made during the decade preceding 1944 in

England, France, Germany, Japan and the United States are critically reviewed in research paper RP.1606 of the U.S. National Bureau of Standards. This analysis shows the most probable values to be: one mean international ohm equals 1,000,490 absolute ohms, the mean deviation from the mean of the results used being only 14 parts per million. One mean international ampere equals 0.999,853 absolute ampere, the mean deviation from the mean of the results used being 3 parts per million.

Manufacture in Canada

Canadian manufacture of electrical machinery and apparatus doubled in value between 1939 and 1942. In the latter year the total selling value at works amounted to \$208,873,000. The outstanding advance was in radio apparatus in which case there was a jump from \$15,500,000 in 1941 to \$32,560,000 in 1942. The main items of manufacture are shown in the accompanying table. It will be seen that virtually

Class of Goods	1942 (\$000)	inc. or dec. on 1941 (\$000)
Batteries and parts	11,230	+ 280
Vacuum cleaners	1,560	- 400
Generators AC	3,770	+ 1,935
Generators DC	970	+ 325
Lamps	8,040	+ 1,080
Washing machines	5,720	- 740
Furnaces	980	+ 339
Watt-hour meters	1,190	- 533
Wires and cables	32,900	- 200
Motors AC and DC	13,710	+ 30
Radio apparatus and parts other than valves and trans- formers	32,560	+ 17,500
Radio valves	1,278	- 219
Refrigerators	6,720	- 3,700
Transformers and parts	11,490	- 1,580
Telephone material	8,410	- 1,180
Stoves	1,012	- 443
Switchgear (except telephone)	9,181	+ 1,074
Wiring devices	4,097	- 453
Welding apparatus	2,106	+ 877
Apparatus and parts, n.e.s.	33,717	+ 12,733

the only decreases are in goods which may be considered as not essential to the war effort. The very small decline in the production of wires and cables still left the total more than twice its pre-war level.

The Television Report

We regret that in the review of the Television Committee's report in our last issue the Committee was called the "Sankey" Committee. The chairman is, of course, Lord Hankey.

Colliery Electrification

Several of the pits controlled by Cannock Associated Collieries, Ltd., are reported to be included in a development scheme involving an expenditure of tens of thousands of pounds. The proposals provide for the substitution of electricity for compressed air and the introduction of new cutters and conveyors.

Australian Company's Silver Jubilee

A handsome illustrated brochure has been received from Elphinstones Pty., Ltd., Brisbane, which commemorates the company's twenty-fifth year of business. It gives a brief history

of the concern, which carries out a great deal of electrical and other maintenance work, mainly in connection with automobiles. The brochure contains pictures of the company's various departments and chief officials, as well as statistical information regarding Queensland and the Commonwealth.

Contract Price Adjustment Formulae

The latest figures for the B.E.A.M.A. contract price adjustment formulae show no change; they are as follows:—(a) Rate of pay for adult male labour at March 17th, 90s. 6d. (b) Cost of material: latest Board of Trade index figure (March 17th), 176.9.

Trade Announcement

Rands & Co., Ltd., have moved to 34, Victoria Street, Westminster, S.W.1. The telephone number is unchanged.

TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from March 14th:—

MARCONI. No. 624,154, Class 9. Electrical apparatus and instruments for measuring electrical, physical and chemical characteristics and properties and for deriving therefrom indications, records and controls. Also No. 624,155, Class 10. Electro-medical apparatus.—Marconi's Wireless Telegraph Co., Ltd., Electra House, Victoria Embankment, W.C.2.

REPUBLIC. No. 631,535, Class 9. Radio receiving and transmitting apparatus and parts thereof not included in other classes; electric batteries, accumulators, switches, terminals, coils and measuring instruments and apparatus.—Wizard Production Co., Ltd., 16, Withy Grove, Manchester, 4.

INDICORDER. No. 632,038, Class 9. Measuring instruments and apparatus, instruments and apparatus for indicating and recording measurements; and parts (not included in other classes) of all such goods.—Ether, Ltd., Tyburn Road, Edrington, Birmingham, 24.

NEGROVIN. No. 632,187, Class 9. Insulated electric wire and cables.—Ward & Goldstone, Ltd., Frederick Road, Pendleton, Salford.

WELCO. No. 626,550, Class 11. Electric lamps.—Westminster Electric Lamp Co., Ltd., 7, Victoria Street, Westminster, S.W.1.

INFORMATION DEPARTMENT

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

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

Midland manufacturer of domestic food mixing machine similar to the American "Mixmaster."

PARLIAMENTARY NEWS

By our Special Reporter

Electricity and Telephone Lines

IN the House of Commons Mr. Bossom asked the Minister of Fuel and Power why it was necessary in rural areas in this country to have one series of poles to convey the wires for electric light and power and another to carry the wires for telephones and so forth. In other countries both lines were carried on one series of poles. Would he confer with the Postmaster-General with a view to ending this practice?

Major Lloyd George replied there were technical considerations which seriously limited the use of the same pole by electricity and telephone wires, but nevertheless the practice was not unknown in this country. He had consulted the Postmaster-General who agreed that their two Departments should confer and examine the possibility of extending the joint use of poles.

Mr. Bossom asked the Minister whether he would write to the United States where he would find that there were many thousands of miles over which this was done and all the technical disability had been overcome. Was he aware that the failure to do this is preventing electricity from going into rural areas?

Major Lloyd George said he was certainly prepared, and indeed, would be glad to examine the matter, but many of the rural areas up to now had been equipped with telephone only, and in many cases the pole was not of sufficient size to carry the other wires.

Control of Electricity

During the Committee stage of the Ministry of Fuel and Power Bill, Captain Duncan moved an amendment to except electricity from the functions of the Minister of Fuel and Power. He said that he did so on the ground of efficiency. The right course was to make the Minister a coal Minister with the duty of reorganising the coal industry, and to put electricity under the charge of the Minister of Transport. Mr. Shinwell and Mr. Wootton-Davies opposed the amendment, the latter saying that it would be a retrograde step to place electricity under any other Minister.

Major Lloyd George, Minister of Fuel and Power said that if this amendment and the consequential ones were accepted they would destroy the Bill. The whole purpose of the Bill was to carry on into peacetime the idea of co-ordinating our fuel resources which was implied when the Ministry was set up in 1942. It was impossible to use those resources to the best advantage unless all the industries consuming fuel for the purpose of producing power were co-ordinated. That could only be done by having someone capable of seeing the whole picture. The amendment was negatived.

Captain Duncan moved another amendment, but subsequently withdrew it, to limit the life of the Ministry to December 31st, 1948, unless Parliament determined otherwise.

Major Markham moved an amendment to make the Minister of Fuel and Power responsible for measures tending towards smoke abatement. He said that if the smoke nuisance

was to be stopped, it must be done at its source. The only way to do it was to give the Minister power to control the apparatus put into houses and industries and to select the best fuel for use.

Mr. Shinwell said that by the loss to industry from the wrong use of coal, the effect on the nation's health, and in other ways, the country must be losing millions of pounds a year. If he had the power he would prevent the burning of coal in its raw state. The "free choice" idea could be carried too far, and in the long run the community suffered.

Major Lloyd George said that no one would be other than sympathetic to the purpose behind the amendment, but it was not necessary to insert it in the Bill. The Minister was already charged with the duty of promoting economy and efficiency in the use of fuel, and the basis of most of the nuisance was the wrong use of fuel. During the war a great deal had been done which regard to fuel efficiency, and but for that work the difficulties of fuel supply would have been much greater than they had been. The savings in some cases had been remarkable, and would have a great effect when the results were seen by manufacturers. The work of the research centres was not confined to the right use of fuel in industrial appliances but included also domestic fuel appliances. The amendment was withdrawn.

Conditions in Italy

Restoring Electricity Supplies

DESPITE the Germans' wholesale and methodical demolition of electric power plants in Italy, progress has been made in getting essential public utilities back into operating condition, but the work yet to be done is enormous. By the end of 1944 the electricity supply industry, under the direction and help of the Public Works and Utilities Sub-Commission of the Allied Commission, had been able, in less than six months from the time when the area was first liberated, to increase the effective generating capacity of power plants in central Italy from 57,000 kW to 170,000 kW. The Sub-Commission estimates that by June 30th generating capacity will be further increased to 342,000 kW, or about one-third of the pre-war figure.

In addition, from July to December last about 2,000 km. of transmission lines were reconstructed, despite the fact that all the copper wire had been taken away and many towers were destroyed or badly damaged. Increased efficiency of existing operating facilities has been obtained by the inauguration in January of a unified or central grid system. Frequencies have been standardised at 45 c/s. In order that basic domestic needs could be met a severe electricity rationing system was put into effect. When the armies moved north it was found necessary to impose an even stricter rationing order in the Central Italy area. Co-operation with and training of Italian personnel to take over a greater measure of control will be furthered through boards which have just been formed by the Sub-Commission,

Guarantees

Dealing with the Unremunerative Consumer

THE future of electricity supply undertakings is likely to be precarious unless the subject of additional capital expenditure, particularly in regard to mains and services, receives very careful consideration. We are all familiar with the curve which is always trotted out to demonstrate that the greater the use the lower the price. This does not mean that a particular undertaking at the lower end of the curve is charging lower all-round prices than undertakings higher up on the curve. The conditions of average or normal undertakings should be taken.

An undertaking with a predominant power load confined to a relatively small number of consumers may show a low overall average price and possibly a high average consumption per consumer, but nevertheless its ordinary day-to-day tariffs and average consumption under these tariffs may compare unfavourably with another undertaking although the latter's overall average price is higher and average consumption per consumer is lower.

It is the great mass of domestic and ordinary business consumers who are looking for lower-price electricity. Reductions in price will, in the main, be consequential upon an increase by these classes of consumers in their consumption, and the snow-ball effect of such reductions will encourage further increases in consumption. The addition of millions of consumers per annum, without an appropriate revenue from them, is not progress but retardation. The charges to existing consumers must be maintained in order to subsidise the new and unremunerative consumers. It is idle to argue that a few new consumers do not add to the cost; when in due course the few become a few thousand the effect is apparent and sound financial consideration demands a proper allocation of costs to each consumer.

Bulk Supply Costs

How, therefore, does the industry stand in regard to the future? Consider first our raw material, so to speak, *viz.*, bulk supply, and all undertakings are, in fact, purchasers of bulk supply. The rise in the price of coal is common knowledge and the prospect of any appreciable reduction in the near future is somewhat remote. It is doubtful if there are many undertakings where the cost per unit of bulk supply, as finally delivered to the terminals of ordinary l.v. consumers, is less

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than a halfpenny. The kilowatt charge under grid tariff has been kept stationary during

the war, but the shadow of things to come can be seen in the programme of new plant authorised by the Central Electricity Board. As newspaper propaganda this has been heralded as the forerunner of large electrical developments, whereas it can in the main only provide the capacity for normal development and standby, as well as substitute for plant to be dismantled, all of which has been held up by war conditions.

The estimated cost of £30 per kW, compared with £10 to £20 per kW pre-war, for new plant or stations, together with increased operating and maintenance costs, is bound

to be reflected in the kilowatt charge for bulk supply. Incidentally, it will give rise to still more complex and hypothetical considerations as to what the cost would have been if the 1926 Act (Section 13) had not been passed.

Coupled with this increased cost of bulk supply is the increased cost generally of labour, material and taxation, as well as such miscellaneous items as standardisation of systems and voltages, implementation of the 1936 Meters Act, improved social conditions, etc.

Tariffs and Consumption

It is obvious that even in the case of an undertaking not involved in development of any appreciable amount, existing tariffs can be maintained only by an increased consumption per consumer; certainly it is high time that all the cries for electricity at a halfpenny per unit all-in under existing conditions were scotched. It is not going to be easy to achieve such increased consumption even with existing consumers; lighting, which in itself is not highly productive of revenue, will attain higher standards not by increased consumption but by more efficient lamps; cooking and heating appliances normally supplied on hire will doubtless be more expensive in initial and subsequent maintenance cost so that the higher rents will slow up demand. Industrial power is a doubtful quantity, and the war demands may not be exceeded for an appreciable time in the post-war service and certainly overall load factors will be lower. So I hold that, given the post-war maintenance of these factors, it will need a strenuous effort to increase sales per consumer if price increases are to be avoided.

Pointing to the adverse consequences of unremunerative new development the author says that the required revenue can be maintained either by a guarantee or by an assurance that the properties to be connected shall be wholly electric

Against this we are faced with a potential demand from millions of new dwellings involving £ millions of new capital on which, unless adequate guarantees are obtained, the undertakings will lose £ millions. What is an adequate guarantee? Certainly not the one in the 1899 Act which, under certain conditions, is limited to 20 per cent. on the cost of mains and services for two or three years only. This is as much out of date as many other provisions of the Electricity Acts.

Present Position

Let us consider the position to-day. An examination of the accounts of all undertakings in the Greater London area for the year 1937-8 shows that, to cover the cost of bulk supply, together with capital and other charges, a revenue was necessary equal to approximately 44 per cent. of the total capital outlay on mains and services. The sub-division between bulk purchase and other charges shows an average of 20 and 24 per cent. respectively. Individual cases vary above or below these figures, but such variations do not affect the point at issue; equally some adjustment of the figures may be necessary with up-to-date accounts under war conditions, and if anything I suggest they will be on a higher level whilst still maintaining approximately the respective ratios. The only explanation I can suggest for the inclusion of 20 per cent. in the Electricity Acts is that this was the return calculated in terms of the total capital expenditure of the undertaking (which is approximately correct to-day) and then applied to one section only, namely, extensions of the distribution system.

To take a simple example of an extension, whether it be a main or service involving an expenditure of £100, in order not to place an additional burden on existing consumers it must provide a return to cover (a) the additional annual capital charges in respect of the new capital, (b) the cost of the bulk supply to be purchased, and (c) the other charges which include overhead and administrative charges and a share at least of all other capital charges. As to (a), it can be assumed to be not less than £7, and in regard to (b) it has been shown above that £20 is the existing rate, but in regard to (c), although a lower figure than £24 may be reasonable, it certainly would be unreasonable to go below, if as low as, one half of this, *viz.*, £12. Thus a total revenue of £39 on the capital outlay of £100 should be obtained, and even on this basis there would only be the smallest margin available to assist in building up a surplus to justify reductions in prices. Had an annual guaranteed revenue of only £20 been obtained, as £7 is straightaway absorbed for the new capital charges, there would only be £13 left to pay for the purchase of the necessary bulk supply and the proper proportion of other charges.

It should be noted that unless the figure of £44 is reduced by the addition of new consumers to the estimated figure of £39, these new consumers will still constitute a liability to the undertaking. One is, therefore, driven to the conclusion that, unless a guarantee of the order of 40 per cent. is obtained in respect of new capital outlay on mains and services, further price reductions will be impossible, and in fact price increases may be necessary.

It may be suggested that outright payment of the capital outlay would be a better solution, but from a careful study of the analysis above it will be seen that this procedure will relieve the undertaking of only 7 per cent. in respect of the new annual capital charges and still require a revenue of 32 per cent. to cover bulk supply and other charges. Assuming that the whole capital outlay is paid without any guarantee, and that a revenue of, say, 15 per cent. is obtained, as about one half, say $7\frac{1}{2}$ per cent., will be absorbed in payment of bulk supply, there will only remain $7\frac{1}{2}$ per cent. which will be totally inadequate.

It is an inescapable fact that, on the average figure of 44 per cent., to maintain the *status quo*, plus 7 per cent. in respect of capital for mains extension, giving a total of 51 per cent. under a guarantee of only 40 per cent. an undertaking must be satisfied that it can carry the new business at 11 per cent. less than on the existing business, a proposition which, on past results, is no easy matter to substantiate.

"Distribution Capital Efficiency"

On this point, Sir John Kennedy, vice-chairman of the Electricity Commissioners, in a paper (jointly with Miss Noakes) before the I.E.E. in 1933, drew especial attention to this fact from another point of view in the following statements—

"The distribution capital efficiency is practically no better than it was ten years ago and is appreciably worse now than it has been in any of the intervening years. There has been no material increase in the efficient use of distribution capital. The absence of any marked reduction in the cost per unit with the larger increasing sales, however, is merely an indication that the units sold per £ of distribution capital have remained constant."

It was also pointed out that during the ten-year period under review, although the energy sold had increased by 200 per cent., namely, from 3,000 to 9,000 million, the total distribution costs had only been reduced by $12\frac{1}{2}$ per cent., that is from 0.812 to 0.706 per kWh sold.

The McGowan Committee, in its report of 1936, made very similar criticisms, and if they had probed the matter a little deeper they would have seen from Table I of their Distribution Statistics that in 1933-34 a revenue equal to approximately 40 per cent.

of the capital outlay on mains and services was required, and moreover the additional capital outlay during the previous seven years necessitated a similar return. This demonstrates that the increased consumption of existing consumers, which would have improved the distribution efficiency, had been nullified by the new consumers connected without an adequate guarantee.

It may be advanced that my proposal would have a very bad psychological effect and retard development. I would counter this by stressing that it would have a much worse effect not to adopt it as prices, if not necessarily increased, could not be reduced to existing consumers as they should be, and this would most definitely retard development. It might also be argued that such a proposal is, in effect, a price discrimination and morally, if not legally, contrary to the Electricity Acts. This, however, is not the case; the price will be the same, and so will be the total cost if the new consumers use the supply at the same average rate as the old consumers. Moreover, there is just the same price discrimination in many present-day block or two-part tariffs.

Government Subsidised Houses

From such up-to-date figures as are available, there is no indication of any appreciable improvement in "distribution efficiency" since the date of the I.E.E. paper, nor can any be anticipated so long as the return on capital outlay by way of adequate consumption or guarantee is not obtained. An adequate return will not be obtained from the many thousands of houses to be provided by Government subsidy unless a full use is made of electricity as there is little chance of the equipment, if not electrical, being changed during the life of the houses.

I would stress that my arguments apply only to expenditure on mains and services, as this is the only cost in the 1899 Act to which the 20 per cent. guarantee refers; other capital costs in respect of distribution generation, etc., do not come directly into the guarantee picture and I feel that this is where a good deal of the confusion arises. I realise that in built-up areas, with little room for expansion, the problem will not be so acute, and similarly in areas with favourable conditions as to tariffs and consumption per consumer, but nevertheless the problem will be with them all the same, and it will need their very serious consideration as to how long and to what extent they can carry the loss entailed by accepting unremunerative consumers.

The alternatives are clear if unremunerative capital investment is to be avoided. The revenue must be maintained approximately on the basis of 40 per cent. of the capital expenditure on mains and services and this can be done, broadly speaking, by

either (a) a guarantee which ensures the undertaking the appropriate revenue either by way of sale of electricity or by supplementary payments under the guarantee agreements, or (b) an assurance that the properties to be connected shall be wholly electric and therefore necessitate no guarantee.

Only by protection against unremunerative new development at the expense of existing consumers can tariff reductions be safeguarded or the present level of tariffs maintained against rising costs. Intensification of sales demands the continuation of tariffs at the lowest possible prices and nothing will operate so effectively against development as tariff increases necessary to meet the costs of connecting consumers taking only small supplies of electricity. By no stretch of imagination can it be suggested that the temporary houses to be provided by the Government, with the use of electricity restricted to lighting and a few electrical gadgets, can ever provide an adequate return even if the capital outlay involved is reimbursed to the undertaking.

Locomotive Lighting Experimental Electrical System

TO overcome the disadvantages of the oil burning head-lamps and to provide engine crews with illuminated gauge and control points in locomotive cabs, the L.N.E.R. has evolved a new system of locomotive electric lighting in conjunction with the Metropolitan-Vickers Electrical Co., Ltd. Four Class A2/1 Pacific locomotives are to be provided with this equipment as an experiment and engine No. 3698 has already been so fitted.

Electric power is obtained from an axle-driven generator mounted on an extension screwed and welded into the end of the trailing axle of the leading bogie. The nominal voltage of the generator is 6 V.

When the engine is stationary, current for the lamps is supplied from a 5-cell "Nife" battery of 35-Ah capacity. On starting, the generator field is excited from this battery and when the engine speed reaches 10 m.p.h. sufficient voltage is generated to provide a charging current for the battery. At the same speed the current is supplied to the whole system from the generator and, as the speed increases, the current rises rapidly to the full value and is subsequently maintained constant. When the cell voltage rises to 1.75 V per cell, a relay opens a contactor and places a resistance in series with the generator field. When the engine is stationary the battery is isolated from the generator field by a mechanically operated switch under the control of the steam regulator handle.

The control panel is fitted into the cab roof and on the face of the panel is reproduced, in diagrammatic form, the front of the engine and the back of the tender with pilot lights indicating which of the lamps are in use at any particular time. In addition to the head and tail lamps, spot lighting is provided in the cab to illuminate the gauges, etc.

Views on the News

Reflections on Current Topics

MOST electricians think that once they have installed a socket outlet the thing is there for all eternity. They wire the socket up, giving themselves plenty of slack for the job and then pull back the wires to bring the fitting tight up against the wall. In due course something goes wrong and the next comer takes the fitting off to find that he has half-inch ends of wire to work on. It needs a considerable amount of manipulation to work three wires into three small holes at the back of a fitting, particularly if the earth terminal has a blind hole, which frequently happens. Whenever possible a little slack should surely be left by the wireman who should remember that it may be he himself who will be called upon to do the replacement work. It would also help if the wire ends were sweated up solid to prevent their splaying when being pushed in.

* * *

Though promising a general reduction in the price of gas after the war, Sir David Milne-Watson, governor of the Gas Light and Coke Company at its annual general meeting last week did not present the wartime record of gas in a very favourable light in relation to electricity. Since the beginning of the war, he said, the price of gas had been increased by 44 per cent., despite the fact that the price of coal had been doubled. Although having to bear the same increase in coal charges, many electricity supply undertakings have been able to avoid making any increases at all in their charges, while what advances have had to be made have generally been confined to between 10 and 20 per cent. Nowhere have they reached the gas figure. This has been largely due to the fact that generating stations are able to consume low-grade coal quite useless for the production of gas.

* * *

I have just read a report by the manager of the Cardiff Corporation Transport Department which gives an interesting comparison of the running of trams, trolley-buses and motor-buses in the arduous conditions existing in the last week of January. Because of the low bridges which they have to pass under the Cardiff trams are designed with an extremely low truck clearance from the track; in fact they are the lowest built in the country. This resulted in snow beating up from the track and the vehicles developed motor and cable defects, many becoming stranded. Bus services were badly interfered with, the engines becoming overheated, so that circulation and pump troubles imme-

diately ensued. Further, the cold was so intense that the steam from the radiators froze on the windscreens and the drivers could not proceed at all. On the first day the trolley-buses were brought in because of the danger of skidding and overturning, but later on, when the motor-bus position—to quote the manager's words—was "absolutely hopeless," the trolley-bus operated a normal schedule.

* * *

It will come as a shock to many electrical men to learn that there is no such thing as a "Megger," whether spelt with a big or little "M." Those who, like myself, have consistently used the word for almost any sort of insulation tester have doubly transgressed—first, because the term is a registered trade mark of Evershed & Vignoles, Ltd., and secondly, which is the main point, because the word, being a trade mark, should be used as an adjective not a substantive, e.g., a "Megger" insulation tester. In response to a nicely-worded note from E. & V., I hereby resolve to break myself of the habit and persuade others to do the same. It is one of the penalties of coining a household word that the credit is forgotten. Another outstanding case of this is Burroughs, Wellcome's "Tabloid."

* * *

Challenging monopolists, Sir Herbert Williams writing in the *Evening Standard* says that there are some monopolies which are inevitable, but they are essentially all localised monopolies. Because of the great capital expenditure involved in the laying of mains, it would, he says, be a mistake to have two water, gas or electricity undertakings with mains in the same street. This argument can be carried a stage farther to query whether it is economical to have both gas and electricity services in the same street when the latter can cater for all requirements. On the other hand there is the point that the provision of both services stimulates competition which is not always a bad thing.

* * *

I, and fellow members of the press, blushed at the nice things said about us at the E.D.A. annual meeting by Mr. C. D. Taite in proposing a vote of thanks to the electrical press. He said that the electrical journals were actually about the only ones which enjoyed no financial advantage from E.D.A.'s advertising activities. That is true, but they derive benefits from E.D.A.'s work with the rest of the electrical industry and editorial support for this work is a part of their functions gladly performed.—REFLECTOR.

Sunflower Seed Treatment

Electricity's Share in a New Industry

IN Russia the cultivation of sunflowers has been undertaken for centuries for the purpose of obtaining the seeds, which yield an oil claimed to be equal to olive or almond oil for table use, fish frying or margarine manufacture. The seeds are also in great demand

the seed without breakage, these machines incorporate propeller drums which rotate inside suitable casings designed to release the individual seeds from further attrition. The de-seeded waste material is forced out at one end into a horizontal conveyor and thence to a breaker which reduces it to a suitable size for such uses as silage making, or, after further treatment, as feeding meal.

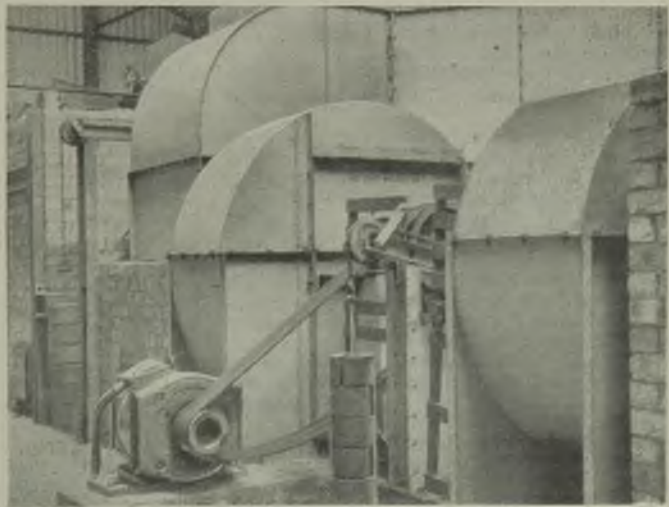
The seeds are contained in the de-seeding machines until a separating process has been carried out by a series of sieves, riddles and a fan similar to those of threshing machines, being thereafter discharged into an enclosed continuous dryer for the first step of the drying processes. The drying plant has been arranged so that the seed may be dried in two steps. The first step by utilising a Ransomes-Davies "B.C.D. 8/4" grass/grain dryer, and the second step by means of a "B.C.D.8" grain dryer.



Sunflower heads arriving at the factory

for cattle and poultry food, while cellulose and potash are subsidiary products. What is believed to be the first factory in this country to handle the seeds on a commercial scale has just been opened by Sunflower Seeds, Ltd., at Bulstrode Farm, Chipperfield, King's Langley. It provides an excellent example of the way electricity makes it possible to establish new rural industries at a site most convenient to the work which is to be accomplished.

On arrival at the factory the sunflower heads, already cut off the stalk from 120 acres of the Bulstrode and the neighbouring farms, are fed by hand into hoppers at ground level and carried by inclined conveyors to the de-seeding machines. To rub off



A 20-HP motor driving the fan and conveyor of the first section of the drying plant

The seed, after leaving the de-seeders, is fed into the first dryer, which is approximately 41 ft. long. This can be used either for two drying stages or for one drying stage and one cooling stage. The system of drying employed consists of blowing air at 110–115 deg. F. through the seed in an upward direction, the seed being conveyed by an endless conveyor, 7 ft. wide, over a perforated steel floor. This conveyor has a speed range from 1 in. to 54 in. to the minute. The air is supplied by two fans running on a common shaft, the necessary heat being supplied by a coke furnace.

As this dryer can also treat de-seeded heads at a higher temperature, a greater part of the air which has passed through the material is recirculated and re-heated for the purpose of fuel economy, but the air which has passed through the material at the initial part of the drying process, having a greater humidity, is passed through a vertical duct to the outside of the building. The seed discharged from the end of the dryer is passed into a winnower, and thence by elevator to the dryer for the second stage.

In this stage the seed is passed over a "B.C.D.8" grain dryer which has one drying stage and one cooling stage. The seed is similarly fed through this dryer where the temperature of the incoming air is, as in the former instance, 110–115 deg. F. On leaving this dryer the seed has now been dried to the necessary moisture content of 14 per cent., and is elevated into a Boby "Cleenestol" dresser for dressing and sacking.

The drying of the heads is carried out on the first dryer, the de-seeded heads being discharged from the de-seeder into a breaker. This breaker reduces the size of the de-seeded heads so that complete drying may be effected. The broken-down heads are now fed on to the dryer, and for this purpose two drying stages are used. After passing through the dryer, the heads are conveyed into a "Hammamac" grinding mill and ground into meal for cattle food, etc.

Flexibility has been accomplished by the use of independent electric motors for driving the various units. The two dryers, de-seeders, breaker, dressing machine and grinding unit can then be run independently, and it is possible, when ingoing seed is of low moisture content, to use both dryers independently.

Only six electric motors are employed. The largest, a 30-HP, 1,445-RPM unit, drives, through a system of countershafting, the

whole of the group of equipment at the discharge end of the first dryer—the horizontal conveyor, the first cleaner and the two vertical elevators before and after it, as well as the elevator to the bagging plant. The fan,



Feeding the sunflower heads into the conveyors leading to the de-seeders

which has a shaft speed of 650 RPM, and the conveyor of the first dryer are driven through six Brammer belts by a 20-HP, 1,435-RPM motor, a similar unit serving through countershafting, the two separators, the second cleaner and the various related conveyors. For the fan of the open type dryer the motor is of 15 HP and runs at 1,430 RPM. The chopping machine motor is a 10-HP, 700-RPM unit, while for the horizontal conveyor feeding it a 2-HP, 1,400-RPM unit has been installed. A seventh motor (10 HP, 730 RPM) will shortly be put into service for working a hammer mill for making poultry food.

Fluorescent lighting employing "Dawco" make equipment has been provided over the intake conveyors. All the oil pressing machinery has not yet been completed.

The drying plant was supplied and installed by Ransomes, Sims & Jefferies, Ltd. The electrical installation was by the Arco Electrical (Armature Repairs), Ltd., the motors being supplied by Lancashire Dynamo & Crypto, Ltd.

ELECTRICITY SUPPLY

Lincoln and Aberdeen Extensions. Ilford Housing Debate.

Aberdeen.—POWER STATION EXTENSION.—The Electricity Committee proposes to apply for consent to a loan of £140,000 for an extension scheme at the power station. The project includes the installation of two boilers each of 70,000-100,000 lb. per hr. evaporative capacity, with the necessary auxiliary plant, etc. It is hoped to have the new plant installed by 1946. The extension follows on the naming of Aberdeen as a selected station under the hydro-electric scheme.

Blackpool. — CHOICE OF STREET LIGHTING. — Having considered reports from the gas and electricity engineers, the Highways Committee has decided to adopt electric street lighting on the Grange Park estate.

LOANS. — The Electricity Committee is seeking sanction to borrow £19,935 for mains and services and £8,275 for substations and plant.

Brighouse. — SUBSTATIONS AND EQUIPMENT. — The Electricity Committee is applying for permission to place advance orders for meters, switchgear and transformers at a cost of £10,175 and to erect two substations (£1,680).

ELECTRIC DETARRER. — The Gas Committee is to invite tenders for the installation of an electric detarrer at the gas works at an estimated cost of £1,400.

Burton-on-Trent. — DOMESTIC EQUIPMENT. — The Housing Committee has decided that the cookers, refrigerators and wash boilers are to be electric in 85 temporary houses and of the gas type in 15 houses.

DISTRIBUTION PLANS. — A post-war scheme for new mains, substations and meters at a cost of £85,150 has been approved by the Electricity Committee.

Cardiff. — SUPPLY TO HOUSING SITE. — The Housing Committee has arranged for the Electricity Department to provide a supply to the Crystal Glen housing site at a cost of £2,508.

Chesterfield. — NO RATE AID. — The Electricity Committee has decided that no contribution shall be made to the rates this year.

Folkestone. — REDUCED SURCHARGE. — It was announced at a recent meeting of the Town Council that the Folkestone Electricity Supply Co., Ltd., had decided to reduce the present surcharge from 30 to 25 per cent. on all electricity accounts rendered after the first quarter.

Glasgow. — SITE AGREEMENT. — At a special meeting of Glasgow Corporation Electricity Committee the convener reported on a further meeting with Clyde Navigation Trustees at which the Trustees had finally agreed to modify the conditions on which they would grant the site at Braehead for the new generating station. The Committee authorised the Town Clerk to make application to the Electricity Commissioners for consent to the construction of the new station, and to borrow up to £4,000,000 to meet expenditure on the scheme.

Godmanchester. — ALL-ELECTRIC HOUSES. — The Council at a special meeting decided, on the recommendation of the Housing and Town

Planning Committee, to have all-electric houses on The Grove estate.

Ilford. — ELECTRICITY CHOSEN. — When the Council was called upon to choose the form of service for the temporary houses to be erected on the Loxford estate 15 voted in favour of the all-electric principle and 9 against.

Councillor W. B. Eke, moving that electricity should be used, said that thousands of people had had gas taken out and electricity put in, and there would have been many more but for the war.

Alderman C. Farman said the gas company had stated that the running costs would be 1s. 0½d. a week for a cooker 4½d. for a wash boiler and 1s. 4d. for a refrigerator, but he claimed that these costs were worked out on the pre-war figure of 9d. per therm. The electricity figure of 5s. a week also included lighting, which would be 2s. a week at least, and in addition there were two fires and an immersion heater. The gas company said that there were 45,000 gas cookers in Ilford compared with 5,000 electric cookers, but actually the figure for electric cookers was 10,000, and something like 10,000 applications had been turned down. It was unfair that they should have to lay electric services to light gas houses because lighting alone would not pay them.

Alderman T. Braithwaite denied that the gas figures were on the pre-war basis of 9d. a therm and said that the price was 16d. He referred to the Act of Parliament which gave gas companies the right to install gas in all houses built by municipal authorities.

Lincoln. — CONTRACTS FOR EXTENSIONS. — It was reported at a recent meeting of the City Council that in connection with the scheme for extending St. Swithin's generating station the Central Electricity Board had authorised the acceptance of tenders totalling £368,435 for work which included boilers (£213,220), automatic soot blowers (£11,804), turbine (£97,207) and switchgear (£30,236).

Liverpool. — UNDERTAKING'S ESTIMATES. — Alderman A. E. Shennan stated at last week's Council meeting that due caution had been exercised in estimating a surplus of £7,500 only on the electricity undertaking for the year to March 31st, 1946, having regard to the possibility of a temporary falling off in the demand for electricity during the change over from war industry to peacetime production. No contribution could be made towards the relief of next year's rates.

London. — LIGHTING RATE REDUCED. — The City of London Electric Lighting Co., Ltd. announces a reduction in the standard rate for lighting from 5½d. to 5d. per kWh to take effect after the first quarterly period of the year.

Perth and Kinross. — SCHEME OPPOSED. — The County Council has unanimously decided to oppose the Tummel-Garry water-power scheme.

Stalybridge. — LOAN. — The Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board proposes to order equipment for future developments and the Finance

Committee is recommended to make application to the Electricity Commissioners for consent to borrow £70,452 for the purpose.

Walsall. — **NEW FEEDER.** — The Electricity Committee has authorised the installation of additional feeder mains and ancillary apparatus at an estimated cost of £20,500.

Overseas

Canada.—**RURAL DEVELOPMENT IN NOVA SCOTIA.**—In a recent speech to the Legislature of Nova Scotia the Premier, Mr. MacMillan, suggested taking over hydro-electric power installations in the Province should that be deemed necessary in the interests of consumers. The object, he said, would be wider and cheaper rural electrification. Companies which had gone into the profitable districts must be prepared to furnish facilities for the non-profitable before being allowed to build up reserves and pay dividends on a large scale, otherwise the Nova Scotia Power Commission might step in and take control of production plants and operate them at a cost which would make possible extensions into many rural districts not now receiving these services. Mr. MacMillan added that the Nova Scotia

Government was going to stop paying for right-of-way over land covered by the electrification programme. Claiming that it cost £20 a mile, the Premier declared that if the people wanted electricity they should waive these charges.

Egypt.—**INTEREST IN HYDRO-ELECTRIC SCHEMES.**—The Cairo correspondent of *The Times* states that with the recent arrival in Egypt of Major F. Newhouse, principal assistant to Sir Murdoch MacDonald in connection with the remodelling of the Esna barrage, the Egyptian Ministry of Public Works is reported to be taking a new interest in several other schemes. Among them is the Aswan dam hydro-electric project. The possibility of action on a third dam also is growing. A statement on the subject is expected soon.

Eire. — **IMMEDIATE START ON ERNE SCHEME.** During the discussion in the Dail on the second stage of the Eire Rural Electrification Bill, Mr. Lemass, Minister for Industry and Commerce, explained that the scheme was quite apart from the Erne water power development project. The Erne scheme was required now and constructional activities would commence in the spring; the rural electrification provided for would be spread over ten years.

Forthcoming Events

Saturday, March 24th. — *Newcastle - on - Tyne.*—I.E.E. North-Eastern Students' Section. Visit to King's College Electrical Laboratory (ladies invited).

Wakefield. — Strafford Arms, 6 p.m. Association of Mining Electrical and Mechanical Engineers (Yorkshire N.W. Branch). Annual dinner.

Leeds. — Electricity Department Offices, Whitehall Road, 2.30 p.m. I.E.E. North Midland Students' Section. The Students' Lecture on "Electrical Engineering Research," by H. W. H. Warren.

Monday, March 26th. — *London.* — Institution of Electrical Engineers, 5.30 p.m. Informal discussion on "The Future of Synthetic and Thermoplastic Insulated Cables," to be opened by T. R. Scott, D.F.C.

London.—Northampton Polytechnic, E.C.1. Electrodepositors' Technical Society. Symposium on "Powder Metallurgy," by Dr. G. E. Gardam.

Birmingham. — James Watt Institute, 6 p.m. I.E.E. South Midland Centre. Discussion of the Installation Section of the report on "Electricity Supply, Distribution and Installation," and of "Post-War Building Studies, No. 11: Electrical Installations." Opener, W. N. C. Clinch. Responder, J. Beard.

Newcastle - on - Tyne. — Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. Lecture on "An Elementary Description of the Molecular Theory of Permittivity and Energising Loss in Dielectrics," by Dr. E. B. Moullin.

Tuesday, March 27th. — *London.* — At Institution of Electrical Engineers, 5.30 p.m. Television Society. Annual general meeting (members only) followed by an informal discussion on "The Social Aspects of Television," to be opened by Capt. C. H. Cazaly.

Newport.—Assembly Room, Town Hall, 6 p.m. Institution of Civil Engineers. "Rural Water Supplies," by S. R. Raffety.

Manchester.—Engineers' Club, 6 p.m. I.E.E. North-Western Centre and Institution of Post Office Electrical Engineers. "Survey of X-rays in Engineering and Industry," by Dr. V. E. Pullin, C.B.E.

Wednesday, March 28th.—*London.*—Institution of Electrical Engineers, 7 p.m. London Students' Section. Address by the President, Sir Harry Railing.

London. — At Institution of Mechanical Engineers, S.W.1, 6 p.m. Institution of Heating and Ventilating Engineers. "Specific Effect of Infra-red," by A. C. F. Mackadam and Dr. A. M. J. Janser.

Birmingham.—James Watt Institute, 7 p.m. I.E.E. South Midland Students' Section. "Turbo-alternator Ventilation," by H. R. Ogle.

Edinburgh.—Heriot-Watt College, 6 p.m. I.E.E. Scottish Centre. "Relation Between Steam and Hydro Power," by R. W. Mountain and C. G. Carruthers.

Manchester.—Engineers' Club, 7 p.m. Junior Institution of Engineers (N.W. Section). Visit of Major-General K. C. Appleyard, who will read his presidential address. *The T.V.A. film will also be shown.

Birmingham. — University (Latin Theatre), Edmund Street, 6 p.m. British Institution of Radio Engineers (Midlands Section). "Dielectric Heating by the Radio-frequency Method," by L. Grinstead, M.I.E.E.

Friday, March 30th. — *Cardiff.* — I.E.E. Cardiff Students' Section. "AC Commutator Motors, Schräge Type," by S. R. Phelps and L. Davies.

Tuesday, April 3rd.—*Manchester.*—Engineers' Club, 6 p.m. I.E.E. North-Western Centre Installations Group. "Organisation of Industrial Electrical Maintenance," by J. C. B. Nicol.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

British Insulated Cables, Ltd., are paying a final dividend of 10 per cent. (same), plus a cash bonus of 5 per cent. (same), again making 20 per cent. for the year. The trading profit for the year ended December 31st last amounted to £897,485, as compared with £940,539 in the preceding year. Adding interest and dividends on subsidiary and general investments £208,773 (£189,714), the total profit was £1,106,358 (£1,130,253). Depreciation takes £249,264 (£256,626), provision for income tax £493,284 (£566,482) and reserve for war and post-war contingencies £100,000 (same). The carry-forward is increased from £390,484 to £409,867.

British Thomson-Houston Co., Ltd., reports that after providing for taxation the profit for 1944 amounted to £596,527, which compares with £580,362 in the previous year. Depreciation takes £228,975 (£226,435) and £150,000 is again placed to general reserve. A dividend of 7 per cent. (same) is to be paid, leaving £225,704 (£248,368) to be carried forward.

International Combustion, Ltd., held its annual general meeting on March 13th. Mr. G. R. T. Taylor, chairman, in a statement circulated with the report, says that the company's plant is employed to its fullest capacity and is expected to continue to be so for some years to come. Orders on hand are by far the highest in the company's history, comprising large plants for power stations both at home and abroad.

The Automatic Telephone & Electric Co., Ltd., states that the profit for the year ended December 31st last amounted to £299,800, against £280,952 for the previous year. After deducting directors' fees, depreciation, taxation, etc., a sum of £30,000 (£20,000) is allocated to war contingencies reserve. The final ordinary dividend is 7 per cent., with a cash bonus of 2½ per cent., again making 12½ per cent. for the year, and £124,934 (£130,348) is carried forward.

Hoover, Ltd., records a profit for 1944 amounting to £574,967, this figure being arrived at after providing £184,502 for depreciation, including £50,000 additional amortisation of buildings. The profit for the previous year was £452,659. A final dividend of 11½ per cent., is to be paid, again making 15 per cent., plus a bonus of 10 per cent. (5 per cent.). A sum of £39,135 (£26,318) is carried forward.

Lancashire Dynamo & Crypto, Ltd., is paying a final dividend on the ordinary shares of 10 per cent. together with a bonus of 7½ per cent. again making a total distribution of 22½ per cent. for the year. Preliminary figures give the net profit available for distribution as £134,000 against £127,000 for 1943.

Ericsson Telephones, Ltd., announces a final dividend on the ordinary shares of 12 per cent. and a bonus of 3 per cent., both free of tax. This makes 20 per cent. tax free for 1944 the same as for the previous year. The trading profit after providing for depreciation, was £414,371 against £363,176 in the preceding year. After deducting £30,000 (same) for obsolescence,

£161,364 (£138,839) income tax and E.P.T. £105,000 (£80,000) future income tax liability, and £1,500 directors' fees the net profit is £116,507 (£112,837), to which is added £34,900 (£31,068) brought in. A sum of £20,000 is allocated to general reserve and after payment of dividends, £42,401 is carried forward.

Taylor Tunnicliff (Electrical Industries), Ltd., report dividends from subsidiaries for 1944 amounting to £20,675, as compared with £20,615 for 1943. To this is added tax repayment £202 (£413), making £20,877 (£21,033). The ordinary dividend is maintained at 10 per cent., and £447 (£399) is carried forward. The net trading profit of the company and its three wholly-owned subsidiaries was £89,065 (£83,297). In his report the chairman mentions that the company has been able to erect and equip a new factory during the past two years for making special ceramic products.

The British Aluminium Co., Ltd., reports a trading profit for 1944 of £1,049,257 against £1,045,112 for 1943. A sum of £125,000 is again allocated to general reserve (which now totals £3,450,000) and £75,000 to depreciation reserve (total £1,750,000). The final ordinary dividend is repeated at 7 per cent., again making 10 per cent. for the year, and £280,691 is carried forward, against £274,684 brought in.

Charles Clifford & Son, Ltd., report a net profit of £18,428 for 1944, as against £18,539 for 1943. Reserve for war contingencies again receives £5,000 (making that reserve £40,000) and general reserve £2,000. A final dividend of 2s. 6d., tax free, is to be paid, making 3s. 6d., tax free (same), and £24,958 (£24,930) is carried forward.

Brown Brothers, Ltd., propose to pay a final dividend of 10 per cent., making 12½ per cent. (same). The net profit for the year ended January 16th was £106,634, as against £102,763 in the previous twelve months.

County of London Electric Supply Co., Ltd.—With the accounts for 1944 is included a summary of the results for the four preceding years. Gross revenue is shown to have increased from £5,993,000 in 1940 to £7,428,000 in 1943, with a further advance last year to £7,897,985. Between 1940 and 1943 the balance after deduction of working expenses rose from £2,563,000 to £2,819,000 and last year the profit on working was £2,942,076. Adding to this £787,759 brought forward and £2,342 profit on investments realised, there is £3,732,177 available. After meeting debenture interest, etc., and preference dividends it is proposed to maintain the ordinary dividend for the year at 8 per cent. by a final payment of 5 per cent. This leaves £796,941 to be carried forward.

Last year 2,481.3 million kWh was generated or purchased as compared with 2,566.4 million kWh in 1943. Of this (in million kWh) 131.6 (128.5) was used on works, the C.E.B. retained 680.4 (784.1), 141.0 (130.8) was used in transmission and distribution and 1,528.3 (1,523.0) was sold. The total m.d. was 488,408 kW against 523,660 kW in 1943. In the three years

1940-42 the kWh sold, including quantity retained by the C.E.B., was respectively (in million kWh), 1,902, 1,944 and 2,201, with m.d.'s of 482,000, 477,000 and 506,000 kWh.

British Power & Light Corporation, Ltd.—The consolidated profit and loss account for 1944 shows that revenue from the sale of energy was £2,347,780 against £2,203,188 in 1943, the gross profit being £1,097,465 (£1,002,795). After meeting various charges, including £421,267 (£362,886) provision for taxation, the amount available for service of ordinary capital is -£101,873 (£88,465).

Revenue received by the parent company by way of interest and dividends, etc., is £390,865 (£344,694). Taxation allocation is £242,000 (£208,500), and after paying of the preference dividends and maintaining the ordinary distribution at 7 per cent. by a final payment of 5 per cent., £183,778 (£157,896) is carried forward.

Group-Capt. C. E. Benson, D.S.O., chairman, in a statement accompanying the report and accounts, says that the demand for electricity in all the areas of the subsidiary companies continues to increase. In 1944 rather more than 410 million kWh was sold as compared with 145 million kWh in 1938, an increase of approximately 182 per cent., representing a steady growth of 19 per cent. per annum. The greater part of this was due to the increase in the power demand. None of the subsidiary companies has found it necessary to increase its charges. Since 1938 the increase in the company's own operating and management expenses (excluding generation) has been no more than 25 per cent., although the amount of electricity sold has expanded by 182 per cent. and the costs of almost everything bought have gone up.

Last year it was announced that two eminent engineers had been appointed to investigate the further water-power resources of North Wales, and the chairman states that their preliminary investigation has recently been completed. The report, which has been submitted to the Minister of Fuel and Power, the Electricity Commissioners and the Central Electricity Board, refers to a number of developments the economic possibilities of which merit careful study.

Mention is made by the chairman of the burden of local taxation in connection with the economic development of supplies in rural areas.

The North Wales Power Co., Ltd., reports a net operating profit for the year ended December 31st last of £415,474, which with £38,077 interest, rents, etc., makes £453,551. The balance on the profit and loss account is £301,977 and after deducting £159,000 for E.P.T. and £83,000 for income tax (including £43,000 towards the fiscal year 1945-46), there is left £90,359. From this it is proposed to pay an ordinary dividend of 5½ per cent. and carry forward £35,359.

The directors' report states that sales during the year amounted to nearly 352 million kWh as compared with 128 million kWh in 1938, an increase of approximately 175 per cent., which was largely due to the increased power demand.

The Northampton Electric Light & Power Co., Ltd., in its accounts for 1944, records a gross income of £832,068 for the year against £767,903 for 1943 and operating expenses of £611,987 (£567,407). Net revenue after deducting *inter alia* £9,236 (£15,000) for war damage insurance

provision and £40,000 (£17,500) for E.P.T., including adjustment of previous years, is £158,365 (£146,198); to this is added £95,738 (£94,130) brought forward. Income tax, including £19,224 required to complete the provision for taxation on the profits for the year, takes £96,000 (£79,777) and £15,000 (£20,000) is transferred to general reserve, which now totals £594,692. As already announced, the ordinary dividend is maintained at 10 per cent. by a final distribution of 6 per cent. and £98,290 is carried forward.

A statement by the chairman, Lord Henley, which is printed with the report and accounts, gives details of output and sales for the six years 1939-44. From 115.2 million kWh sent out from the generating station and sold to the C.E.B. in 1939 the total output rose to 228.3 million kWh last year, while sales to consumers and associated companies increased from 108.8 million to 181.2 million kWh. Although there has been an increase in the price of coal during the period from an average of 20s. 4½d. to 35s. 9½d. a ton, the company's general tariffs have not been raised. War conditions have restricted new developments in the rural area mainly to supplies to farms; the company is already supplying nearly 1,000 of these.

Rushton and District Electric Supply Co., Ltd.—

The 1944 accounts show a gross revenue of £137,093 (£121,297 in 1943) and an operating balance of £30,663 (£22,204). After deducting debenture interest, etc., £16,722 (£6,000) and E.P.T. provision, including previous years' adjustment, the net revenue is £11,702 (£13,085). A final dividend of 5 per cent. is paid, again making 9 per cent. for the year. The carry forward is £13,799. The number of kWh sold has risen from 15,986,000 in 1939 to 28,664,000 last year.

The Clyde Valley Electrical Power Co.'s accounts for 1944 record a gross revenue of £2,418,572 against £2,299,227 in the previous year, and a balance, after payment of working expenses, of £709,806 (£632,591). With interest, etc., receivable and £189,949 brought forward there is £921,468 available. The contingency fund receives £275,000 (making a total in the fund of £4,000,097) and £25,000 is set aside for war damage insurance (making £150,000 altogether). A sum of £100,000 is provided for taxation, £15,000 for superannuation special contribution and £10,000 for deferred repairs. Preference dividends absorb £58,000 and after paying a final ordinary dividend of 5 per cent., making 8 per cent. (same) for the year, £186,468 is carried forward.

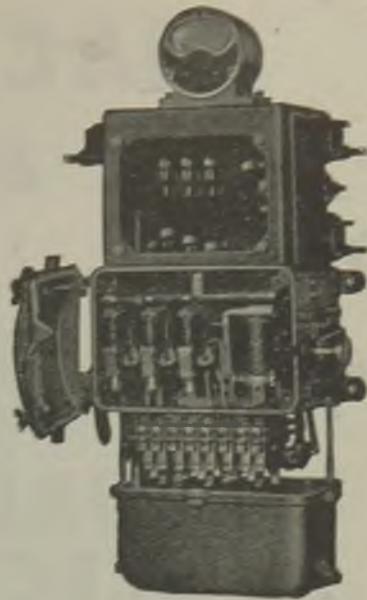
The report states that three additional 30,000-kW turbo-alternators with boilers and ancillary plant have been installed at Clyde's Mill power station since the beginning of the war.

Midland Counties Electric Supply Co., Ltd.—

Mr. William Shearer, chairman, stated at the annual general meeting on March 15th that the rate of progress achieved in the immediate pre-war years had been maintained in the annual increase of load connected and in sales of energy. With regard to the future, the loss of the wartime load should be substantially replaced within a reasonably short time by increased domestic supplies, requirements for new housing developments, shops, business premises, re-establishment of peacetime

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Sales of electricity in 1939 were 490 million kWh, while in 1944 they had reached 808 million kWh, the connected load having increased from 447,000 kW to over 621,000 kW and the maximum demand from 121,000 kW to over 209,000 kW. During the past ten years, notwithstanding the gap in domestic development during the war, an average of over 10,000 new connections had been made annually. The average price for electricity sold by all their operating companies was 0.932d. per kWh. Special consideration was being given to supplying isolated premises, particularly farms, and at present nearly half of the 15,000 farms in their areas had electricity available.

To connect the remaining farms and isolated premises was estimated to cost £2,000,000. Unfortunately farmers did not make the fullest use of electricity already made available to them, but they hoped after the war to persuade the farmer in his own interests to make extensive use of the supplies, which would assure a reasonable return on the capital expended.

The Bognor & District Gas & Electricity Co.'s report for 1944 shows a balance from the electricity undertaking amounting to £13,390 and from the gas undertaking £15,667, making £29,057, plus £701 interest. A final dividend of 3½ per cent. is to be paid on the consolidated ordinary stock "A," making 7½ per cent.; 4½ per cent. on "B," making 8½ per cent.; and 3½ per cent. on the new consolidated stock, making 7 per cent. A sum of £10,588 is carried forward.

The Lancashire Electric Light & Power Co., Ltd., reports that, after providing for fees and debenture interest £75,313 (£74,288) the profit for 1944 amounted to £369,588 (£370,466). A sum of £13,241 (£12,611) goes to debenture redemption and income tax takes £184,872 (£187,653). After again paying an extra ½ per cent. on the 7 per cent. cumulative participating preference shares, a final ordinary dividend of 5 per cent. (same) again makes 7½ per cent. for the year, leaving £15,613 (£14,877) to be carried forward.

The report states that the company's subsidiary, the Lancashire Electric Power Co., has been directed to extend the Kearsley generating station by the installation of two 52,000-kW turbo-alternators with the necessary boilers and ancillary plant.

The Lancashire United Transport & Power Co., Ltd., is to pay a final dividend of 6 per cent. (same), again making 10 per cent. The profit for 1944 was £154,574 (£153,419).

The Newcastle and District Electric Lighting Co., Ltd., made a profit of £70,485 last year to which is added £1,642 interest on investments and £17,569 brought forward, making £89,696. After making provision for income tax, depreciation, etc., there is a balance of £35,721. The dividend for the year is maintained at 7 per cent. and £14,721 is carried forward.

The Llanelly & District Electric Supply Co., Ltd.—At the annual general meeting on March 14th, Mr. Morrice A. Edwards, chairman, said that the sales of electricity by the company and its subsidiary increased from 79,557,728 kWh in 1940 to 140,724,475 kWh in 1944, the average price obtained in 1944 being 0.86d.

per kWh. The company supplied 26,217 consumers. Having now a combined depreciation fund of £505,000 and bearing in mind the very large sums previously written off, they considered that the company was in a sound financial position, there being no debentures or other loan capital liabilities.

The South London Electric Supply Corporation, Ltd., records a revenue of £147,042 for 1944, plus £346 brought in, £16,100 transfer from reserve fund and £1,303 refund of rates, making £164,791. After providing for debenture interest £13,500, difference between issue and redemption price of debenture stock £685, contributions to sinking funds £87,195, taxation £24,000 and preference dividends £1,800, an ordinary dividend of 7 per cent. is to be paid, leaving £265 to be carried forward.

The Woking Electric Supply Co., Ltd., is again paying a final dividend of 4½ per cent., making 7½ per cent. tax free (same).

The Scottish Power Co., Ltd., proposes to pay a final ordinary dividend of 5 per cent., making 8 per cent. (same) for the year.

The Waste Heat & Gas Electrical Generating Stations, Ltd., reports a net profit for the year ended January 31st of £8,786, as against £8,412 in the previous year. A final dividend of 5½ per cent. (same) again makes the total distribution for the year 8 per cent.

The Philco Radio & Television Corporation of Great Britain, Ltd., announces that Treasury sanction has been received to an increase in capital. While closer working arrangements in the electro-mechanical field are being made with Aero Engines, Ltd., there are no grounds for envisaging a share exchange on the basis forecast in the financial press. Accounts for the past two years will shortly be published and dividends declared on the ordinary shares.

The Watford Electric & Manufacturing Co., Ltd., is paying a final dividend of 10 per cent. (the same as last year but on increased capital), again making 15 per cent.

Companies' Returns Increases of Capital

Associated Electrical Industries, Ltd.—The nominal capital has been increased by the addition of £1,363,000 beyond the registered capital of £6,495,000. The additional capital is divided into 1,363,000 8 per cent. cumulative preference shares of £1 each. (This relates to the acquisition of shares in the B.T.H. Co. It is announced that over 90 per cent. acceptances have been received from B.T.H. preference shareholders.)

Franco Signs, Ltd.—The nominal capital has been increased by the addition of £100,000 beyond the registered capital of £200,000. The additional capital is divided into 200,000 shares of 10s. each.

Bankruptcies

N. E. Butcher, battery manufacturer, trading as the "Herts Electrochemical Co." 2 Woodfield Road, Welwyn Garden City.—First and final dividend of 7½d. in the £ payable at the Trustee's Office, College Hill Chambers, Cloak Lane, Cannon Street, London, E.C.4.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets are pursuing a quiet and not particularly eventful course. Few striking features develop from day to day. The interesting, if rather negative, point about prices is the steadiness that characterises them in the comparative idleness of business. Company reports, dividend declarations and chairman's speeches are almost uniformly satisfactory—allowing, be it hastily added, for wartime burdens.

Price Fluctuations

The breathless rise in De la Rue shares which ran up the price to 11½ had the effect of bringing in sellers, and at 10½ there is a reaction of 3s. 9d. on the week. British Insulated eased off ½ to 5½; repetition of the usual 20 per cent. dividend had been generally expected. The total profit for the year is a little lower. Telegraph Construction & Maintenance have reached the level £3, and Hopkinsons advanced to £4. Ransome & Marles are 3s. 9d. higher at 91s. 3d.; International Combustions have put on 5s. at 7½. Westinghouse Brakes are a good market at the advanced price of 78s. 9d. Another rise of ½ lifted Tube Investments to 5½. Ferranti preference are 1s. up at 33s. 6d. General Electrics and Johnson & Phillips are easier. The recent flutter of excitement over Indian utility shares has given way to quieter conditions. Calcutta Trams are 1s. down at 64s. 6d. and Delhi Electrics have gone back 3s. to 72s. 6d.

The veil of security secrecy imposed upon the accounts of utility companies has been sufficiently lifted to demonstrate how little, from the profit-making point of view, electricity supply undertakings have suffered by war conditions. In this market Yorkshire Electrics hardened to 45s. 6d.; Scottish Power to 41s. 6d.

Profit Statements

British Aluminium Company's total profit, after providing for E.P.T., comes to £1,049,257, which is about £19,000 less than the profit of the previous year. The dividend, making 10 per cent. for the year, is handsomely covered and the price of the shares remains unchanged at 46s. cum dividend, affording a yield at that price of £4 7s. per cent. on the money. British Thomson-Houston made a net profit of £596,527, being an increase of about £16,000 as against the previous twelvemonth and the dividend is again to be 7 per cent., carrying on the tradition established in 1935.

Another interesting dividend is the final of 10 per cent. with a bonus of 7½ per cent., making 22½ per cent. in all, from Lancashire Dynamo & Crypto. The dividend is in accordance with expectations, and the price

of the shares retains the improvement recorded last week, being now 5½. The Ericsson Telephones trading profit of £414,500 is nearly £51,000 up; the price of the shares remains at 54s. At this, the return on the money is £1 15s. 9d. per cent. net. Vactric shares, after their sharp rise of 4s. last week to 21s. 6d., have reacted to 20s. 6d. The company is taking over a fully equipped works, and is to erect another factory.

County of London

The County of London Electric Supply Company, now in its fifty-fifth year, states that its output for 1944 was a record, with the one exception of the output in 1943. The County of London is one of the largest of the supply companies in the list. The authorised share capital is £16½ million, of which just over £13½ millions has been issued. Its own area for generation and distribution is about 1,500 square miles and the company serves a total population of something like 3,000,000, the consumers supplied, directly or indirectly, being nearly 300,000.

The shares are regarded as one of the soundest in the industrial list and the possibility of increase in the dividend is reflected in the current price of 45s., at which the return on the money is a modest £3 11s. per cent.

Automatic Telephone

The Automatic Telephone & Electric Co. has paid an annual 12½ per cent. dividend (which includes 2½ per cent. bonus) since 1938, and the final dividend for 1944 maintains this. The company owns a controlling interest in several automatic telephone undertakings, and is associated with British Insulated Cables in distributing companies that operate in North and South America. The 100,000 "A" deferred shares of £1 are all held by British Insulated Cables. The price of the company's ordinary shares has risen to 67s., hardly a shilling below the record high price touched last year. Within the past five years it has been down to 30s.

Radio

Lack of business, more than any pressure to sell, is the main reason for dullness in the radio group. The week's changes in prices, where any have occurred, are of little consequence, as these examples show:—

Share	Nov.	Price	Rise or Fall
	s. d.	s. d.	
Broadcast Relay	5 0	9 0	+ 3d.
Cole, E. K.	5 0	26 9	— *
Cosser	5 0	31 6	—
E.M.I.	10 0	34 0	- 9d.
McMichael	5 0	8 0	—
Philco	2 0	14 6	—
Peto Scott	2 0	5 6	—
Pye Defd.	5 0	32 6	- ½
Radio Rentals	5 0	28 6	- 3d.
J. & F. Stone	5 0	8 0	—
Scophony	5 0	4 3	- 3d.

Export Trade Fundamentals

Manufacturer and Agent Relationship

THE necessity for re-developing and expanding our export trade immediately hostilities cease is a problem to which most manufacturers must have already given some consideration. Opportunities for extending former export trade and developing new markets with countries which were closed to us before the war will no doubt exist, but manufacturers must realise that competition will be keen and that slipshod, half-hearted efforts to secure and maintain their share of the trade will not suffice.

The basis of transacting export trade through an overseas agent has very many similarities to transacting trade at home through wholesale distributors. Yet many manufacturers who have adopted and favour the selling of their products through wholesalers in the home market fail to appreciate that the overseas agent necessarily requires just the same amount of support and co-operation. Just in the same way as a wholesaler in the home market spreads his handling, selling and distribution costs over the whole range of his products, so does the export agent offer this valuable and very essential advantage to all the manufacturers whom he represents.

The manufacturer should ensure that every possible opportunity is taken to acquaint the agent with his specialised knowledge, gleaned from long experience, of the technical features, advantages, sales arguments and answers to sales resistance. If climatic or other conditions in the agent's country necessitate some slight adaptation of the product the manufacturer should be willing to make that modification in so far as his manufacturing economy will permit.

Sales Development

A manufacturer would not expect to develop the sale of a new product in the home market without advertising or popularising it and ensuring that a plan of distribution to meet the demands of probable users of the product had been created. No more can he expect to develop an export trade if he chooses to ignore these very important factors.

The plan of campaign which he adopts in co-operation with his agent should be clearly understood by both parties. Misunderstandings are fatal to proper development. It is the agent's job to distribute the goods in the country in which he represents the manufacturer. It is because of his contacts and his knowledge of the trades and customs in that country that the manufacturer has chosen him to assist the development of sales to the mutual benefit of agent and manufacturer.

By "Sala" The manufacturer's job is systematically and efficiently to manage this potential expansion—for that is what it is—by advertising, in whatever form he and the agent agree is the best way of appealing to prospective users, and educating them to appreciate the manufacturer's product. The term "advertising" here includes leaflets, display material, attractive packs and Press advertising, whichever is considered the most suitable.

In formulating his plan of expansion the manufacturer must obviously have satisfied himself on what volume of business he might ultimately be able to secure from the overseas market, and he must base his advertising expenses on a long-term policy by which he hopes eventually to benefit. If he were introducing a new product to the home market he would realise that he would be committed to a great deal of patient hard work in his efforts to make his product known. He would probably be committed also to a judicious advertising expense quite out of proportion to his initial returns. Just the same applies in developing export business.

Advertising Expenses

There have been many examples in the past of agents marketing and developing the sales of a manufacturer's products at their own expense, the manufacturer making no contribution at all to the advertising costs. This arrangement, however, is to be deplored. It should not be difficult for any manufacturer to realise that in a truly competitive market—as export markets will surely remain—his agent's chances of maintaining his share of the trade are not very rosy if he has to add to the landed price of the manufacturer's goods his handling, distributing, selling and advertising expenses, and then his profit.

Again, many instances have arisen of British manufacturers having forced on the overseas markets various products with no pre-arranged plan of marketing them, many of the products unbranded, unadvertised, just shipped abroad to agents and placed on the market to compete price for price with the most inferior articles of the same nature. There will always be the manufacturer who sells on price alone and there will always be the inferior product. The inferior product is considered good and commands a good price until it comes to be properly compared with a quality article. It cannot compete in quality so the danger of competition is met by bringing down the price, and because users have not been educated to appreciate the saving and the advantages of the quality

article its price comes down also to the same level. It is a competition in price only, and the price levels go down eventually to a most ridiculous figure.

No wonder many British manufacturers have, in the past, had such sad experiences of overseas markets. But they had only themselves to blame, in many instances, for the unplanned, unsupported and slipshod methods which they used in securing for themselves a temporary share of overseas markets.

They must make up their minds now that if they desire export trade they must justify their prices, do the lion's share in making their products known and have a complete understanding with the agents they appoint. Let them appreciate that the main functions of the agent are to stock the manufacturer's goods at suitably dispersed depots so as adequately and conveniently to serve the customers in his country, to assist the introduction of those goods to prospective users by the personal contacts of his representatives and faithfully to support and co-operate with the manufacturer. To carry out these functions satisfactorily he must have the full support of the manufacturer and this can never be attained unless the manufacturer makes himself responsible for the proper introduction of his product to the new prospective users.

U.S. Power Supply

Production and Revenue During 1944

IN a review of the electric light and power industry in the United States during 1944, Mr. C. W. Kellogg, president of the Edison Electric Institute, says that the use of industrial power slowly declined from the high point reached in the autumn of 1943, but towards the end of the year came back to near 1943's high level. Most of the curtailment in industrial power resulted from the shutdown of aluminium plants operating on fuel-generated power and from the stoppage of manufacture of magnesium.

Household use of electricity made the usual gain in spite of the almost complete cessation of the manufacture of appliances and of restrictions on connecting new customers. Because of restrictions in the use of materials, construction expenditures, however, were the lowest in ten years. Principal line extensions during the year were in farm areas; over half of America's farms now have electricity.

The consolidated income statement of electric utility companies shows a gain in gross revenues of approximately \$110 million over 1943 to an estimated total of \$2,925 million. Net income, however, after meeting all charges, has been reduced from \$512 million to \$500 million, taxes now representing 24 per cent. of all money received.

The installed capacity of all utility power plants, both public and private, increased during the year by about 1,500,000 kW, bringing the total at the present time to about 50,500,000 kW. Since the beginning of the war in Europe in the summer of 1939, generating capacity has

grown by 11,000,000 kW. Last year production totalled approximately 230,000 million kWh, an increase of 9,000 million kWh (or 4 per cent.) over 1943. All of this took place during the first eight months of the year, the remaining four having shown a decline. This net increase compares with a gain of 32,000 million, or 17 per cent. in 1943. In the five years from September, 1939, the total annual output has grown from 126,000 million kWh to 230,000 million kWh, an increase of 83 per cent., while generating capacity has grown 28 per cent. In addition, some 2,000 million kWh was imported from Canada. The average cost to the residential consumer continued its usual decline, being now about 3½ cents per kWh.—*Reuter's Trade Service.*

New Zealand Imports

Substantial Increase in 1943

THE electrical import trade of New Zealand in 1943 showed an advance of about 40 per cent. compared with 1942. In this rise nearly all the important groups (except storage batteries and parts) participated, with cable and wire, radio goods, telephone apparatus and lamps showing marked increases. Details, including a note of increases and decreases in value compared with 1942, are appended.

Factory development under the protection afforded by wartime shortage of imported goods and by the import control system has extended to wireless sets and some electrical goods. According to a booklet recently issued by the Department of Overseas Trade the manufacture of such goods is almost entirely for domestic consumption and there is no immediate prospect of any volume of export. Whether some of the new secondary industries will be able to hold their own in competition with imported products after the war is doubtful unless some protection continues.

New Zealand's post-war plans for the extension of electricity supply are to install plant of a capacity of 40,000 kW yearly. Within the next few months it is expected that a 25,000-kW station near Methven, in South Island, will be started up. At Arapuni two 21,600-kW sets are to be erected shortly. In addition, work has been started on five new stations.

Class of Goods	1943 £ N.Z.	Inc. or dec.
Storage batteries	7,600	- 5,500
Parts of storage batteries	14,500	- 5,000
Other batteries, and cells	20,100	+ 13,325
Carbons for arc lamps, etc.	4,200	- 2,250
Cooking ranges	—	- 2,350
Heating & other cooking appliances	12,900	+ 1,750
Unspecified electrical appliances	38,300	+ 23,400
Electrodes for arc lamps, etc.	49,500	+ 11,150
Insulated cable and wire	647,400	+ 283,700
Insulating materials, unspecified	58,600	+ 9,100
Incandescent filament lamp bulbs	145,200	+ 59,800
Elec. lamps, unsp., other than surgical	41,500	+ 20,600
Motors and parts	245,100	+ 12,300
Radio receiving sets	4,000	+ 3,150
Radio valves	205,000	+ 115,800
Other radio goods	228,000	+ 52,700
Telegraph & telephone apparatus, not radio	151,000	+ 80,100
Electric irons	700	—
Insulators	3,200	+ 970
Other electrical apparatus	867,500	+ 136,800

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.

ALPHA Accessories, Ltd., and P. G. Wardle. — "Electric dry batteries." 7961. May 19th, 1943. (567757.)

Automatic Telephone & Electric Co., Ltd., D. Wright and A. Aston. — "Electrical timing arrangements." 14075. August 28th, 1943. (567819.)

Babcock & Wilcox, Ltd. — "Fluid heaters." 13062.43. August 22nd, 1942. (567734.)

K. Baumann and Metropolitan - Vickers Electrical Co., Ltd. — "Machining of irregular surfaces." 5946-8. May 7th, 1941. (567745-7.)

K. Baumann, H. J. Shaker and Metropolitan-Vickers Electrical Co., Ltd. — "Turning and boring irregular curved surfaces." 5945. May 7th, 1941. (567744.)

K. Baumann, H. J. Shaker, J. S. Hall and Metropolitan-Vickers Electrical Co., Ltd. — "Machining of irregular surfaces." 5949. May 7th, 1941. (567748.)

T. Blackmore & Sons, Ltd., and A. T. Blackmore. — "Wire-coiling machine or adaptor." 9227. June 8th, 1943. (567721.)

J. L. Bland. — "Water-tube boilers." 9403. June 11th, 1943. (567723.)

M. C. Bloom. — "Baths for the electro-depositing of antimony." 18041.43. July 28th, 1941. (Divided out of 559164.) (567794.)

British Insulated Cables, Ltd., W. C. Handley and J. C. Quayle. — "Arrangement for mounting electric terminals." 9991. June 21st, 1943. (567809.)

British Thomson-Houston Co., Ltd. — "Apparatus for starting electric-discharge devices." 7074.43. May 8th, 1942. (567782.)

British Thomson-Houston Co., Ltd. (General Electric Co.). — "Magnetic suspension for horizontal shafts." 18367. November 5th, 1943. (567828.)

British Thomson-Houston Co., Ltd., and J. R. Kynaston. — "Open-type electro-plating barrels and electrode supports therefor." 18507. November 8th, 1943. (567795.)

J. H. Buchanan and Metropolitan-Vickers Co., Ltd. — "Oil- and liquid-immersed electric transformers and other apparatus for use on high-voltage circuits." 14027. August 27th, 1943. (567789.)

T. F. Caldwell. — "Electric time switches embodying revolving magnetic clutches." Cognate applications 1324.43 and 18565.43. January 26th, 1943. (567708.)

Callender's Cable & Construction Co., Ltd., and A. B. F. G. Richardson. — "Apparatus for the moulding of thermoplastic materials." 9442. June 11th, 1943. (567805.)

Chloride Electrical Storage Co., Ltd. (W. W. Smith). — "Non-spill arrangements of electric accumulators." 15140. September 15th, 1943. (567824.)

Concordia Electric Safety Lamp Co., Ltd., and C. C. Bleach. — "Electric battery lamps." 12848. August 9th, 1943. (567690.)

Dictograph Telephones, Ltd., and S. Webb. — "Telephone systems." 13507. August 19th, 1943. (567694.)

Ellison Insulations Ltd., W. A. Morgan and H. S. Cattermole. — "Fluid-controlling valves." 11372. July 13th, 1943. (567688.)

General Electric Co., Ltd., and L. Jacob. — "Electric-discharge devices having oxide coated cathodes." 8098. May 21st, 1943. (567718.)

General Electric Co., Ltd., and W. G. Thompson. — "Electro-magnetic pumps for electrically conducting liquids." 8168. June 15th, 1942. (567772.)

R. Jakubskind. — "Variable resistance devices." 13444. August 18th, 1943. (567767.)

B. F. J. Johnson and Power's & Deane, Ransome's, Ltd. — "Electric welding." 13740. August 23rd, 1943. (567696.)

George Kent, Ltd. — "Electrodes for pH measurement." 9370.43. June 10th, 1942. (567772.)

N. E. Af. Kleen. — "Refrigerating apparatus." 13513.42. October 3rd, 1941. (567706.)

E. F. Kohl. — "Speed-actuated electric switches or circuit-breakers." 7694.43. May 16th, 1942. (567680.)

J. Lenegan and J. C. Lenegan. — "Automatic electric vulcanising machine." 9243. July 19th, 1943. (567804.)

A. Mandl and Metropolitan-Vickers Electrical Co., Ltd. — "Dynamo-electric machines for supplying both direct current and alternating current." 16116. November 13th, 1942. (567775.)

Mullard Radio Valve Co., Ltd., and C. L. Richards. — "Frequency-modulated receivers." 12407. July 30th, 1943. (567813.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). — "Shielded high-frequency cables." 2021. February 3rd, 1944. (567704.)

Revo Electric Co., Ltd., and A. E. Felton. — "Tubular fluorescent electric lamp fittings." 19839. November 27th, 1943. (567830.)

A. I. Rochmann. — "Electrically heated soldering irons." 8961. June 4th, 1943. (567802.)

Siemens & General Electric Railway Signal Co., Ltd., and H. J. N. Riddle. — "Road traffic control systems." 10302-3. June 25th, 1943. (567761-2.)

Smart & Brown (Engineers), Ltd., and W. H. Spivey. — "Electrical plug contact pins." 894. January 18th, 1943. (567798.)

Standard Telephones & Cables, Ltd., and P. K. Chatterjea. — "Heating materials by high-frequency electric current." 12115. July 26th, 1943. (567731.)

A. W. Sweetinburgh. — "Means for comparing electrical insulators and detecting deterioration thereof." 14022. August 27th, 1943. (567788.)

Westinghouse Electric International Co. — "Electric-discharge devices." 9414.43. June 17th, 1942. (567683.)

H. Wiggin & Co., Ltd., J. Stockdale and D. E. Rison. — "Insulation of electrical resistance materials." 13210. August 14th, 1943. (567766.)

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.

Cleethorpes.—April 23rd. Electricity Department. Switchgear, transformers and cable (See this issue.)

Edinburgh.—April 4th. Corporation Electricity Department. Interlocked tile cable covers for the year ending May 28th, 1946.

Halifax.—March 30th. Markets Department. Renewing electrical installation at the abattoir. (March 9th.)

Keighley.—April 6th. Electricity Department. Four 400-kVA, 6,600/400-V, three-phase transformers. (See this issue.)

Kilmarnock (Ayrshire).—March 27th. Town Council. Year's supply of electric lamps for all Corporation Departments. Forms, etc., from burgh surveyor.

Littleborough.—April 10th. Electricity Department. 500-kVA transformer. (See this issue.)

Manchester.—April 3rd. Electricity Department. Automatic voltage variation equipment and reactors. Mercury-arc rectifier equipment. DC traction switchgear. (March 9th.)

April 7th. Electricity Committee. Service cut-outs and cables. (March 16th.)

Middlesbrough.—April 20th. Tees-Side Railless Traction Board. Two 300-kW mercury-arc rectifiers, etc. (March 9th.)

Southend-on-Sea.—March 31st. Electricity Department. House meters. (March 2nd.)

Wolverhampton.—April 4th. West Midlands Joint Electricity Authority. Transformers. (March 9th.)

Orders Placed

Bradford.—Electricity Committee. Accepted. 33-kV switchgear for turbo-alternator.—English Electric Co.

Cardiff.—Health Committee. Accepted. Slicing machine (£140).—Peerless Electrical Manufacturing Co.

Chesterfield.—Electricity Committee. Accepted. Cables (£4,444).—Aberdare Cables.

Iford.—Electricity Committee. Accepted. Eight tubular steel lamp columns (£123).—B.T.H. Co.

Leeds.—Corporation Electricity Committee. Accepted. Plant in connection with additions to the Kirkstall power station:—Circulating water pump for cooling tower (£6,100).—Worthington Simpson. Generator switchgear and works transformer switchgear (£20,909).—Ferguson, Pailin.

Stockport.—Electricity Committee. Accepted. Electrical gear (£667).—George Russell & Co. Two transformers (£560).—Electric Construction Co. Boiler feed pumps (£153).—Worthington-Simpson.

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.

Altrincham.—Hospital, Timperley By-pass Road; secretary, General Hospital.

Ardwick.—Works additions, Ardwick Terrace, for the Metallic Seal Co., Ltd.; B. Pendleton, architect, 16, Brazennose Street, Manchester, 2.

Birmingham.—Alterations and additions to restaurants (£5,667); and main drainage works (£74,000); city engineer.

Chester.—Extensions to City Grammar School (£6,399); city engineer.

Hartwood (Lanarkshire).—Extensions to sanatorium at Hartwood Mental Hospital (electrical work); W. C. Brownlie, clerk, Lanarkshire House, 191, Ingram Street, Glasgow, C.1.

Levenshulme.—Rebuilding works, Chapel Street, for Stud Co., Ltd.; A. Brocklehurst & Co., architects, 10, Norfolk Street, Manchester, 2.

Macclesfield.—Works extensions (£11,000); Barracks Fabrics Printing Co., Ltd., Lower Heyes Mill.

Manchester.—Rebuilding rubber works, Bank Street, Clayton; E. Wood & Co., Ltd., Ocean Ironworks, Trafford Park.

Moston.—Works additions, Ashley Lane and Milton Street; Moston Brick and Building Co., Ltd., Kenyon Lane.

Oakengates.—Pumping station, transformer house, etc., for U.D.C.; A. H. S. Waters, 25, Temple Row, Birmingham, 2.

Oldbury.—Maternity home (£50,000); borough surveyor.

Oxford.—Buildings (£11,500 with equipment), Schools of Technology, Cowley Road; borough engineer.

Peterborough.—Technical college; A. J. Reeves, town clerk.

Salford.—Works additions; Oldfield Engineering Co., Ltd., 96, Ordsall Lane.

Additions for T. Bradford & Co., Crescent Ironworks, Broad Street, Pendleton.

South Shields.—Factory, Adelaide Street for Prices (Tailors), Ltd.

Stockport.—Outpatients' block and nurses' home extensions, Stockport Infirmary, Wellington Road South; superintendent.

Stockton Heath.—Installation of electric light in church; Rev. J. Collins, St. Thomas' Vicarage, Stockton Heath, Warrington.

Stretford.—Rebuilding works; T. Barker & Sons, Ltd.

West Sussex.—Emergency huts, St. Richard's Hospital; county architect, Chichester.

Wiltshire.—Farm institute (£50,000); county architect, Trowbridge.



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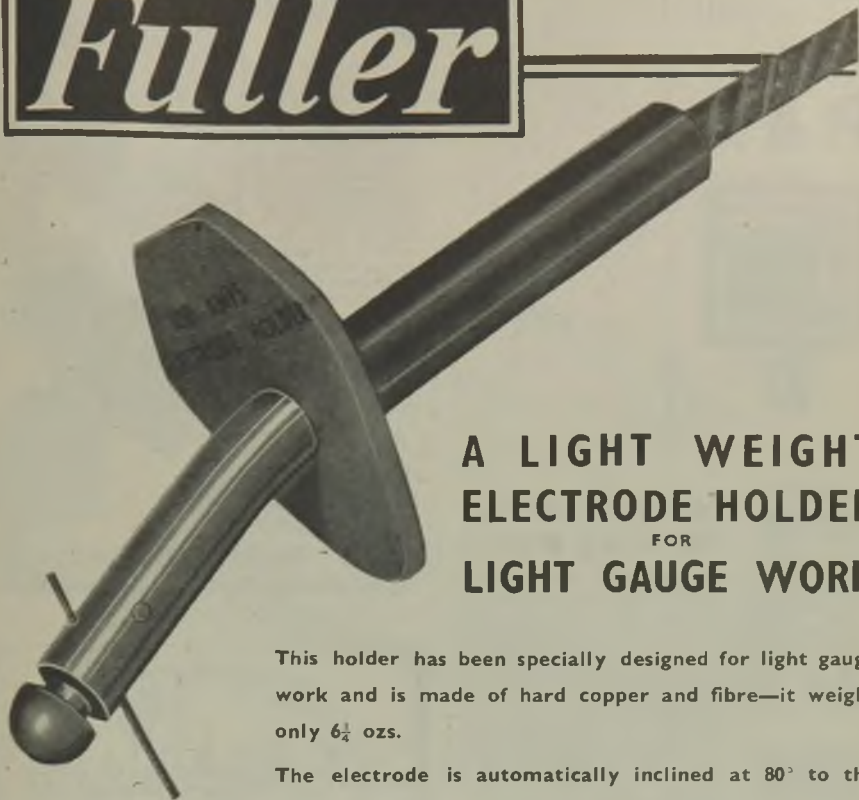
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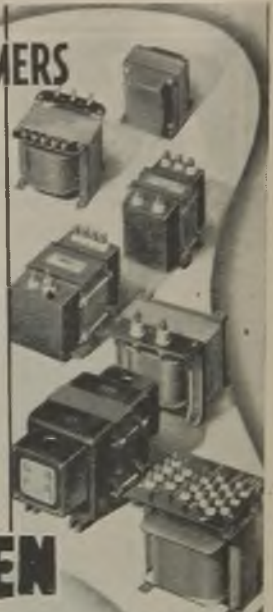
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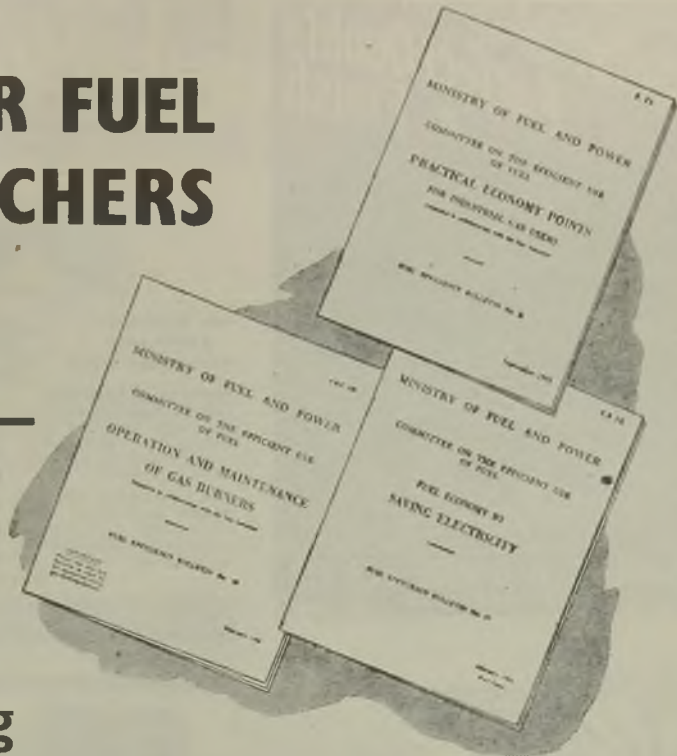
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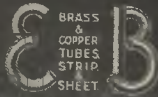
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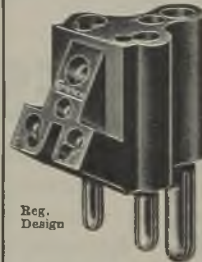
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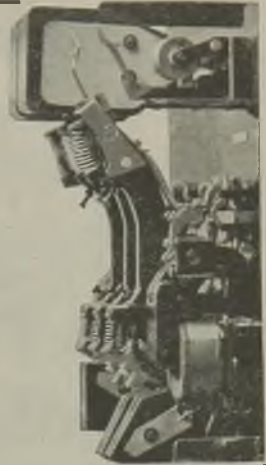
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SUMP Mopump for sunwatering shallow small wells or sumps. Strongly constructed unit prepared for continuous service. Can be provided with float controlled automatic starting and stopping switch

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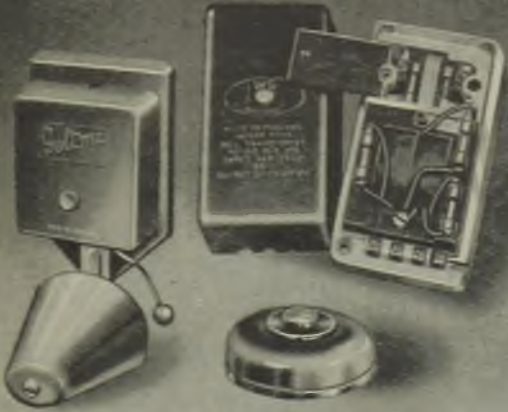
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Also used for: Blinds, Awnings, Hangers, Electric Lighting Fittings in Halls, Hotels, etc., Dampers, Curtains, Ladders, Hoovers, Lifts, Hospitals, Ships, Street Lighting, A.R.P., Clothes Racks, Railway Station Lighting, Hoses, etc.

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DRILLING. Any drilling machine is suitable for drilling Tufnol but high speeds are best for small holes. Sharpen standard twist drills to 118° included angle for average use and grind away the back flutes. Feed the drill slowly to avoid "burning", clear swarf frequently, back up the work with wood and don't use coolants. Drill tapping holes slightly oversize. Fly cutters can be used for large holes.

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RECORD ELECTRICAL CO. LTD.
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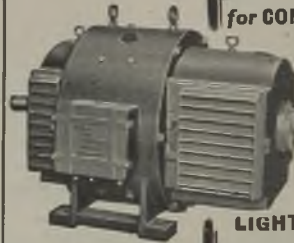
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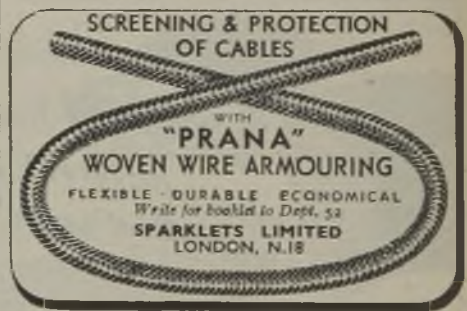
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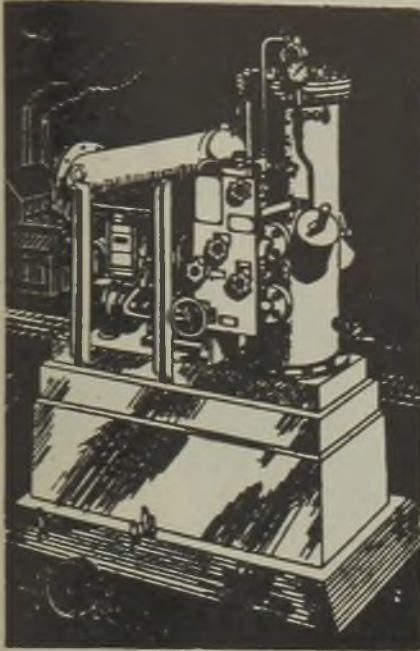


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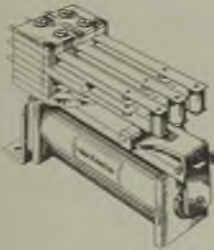
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Twelve supplied in each display box. Safe for voltages up to 750.

Patent applied for.

NO DANGER FOR THE OPERATOR—even if the Indicator Lamp should get broken

Deliveries From Stock **9/6**
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There is a strong analogy in this to another kind of plant—electrical plant, and transformers in particular.

As with seeds, transformers look much alike—all the engineer sees of them is often the tank exterior; but there need be *no uncertainty* in installing this kind of plant, and there will be a definite assurance of reliable results if the plant installed comprises



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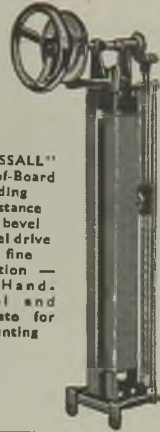
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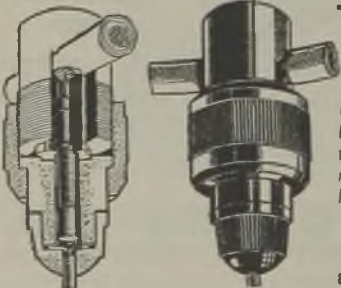


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The FLASH "H" CONNECTOR

The LAST WORD in Cable Connecting.
Attached to Live Lines WITHOUT DANGER.

Connection made in a few minutes. No damage to Cables.
High rupturing capacity fuse at tapping point. No joints
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modate six sizes of cable. Fitted with 5, 10 or 15 amps.
H.R. Fuse. 30-amp. size also made.

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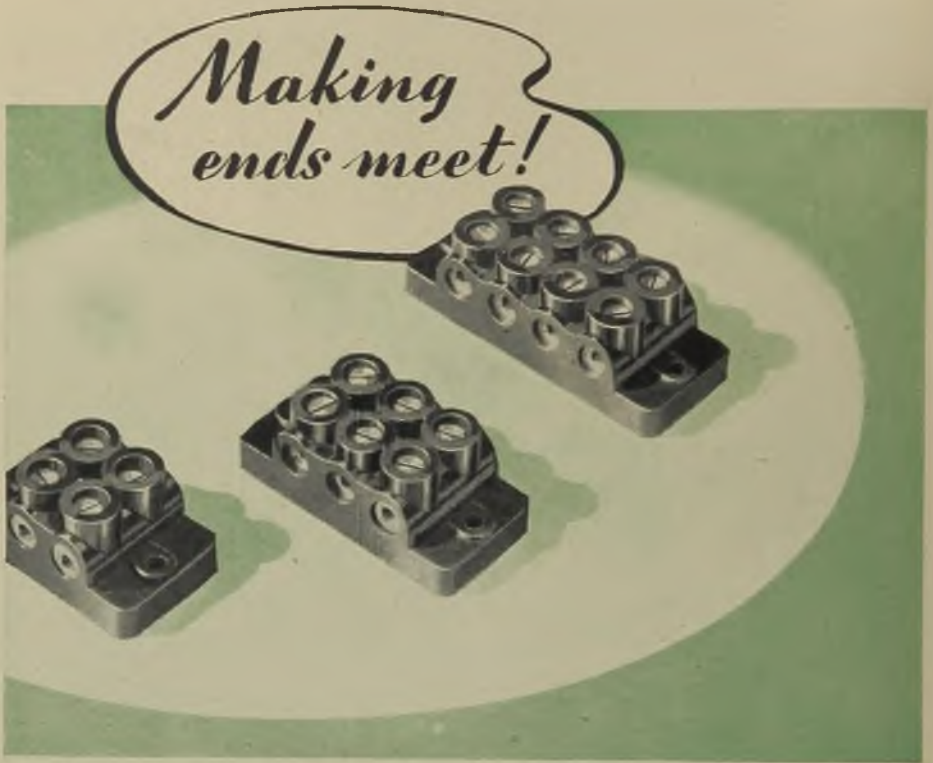
81 JAMAICA ROW, BIRMINGHAM 5. Tel.: Midland 0153-4-5



S.P. Porcelain Covers are incorporated in many Transformer Switchgear and Cable Terminals. We make insulators for all purposes and it may be worth your while to consult us before you finalize your design.

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We have a wide range of Standard 2, 3, and 4 Way Terminal Blocks to meet the requirements of manufacturers of electrical equipment. We have designed and produced many mouldings for the Electrical Trade, and these are some of the few which we can still manufacture for present-day needs. However, we look forward to the time when we shall be solving your post-war problems, assisted by the extensive knowledge we are gaining in manufacturing to exacting war-time specifications.

INSULATORS LTD *Mouldings of Merit*



**ON EVERY FIGHTING
FRONT ON LAND
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AND IN THE AIR**

**PIRELLI GENERAL
CABLES**



Made at
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**CABLES that
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Get it from the G.E.C.

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.

EASTER SCHEDULE CLASSIFIED ADVERTISEMENTS

MAR. 30 issue has already closed for press.

Latest time for receiving copy for **APRIL 6** issue is First post on **THURSDAY, MAR. 29**

OFFICIAL NOTICES, TENDERS, ETC.

LITTLEBOROUGH URBAN DISTRICT COUNCIL

Electricity Department

THE above Council invite tenders for the supply and delivery of the following:—

One 500-kVA INDOOR TYPE TRANSFORMER.

Specification, schedules and forms of tender may be obtained on application to Mr. G. Hill, Electrical Engineer, Council Offices, Littleborough.

No tender will be received except in a plain sealed envelope bearing the words "Tender for Transformer," but which must not bear any name or mark indicating the sender.

Tenders, sealed and endorsed as above, must be received by the undersigned not later than **TUESDAY, 10th April, 1945.**

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

R. C. CLOUGH,

Clerk of the Council.

Council Offices,
Littleborough.

22nd March, 1945.

1654

BOROUGH OF CLEETHORPES

Electricity Department

TENDERS are invited for the supply, delivery (and erection of High Tension, Low Tension Switchgear) for the following:—

- (a) High Tension Switchgear;
- (b) Low Tension Switchgear;
- (c) 500-kVA Transformer;
- (d) High Tension Cable.

Specifications, etc., from Mr. B. S. Lord, Chief Engineer and Manager, Electricity Showrooms, Grimsby Road, Cleethorpes.

Tenders to be delivered by 5 p.m., Monday, April 23rd, 1945.

All tenders to be forwarded in a plain envelope and marked for the item tendered for and addressed to me.

G. SUTCLIFFE,

Town Clerk.

Council House,
Cambridge Street,
Cleethorpes,
Lincs.

1665

BOROUGH OF KEIGHLEY

Electricity Department

TENDERS are invited for the supply and delivery of 4 400-kVA, 6,600/400-volts, 3-phase Transformers. Specification and form of tender may be obtained from me.

Completed tenders should be sent to S. Walker, Town Clerk, Town Hall, Keighley, by Friday, 6th April, 1945, in sealed envelopes devoid of any indication as to tender and endorsed "Tender for Transformers."

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

G. F. MOORE,

Engineer and Manager.

Electricity Offices,
Coney Lane, Keighley.
13th March, 1945.

1646

SITUATIONS VACANT

A group of companies in the Engineering industry, reviewing staff requirements for post-war expansion, will consider applications from men with outstanding qualifications and ability after the present restrictions of engagement of labour are removed. The appointments to be made cover:

DESIGN, DEVELOPMENT, TECHNICAL, PRODUCTION, ADMINISTRATIVE STAFF, SALES MANAGERS, SALES ENGINEERS, ETC.

The group is distinguished by a common endeavour to maintain a high standard of quality for its products, outstanding craftsmanship, and a progressive outlook on industrial relations.

The companies concerned are as follows:

- British Oil Engines (Export) Limited.
- The Brush Electrical Engineering Co. and Subsidiaries.
- Darwins Limited.
- Fielding & Platt Limited.
- Heenan & Proude Limited.
- Lagona Limited.
- Mirreles, Bickerton & Day Limited.
- McLaren Limited.
- Oil Engines (Coventry) Limited.
- Tarran Industries Limited.

Applications must not be sent to the above companies, but addressed to:

D. S. A. E. Jessop,
Industrial Relations Advisory Service,
c/o 27, Gilbert Street,
London. W.1.

All applications will be treated as strictly confidential.

1649

AN energetic Sales Representative required by well-known manufacturers of electrical appliances to cover Yorkshire. Must know the area from previous selling experience in the electrical trade, reside in or near Leeds, and be capable of controlling area office and staff. Splendid opportunity for the right man. State age, experience and salary required.—Box 1636, c/o The Electrical Review.

ASSISTANT Works Manager required. Young man for permanent position. Experience desirable in high speed mass production of small components. Salary according to experience. Apply, giving full details of qualifications, experience, etc.—Box 1674, c/o The Electrical Review.

DEMobilISATION

MEN of definitely outstanding ability seeking permanent and progressive positions upon demobilisation from the armed Forces or from war industries are invited to record particulars of what they have to offer with a large and important electro-mechanical manufacturing group engaged in the development and production of electrical materials, equipment, apparatus, valves, plastics, wire and cable.

The policy of the group is to make promotions from within, but a few appointments for demobilised men of outstanding ability are available in the following fields:—

Research—electrical, mechanical, metallurgical.
Efficiency, time and motion study.
Production engineering—machine design, tool, jig and fixture design—shop-trained engineer draughtsmen.
Tool Room and Shop Supervision.
Factory and Plant Engineering.
Inspection.
Progress and Production Control.
Costing.
Employment and welfare of personnel.
Superlative craftsmen, e.g., toolmakers.
Young men of character suited for further training.

Appointments will be considered immediately relevant Government instructions concerning employment permit.

Men other than those of outstanding ability are advised not to reply to this advertisement.

Applications in the first instance should be made to Box 1491, c/o The Electrical Review.

METROPOLITAN BOROUGH OF FULHAM

Electricity Department

Appointment of Mains Superintendent

APPPLICATIONS are invited from Engineers who are Corporate Members of the Institution of Electrical Engineers and who have had a sound technical education to B.Sc. standard; also technical and administrative experience in relation to Distribution work, not necessarily an Electricity Undertaking.

The salary will be in accordance with the N.J.B. Schedule, Class G, Grade 3, commencing at £652 ls. per annum.

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

Application form and particulars of the appointment may be obtained from the undersigned.

Canvassing, either directly or indirectly, will disqualify.

Applications should be received not later than noon on Saturday, the 7th April, 1945.

CYRIL F. THATCHER,

Town Hall, Fulham, S.W.6. Town Clerk. 1635

NORTH-EASTERN ELECTRIC SUPPLY CO. LTD.

Shift Control Engineers.

APPPLICATIONS are invited for positions as SHIFT CONTROL ENGINEERS in the power stations of the above Undertaking. The duties include the operation of High Voltage Switchboards, the control of Electrical Output from the station, working out results, and general electrical assistance in the operation of the station. The vacancies are located in the Tyneside and Tees-side areas. The salary will be in accordance with Grade 10, Class G, of the National Joint Board Schedule. The commencing salary is at present £280 Os. 6d. per annum.

Experience with a manufacturer of electrical equipment or with an electricity supply undertaking is essential and preference will be given to applicants holding a Technical Qualification or who can show that they are in course of obtaining such a qualification. Suitable Shift Control Engineers will be considered for promotion to Technical Assistant in due course.

Full particulars of practical and theoretical training, previous employers and age, should be addressed to:—

The Secretary,

North-Eastern Electric Supply Co. Ltd.,

Carlisle House,

Newcastle-upon-Tyne. 1. 1602

CHARGE Engineer required for Power Station in India. Experience with large water tube boilers and steam turbines essential. Salary Rupees 800 per month with free quarters and passage. Apply with copies of testimonials, to—Box 1616, c/o The Electrical Review.

A large manufacturing firm has vacancies in its Electric Traction department for two Sales Engineers having experience in preparation of tenders and conduct of correspondence on enquiries and orders in connection respectively with railway electrification work and with tramcar and trolley bus electrical equipments. Good salaries and prospects are offered to the right men. Apply in confidence, stating particulars of age, experience, salary required, and when free to start, to—Box 1633, c/o The Electrical Review.

BOROUGH of Barking. Deputy Borough Electrical Engineer and Manager. Applicants must be Corporate Members of the I.E.E. or of equivalent standard, and have had a sound technical education, and technical administrative and commercial experience of a progressive electricity undertaking. Salary in accordance with Class F, Grade 1, of the N.J.B. Schedule, commencing at £759 p.a., plus car allowance of approximately £60 p.a. The appointment will be subject to the Local Government and other Officers' Superannuation Act, 1937, and a satisfactory medical report. Applicants should write, quoting D.1048XA, to the Ministry of Labour and National Service, Central (T. and S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for the necessary forms which should be returned completed on or before 9 April, 1945.

COMBUSTION Engineer required to take charge of Boiler House during shift. Experience of high pressure boilers desirable. Salary, Class H, Grade 3B, of the N.J.B. Schedule. Applications, with copies of testimonials, to—The Power Station Superintendent, Northmet Power Company, Taylors Lane, Willesden, N.W.10. 1607

ELECTRIC Lamp factory requires Works Chemist for its small but well-equipped laboratory. If possible, some knowledge of fluorescent tubular lamps. Good prospects for the right man. The factory has good foreign connections with large research laboratories. Applications invited to—Box 1650, c/o The Electrical Review.

ENGINEER required by the Government of Nigeria for the Posts and Telegraphs Department for one tour of 12 to 24 months with prospect of permanency. Salary according to qualifications and experience in the scale of £475 rising to £840 a year. On a salary of £475 a year a local allowance of £24 is payable, plus separation allowance for a married man between £84 and £204, according to number of children. Outfit allowance of £60 where salary is £600 or less. Free passages and quarters. Candidates must hold a university degree in electrical engineering or have passed the Associate Membership examination of the Institution of Electrical Engineers, and have been definitely trained in telecommunication work. Applicants should write, quoting D.971A, to the Ministry of Labour and National Service, Appointments Dept., Central (T. & S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for the necessary forms, which should be returned completed on or before 21st April, 1945. 1655

ENGINEER with experience of works and production organisation, and control of personnel, required by important company in the electrical industry in the London area, in the capacity of Assistant Works Manager. Good prospects, salary and pension for man with the required qualifications.—Box 1649, c/o The Electrical Review.

ESTIMATING Engineers required by large electrical engineering firm (S.W. London area). Engagement only when present restrictions on engagement removed. Applications are now invited.—Box No. 297, L.P.E., 110, St. Martin's Lane, W.C.2. 1642

EXCELLENT opportunity occurs in small but rapidly progressing Manufacturers of high grade Electro Mechanical Products, with world export, for young men to train for Stock-keeping, Buying, Inspection and Distribution. Successful applicant will expand with the organisation and if proved worthy may be eventually offered a directorship. Only one with unimpeachable school and business records and able to produce highest references need apply. Anyone who is afraid of hard work or taking their coat off would find this situation incompatible to them. Age 23-26 (£200/300), London, W.1.—Box 1689, c/o The Electrical Review.

EXPERIENCED and energetic Representative required by well-known manufacturers of electric light fittings. Accustomed to working by car and stockroom. Good salary, expenses and bonus. Only first-class men need apply, stating age, education and experience to—Box 1590, c/o The Electrical Review.

J & N. Wade Ltd., 616, Finchley Road, London, N.W.11, wholesale electrical distributors, require London Representative with connection. Salary, travelling expenses and commission. Permanent situation for right man. 6869

MANAGER required with practical experience in installation and maintenance of M.G. sets and of low tension wiring systems. State age, full details of employment over past ten years and salary required.—Box E70, Scripps Advertising Agency, South Molton St., W.1. 1663

JAMES Scott & Company, Electrical Engineers, of Dunfermline, Edinburgh and Branches, are prepared to consider for post-war development, young Electrical Engineers between the ages of 25 and 40 years, for supervisory positions. Applicants should have technical qualifications equivalent to the Institution of Electrical Engineers Graduate Examination, and preferably with experience in electrical contracting, especially in erection and design of overhead extra high voltage transmission with wood and steel poles to very latest practice. Good prospects for energetic men. Commencing salary £400 to £650 per annum, depending on technical qualifications and experience. Apply in first instance, giving all particulars and stating salary expected, to—J. Sclar, James Scott & Co., Chapel St., Dunfermline, 1666

LARGE company in North-West area has vacancies for Senior Electrical Designers, immediately the present restriction on employment is removed. Applications are now required and applicants should have experience of design of all types of A.C. and D.C. machines. State age, experience and salary required.—Box 1592, c/o The Electrical Review.

LEADING firm of electrical contractors, London, prepared to consider applications for position of Manager. Applicants must have wide knowledge of and experience in the contracting industry, be fully qualified and capable of taking full charge of design and dealing with planning, preparation of schemes, estimating, etc. Write fully, stating age, experience and salary required. Confidential.—Box H.2500, Scripps's Advertising Offices, South Molton Street, London, W.1. 1652

MANUFACTURERS of Rubber and P.V.C. Cables, well established in South of England, wish to consider appointment of Works Manager for post-war development. Applicants, who must have had managerial or assistant managerial experience, should write full particulars to—Box 1644, c/o The Electrical Review.

OLD-established engineering company with world-wide connections requires the services of a first-class Export Manager. The successful applicant should have good general educational standard, together with practical experience of export sales of electrical engineering products. The position is regarded by the company as important and the salary range will be from £750 to £1,000, according to qualifications. Applications should be addressed in confidence to—Box No. 198, 8 Serle St., London, W.C.2. 1648

OVERSEAS Employment. Mechanical Inspector of Works (Temporary) required by the Government of Sierra Leone for the Electricity Branch of the Public Works Department for one tour of 12 to 24 months in the first instance. Salary £500 a year, rising to £600 a year, plus separation allowance for married men between £84 and £204, according to number of children. Outfit allowance £60. Free passages and quarters. Candidates must have served a recognised mechanical engineering apprenticeship and have had experience in the running and maintenance of water tube boilers and steam turbines. Experience in modern power station practice and in the running and maintenance of diesel engines would be an advantage. Applications in writing (no interviews), stating date of birth, full details of qualifications and experience, including present employment, also Identity and National Service or other registration particulars, and quoting Reference No. O.S.605, should be addressed to the Ministry of Labour and National Service, Appointments Dept., A.3(A), Sardinia St., Kingsway, London, W.C.2. 1654

PROGRESSIVE Company in the London area, intending to specialise in Electrical Measuring Instrument Manufacture as soon as the present restriction on employment is removed, invite applications for the post of Design Research Engineer. Applicants must have wide theoretical and practical experience in development of electrical and electronic apparatus. Excellent opportunity for really first-class man. Write, giving details of experience, salary required, etc., to—Box 1670, c/o The Electrical Review.

SALES Engineer required for preparation of tenders for switchgear. Applicant required to have first-class technical education and preferably to have had drawing office experience. This vacancy offers excellent opportunity to any young man with ambition, as this is the commencement of a sales section of a rapidly developing electrical engineering company.—Box 1643, c/o The Electrical Review.

STOREKEEPER for progressive company's London depot (W.C.). Knowledge of electrical accessories and electrical switch and switchfuse gear. State salary and experience.—Box 1671, c/o The Electrical Review.

STOREKEEPER required for electrical contractor's business, must be adaptable. Write full particulars and salary required, to—W. H. Smith, A.I.E.E., 172, Kensington Park Road, S.W.11. 6874

STOREKEEPER required by Electrical Contractor (London). Apply giving full particulars and wages required, to—Box 1574, c/o The Electrical Review.

SALES Representative wanted for travelling overseas to all parts of the world to visit existing agents and open up new business. Applicants must have had some experience in the electrical industry. Good opening for energetic man. Apply—Higgs Motors, Witton, Birmingham. 1668

TECHNICAL Commissions in H.M. Forces. Vacancies for two Captains exist in the Corps of Royal Engineers for General Service, with experience as indicated below. Candidates should not be over 45 and should hold a university degree or equivalent professional qualifications. (a) (One) Transmission Line Construction, capable of supervising outside repair work, principally on overhead lines; (b) (One) Electric Railway Traction Operation, capable of supervision, maintenance and operation of an electric railway system, from the electrical engineering aspect. Applicants should write, quoting D.1126A, to the Ministry of Labour and National Service, Appointments Dept., Central (T. & S.) Register, Room 5/17, Sardinia Street, Kingsway, London, W.C.2, for the necessary forms, which should be returned completed on or before 23rd March, 1945. 1692

TECHNICAL Copywriter with creative ability required on the staff of S. H. Benson Ltd., Kingsway Hall, London, W.C.2. Applicants must be able to write knowledgeably about electrical plant. Apply by letter to Production Director, stating age, experience and salary required. 1637

TECHNICAL Lighting Assistant required in London by large lamp manufacturers, to prepare lighting schemes for war applications, factories, public lighting, etc. Electrical and lighting experience and technical correspondent essential. Permanent position with post-war prospects for young man free of National Service obligations. Write, stating age, qualifications, experience and salary required, to—Box 1631, c/o The Electrical Review.

VACUUM Flasks Manufacturers wish to contact Expert, having experience in the manufacture of thermos flasks (vacuum, silvering and sealing). Applicants should state experience, etc., which will be treated in strictest confidence.—Box 6854, c/o The Electrical Review.

WANTED, for public utility undertaking in Scotland, District Engineer with full experience in the operation and maintenance of underground and overhead high and low tension mains distribution systems. State age, married or single, and full particulars of experience and technical training. Salary according to qualifications.—Box 1647, c/o The Electrical Review.

WANTED, Technical Journalist with special knowledge of electricity supply and applications. Whole-time post in London. Salary £600 to £850 p.a. according to qualifications. Write—The General Manager and Secretary, British Electrical Development Association, 2, Savoy Hill, W.C.2. 1645

WORKS Engineer required to take charge, improve and maintain existing methods of manufacture of small printed articles. Experience of printing machinery essential, knowledge of rubber and synthetics preferred. Should appeal to live man with own ideas anxious to join progressive firm.—Box 1575, c/o The Electrical Review.

WORKS Manager required by well-known Company with factory in N.W. London (light engineering and tools). Applicant must have considerable experience in works management and sound technical, organising and commercial ability. The company is on essential war work and is also engaged in the manufacture of products selling through a world-wide organisation to the building, electrical and hardware trades. Excellent post-war prospects for right man. Write, stating experience, age, salary required and when available.—Box 1613, c/o The Electrical Review.

APPOINTMENTS FILLED

Disatisfaction 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.

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ADMINISTRATIVE post required by Senior Draughtsman, age 37, experienced in H.T., L.T., H.F. and L.F. equipment, Higher National in Elect. & Mech. Engineering. London area preferred.—Box 6873, c/o The Electrical Review.

ADMINISTRATIVE Engineer (40). University Graduate. M.I.Mech E., M.I.E.E., with intensive technical and commercial operating and development experience with industrial and electricity supply undertakings, seeks position with post-war prospects inside or outside the engineering industry or as manager of electricity supply undertaking. Organisation, management, finance, company practice, contracting, construction, sales, public relations. Highest credentials.—Box 6810, c/o The Electrical Review.

ADVERTISER seeks position of responsibility Electrical Accessories Sales or Office Administration, methodical and efficient controller. Full particulars and salary.—Box 6858, c/o The Electrical Review.

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RMATURE Winding Foreman, thorough experience repairs, rewinds, assembly fractional to 500-h.p. A.C. and D.C., production or repair shop, desires permanent progressive position.—Box 6817, c/o The Electrical Review.

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SUPPLY Authorities, Qualified Electrical Engineer, M.I.E.E., (38), free from Government Service next few months, would appreciate enquiries in any of the following capacities: Generation, distribution, consumers' engineer, sales or development. Sound technical and executive background.—Box 6870, c/o The Electrical Review.

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6825

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Electricity Department

TENDERS are invited by the first post on Thursday April 12th, for the purchase of any of the following:

400-volt, 50-period, 3-phase A.C. Motors and Starters

H.P. of Motor	Unused Pre-War Stock						Second-hand.
	40	55	75	100	150	210	15
(Number for Sale)	1	2	1	6	2	3	1
							1

D.C. Motors and Starters

H.P. of Motor	440-460 volts.						220-230 volts.					
	75	25	20	10	3	4	1	4	4	1	6	2
(Number for Sale)	1	1	1	1	1	1	1	1	1	1	1	2

One Motor Generator, output 115 volts, 74 amps.

Tender form, giving further particulars, may be obtained on application to the City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6, Lancs.
H. H. TOMSON, Town Clerk.
1659

GEORGE COMEN SONS & CO. LTD.

for
GUARANTEED ELECTRICAL
PLANT.

MOTORS, GENERATORS,
SWITCHGEAR.

etc.

WOOD LANE, LONDON, W.12.
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STANNINGLEY, NEAR LEEDS.
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Established 1854.

27

REBUILT MOTORS AND GENERATORS

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

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE

DYNAMO & MOTOR REPAIRS LTD.,

Wembley Park, Middlesex.

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Also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.
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26

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- 2 Berry, 75 kVA, indoor, 11,000 volts primary, 3,300 volts secondary, delta star.
 - 1 Hackbridge, 10 kVA, indoor, 3,800 volts/415/240 volts, delta/star.
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- All above are for 3-phase, 50-cycle supplies.
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All above are in excellent condition and may be inspected by arrangement.

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1653

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Two 25,000 lbs. evaporation.	175 lbs. W.P.
Three 20,000 lbs. "	175 lbs. "
One 15,000 lbs. "	200 lbs. "
One 12,000 lbs. "	160 lbs. "
One 8, 10,000 lbs. "	200 lbs. "

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

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A large stock of surplus Electric, Fibre, Carbon Rods, A.I.D. Turnbuckles, etc. Also Searchlights (sale or hire), Mirrors, Lenses, also Wrenches of our well-known self-sustaining types. Hundreds of thousands supplied during the last 40 years to Govt. depts., corporations and traders.—London Electric Firm, Croydon.

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LAD-covered and Armoured Cables, P.I. and V.L.R. LAD-covered and V.L.R. Cables, several tons, new LAD-combination.—Box 6788, c/o The Electrical Review.

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MEL-Vick and B.T.H. 8-1/2-ton oil-burned, 11,000-watt and 6,000-watt Oil Switches; also ammeters and kW-meters. Low prices.—Belmont Manufacturing Co. Ltd., 22/24, Erlowin Walk, London, N.1.

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PHONE 98 Staines, 35-kW Crude Oil Set, 220 vo.; 35-kW Browett Steam Set, 220 vo.; 50-kW Hindley Steam Set, 440/220 vo.; 75-h.p. National Twin Diesel: Three-throw Ramp Pump, 3" x 6", 700 lbs. w.p.—Harry H. Gardam & Co. Ltd., Staines. 60

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ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

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TR.S. Cables and Flexibles, Welding Cables, supplied to M.O.S. requirements.—Edwards Bros., 20, Blackfriars Road, London, S.E.1. 6893

TRANSFORMER Lead-in Wire, 7/38 and 14/38 s.w.g.—Insu-Glass finished, various colours, stock.—Saxonia, Greenwich, S.E.10. 34

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TWO duplicate 73-kW, 230-volts, Diesel-driven Generating Sets, each consisting of 110-h.p. Crossley 4-cylinder, vertical, scavange pump, cold start, Diesel engine and direct coupled 73-kW, 230-volts compound wound D.C. Generator and Switchboard. New 1933 and 1936. £725 each complete set loaded on site.—Newman Industries Limited, Yate, Bristol. 1614

TWO 33-h.p. secondhand Laurence Scott Motors, 220 volt D.C., 250/375 r.p.m., compound wound, with full complement of new spares.—London Brick Company Limited, Stewarby, Bedford. 1639

1 11-h.p., 440-volt D.C., 500-r.p.m. Motor; 3 14-h.p., 400-volt D.C., 910-r.p.m. Motors. All Crompton Parkinson ball-bearing machines, shunt wound, complete with starters.—Browning's Electric Co. Ltd., Coleyn Castle, Green Street, London, E.13. 1537

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61 kW Turbo-Generating Set, 110 volt D.C., £40.—22 Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21. 55

71 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

25 kW, 220-volts diesel-driven Generating Set, consist. of 37 1/2 h.p. Crossley vertical diesel engine and direct coupled 25-kW compound wound generator, mounted on baseplate, complete with regulator.—Newman Industries Limited, Yate, Bristol. 1562

38 h.p. Motorised Reduction Gear Unit, 400/3/50, final speed 182 r.p.m., complete with Ellison starter, £140.—Electric Machinery Co. (M/cr.) Ltd., New Union Works, New Islington, Ancoats, Manchester. 1556

68 kW, 220-v., 770-revs. C.I. three-bearing Generator, J. P. Hall, with switchboard.—Greenhaigh Bros., Burton Field Mill, Atherton, Manchester. 1479

69 No. 20FS and 57 No. 35FS M.E.M. Starters and 100 No. 160K Foster Transformer Units, less brackets, all new. Best offer secures.—Box 1660, c/o The Electrical Review. 14

80 unused 1/2-h.p. Squirrel-cage Motors by B.T.H., 400/440 volts, 3-phase, 50 cycles, 1,420 r.p.m.; complete with unused push-button starters. Government licence or declaration required. Delivery ex stock.—George Cohen, Sons & Co. Ltd., Stanningley, Nr. Leeds. 1634

100 h.p. Drysdale Vertical Squirrel Cage A.C. Motors, 400/3/50, B.B., 1,440 r.p.m., 3 available, £60 each.—Electric Machinery Co. (M/cr.) Ltd., New Union Works, New Islington, Ancoats, Manchester. 1559

100 h.p. L.D.M. Squirrel Cage A.C. Motor, B.B., 720 r.p.m., 400/3/50, with starter, £170.—Electric Machinery Co. (M/cr.) Ltd., New Union Works, New Islington, Ancoats, Manchester. 1558

100 h.p., 400/3/50, S.R., 730-revs., Louvre Vent., B.T.H. (ball bearings), with Ellison O.I. gear.—Greenhaigh Bros., Burton Field Mill, Atherton, M/cr. 1478

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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. 1484

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NOTICE is hereby given that Mr. Andrew Bruce Muirhead, Consulting Engineer, practising under the name of "D. Selby Bigge & Co." of 48, West Regent Street, Glasgow, has taken into partnership as from 1st November 1944, Mr. Thomas Donaldson, who has been associated with the firm for many years. The name of the firm remains unchanged. 1641



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COMPANY MEETING

THE MIDLAND COUNTIES ELECTRIC SUPPLY COMPANY LTD.

THE Thirty-second Ordinary General Meeting of the above company was held on March 15th in London. Mr. William Shearer (the chairman) presided, and in the course of his remarks said:

Taking the war period as a whole, the rate of progress which we achieved in the immediate pre-war years has been maintained, not of course in the number of new consumers, but in the annual increase of load connected to the system and in the number of units sold to consumers.

In reviewing the results of all our operating companies, I cannot refrain from calling attention to the contribution we have made to the National Exchequer and local government in the form of rates and taxes. Out of our total trading profits for the last five years we have paid or provided for this purpose no less than 33 million pounds, whereas during the same period the amount of dividends paid to holders of Ordinary stock was £618,000.

These figures, read in conjunction with our low scale of charges to consumers, surely indicate how utterly misleading is a statement contained in the Socialist Party's manifesto of May, 1944, setting out its post-war policy for coal and power, reading as follows: "The solution of the power companies is the monopoly of control for the benefit of the shareholders, ours is the solution of public ownership and control for the benefit of the community."

As the future of our industry has become the subject of controversy, I make no excuse for referring again to certain proposals for nationalisation and public control, on which I have given my views at length a year ago.

The proposals outlined in certain quarters affect many branches of British industrial life, but it would appear that a few key industries, including our own, have been chosen as special targets by those who desire to create huge State monopolies involving a large extension of the bureaucracy, with an increase of political patronage.

The argument is sometimes advanced that if the revolutionary changes proposed were adopted, existing efficient managements would be retained under any scheme of nationalisation, and that, therefore, the benefits of both State ownership and private enterprise would be enjoyed. This is a specious argument, as I imagine that few men of enterprise, trained in business management, would consent to work permanently under the harassing conditions of Government control. No doubt a few would agree to carry on in these circumstances, but what of the next generation, brought up in the enervating atmosphere of rules, regulations, endless forms and returns?

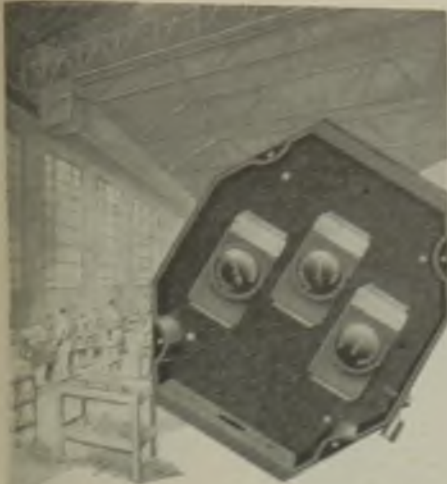
The industry within 20 years would be run by men with a typical civil service departmental outlook, an excellent and very proper outlook in its own sphere, but not in industry. Everyone knows that when the Government enters into the realm of ordinary trading there is a hampering influence; decisions are not quickly obtainable and when given are often reversed. This is by no means a criticism of our permanent civil service, the reputation of which is unequalled anywhere in the world.

The Government can, of course, by reason of the powers which it properly and necessarily obtains in time of war, achieve stupendous results in the field of industry, but in time of peace similar methods would ultimately ruin the richest nation and render competition in the world's markets impossible. Nobody in the business world would suggest that the Government, except by arbitrary price fixing arrangements, obtains the best value for money, judged by ordinary commercial standards.

The content of the proposals I have referred to would improve and cheapen the supply of electricity to the people is, in my opinion, illusory. They are designed to place one of the most vital industries in the country under the power of an ever swelling bureaucracy.

I mentioned last year that every responsible person engaged in the direction of our industry recognises that certain important changes affecting the distribution of electricity are both desirable and necessary, and having enumerated what these changes were, I expressed the view that they could be effected by relatively simple enactments which would avoid a long period of dislocation, if not, indeed, years of chaos. The power companies incorporated all their proposals in this connection in a well-considered memorandum which was submitted to the Minister of Fuel and Power in November, 1943. In the considerable interval that has elapsed, we have become more than ever convinced that these proposals, if adopted, would effect such reorganisation as is required in the interests of the public by means other than those involving "the serious and unnecessary dislocation of electricity supply" which, in the opinion of the McGowan Committee (confirmed in 1942 by the Cooper Committee) would ensue if the present undertakings were vested in public boards.

The report and accounts were adopted. 1664



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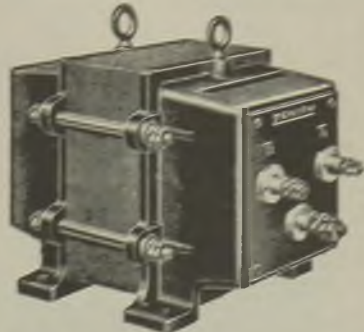
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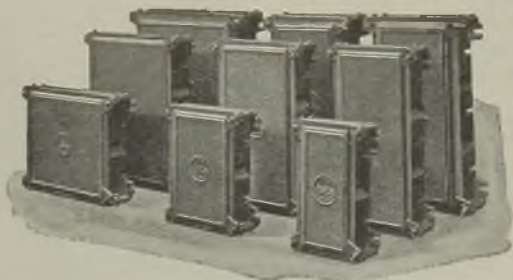
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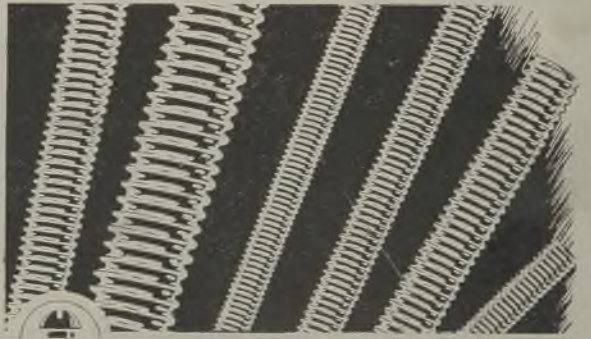
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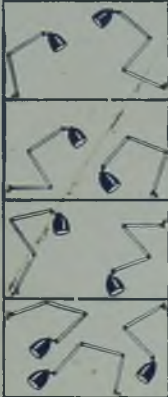
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