

THE

ELECTRICIAN

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Friday, June 22, 1945.

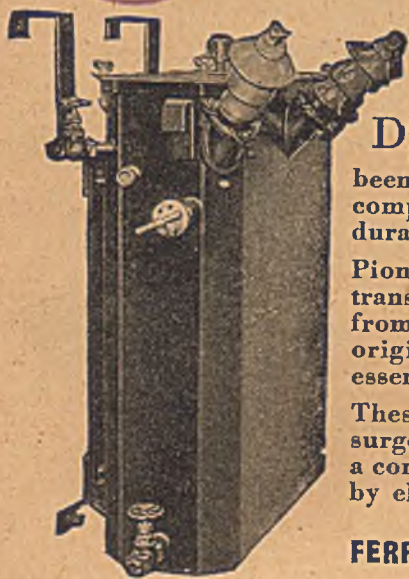
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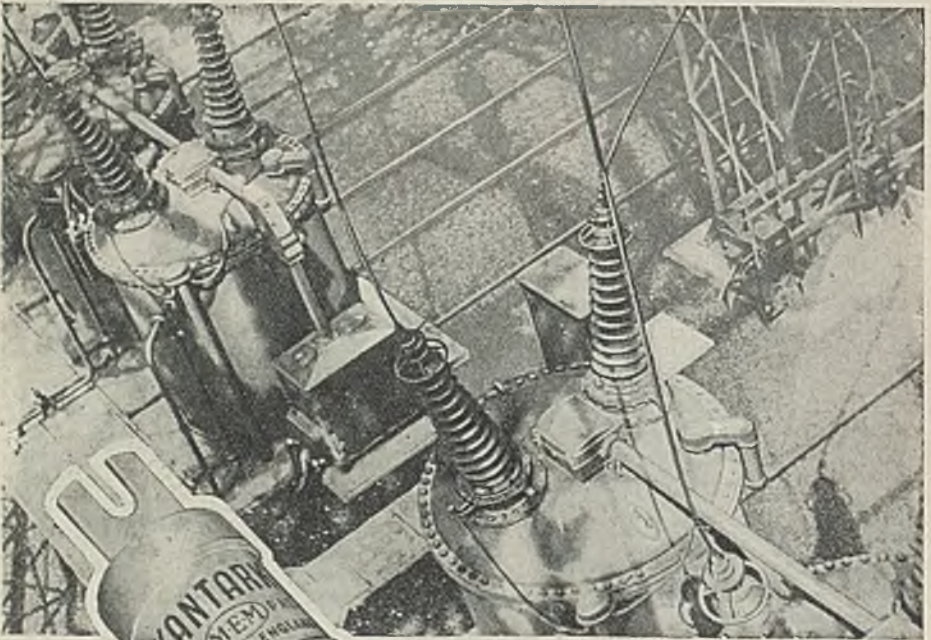
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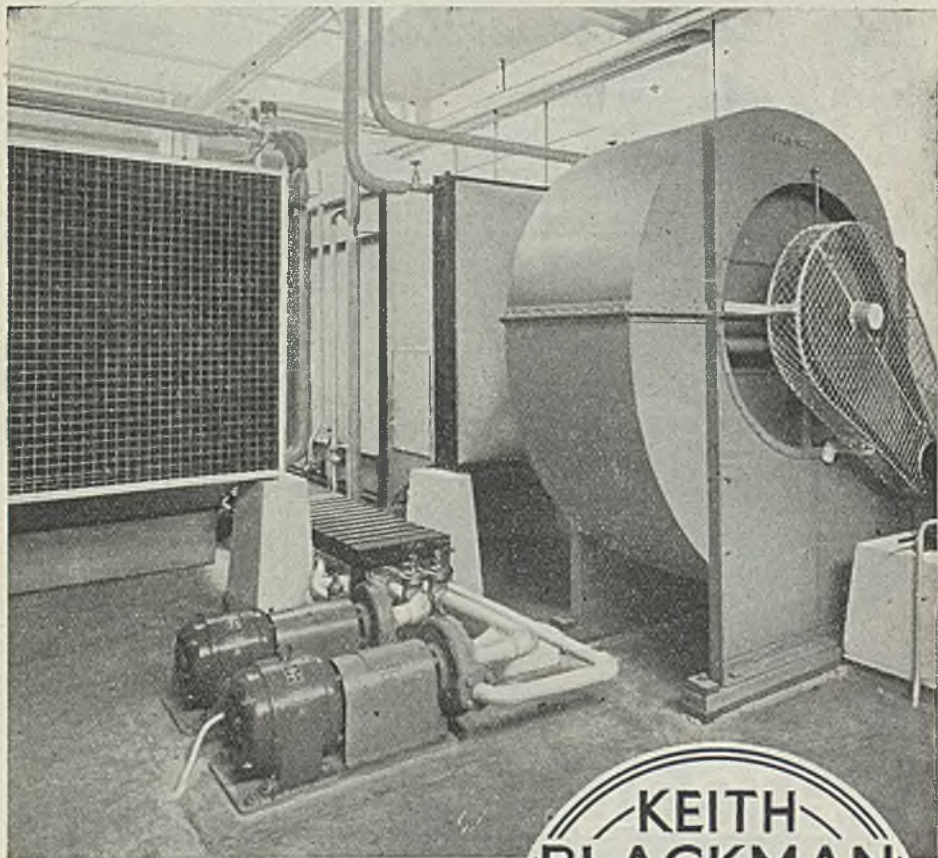
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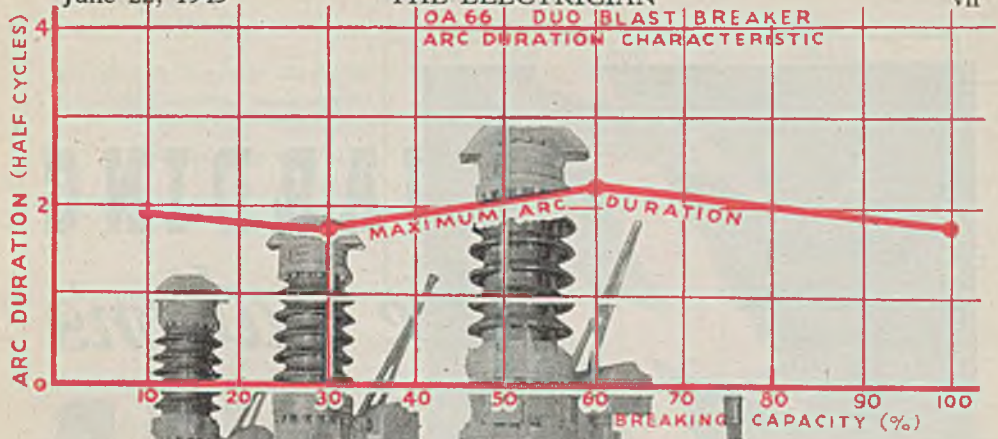


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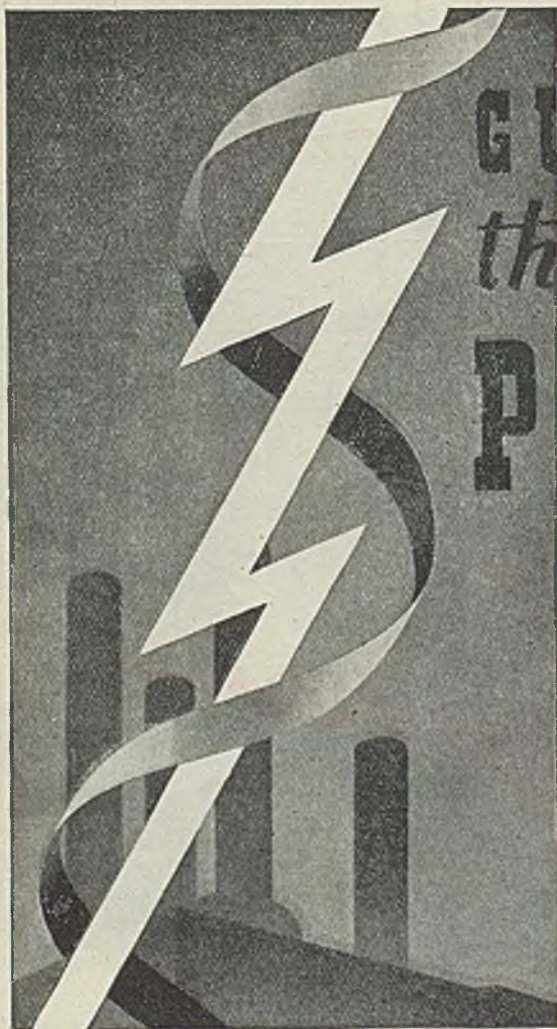
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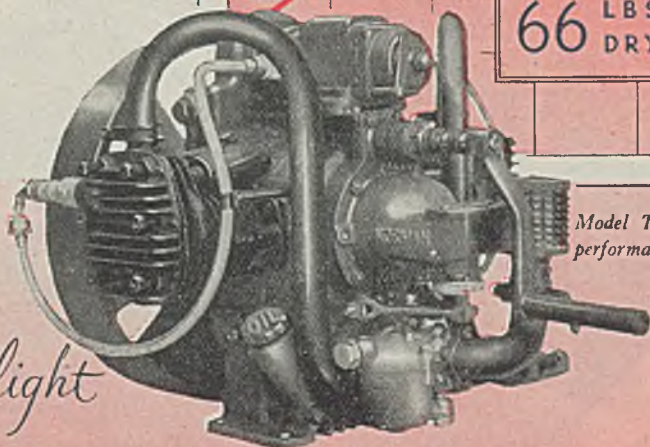
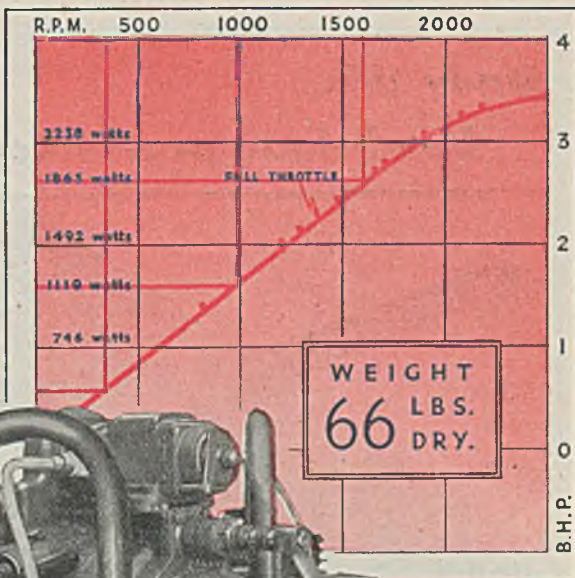
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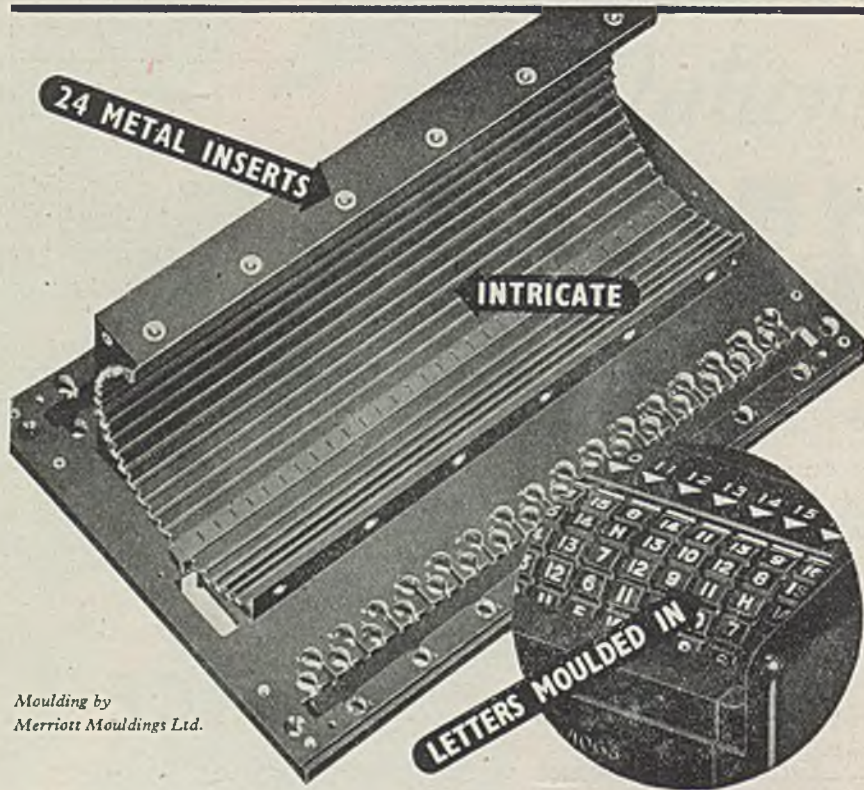
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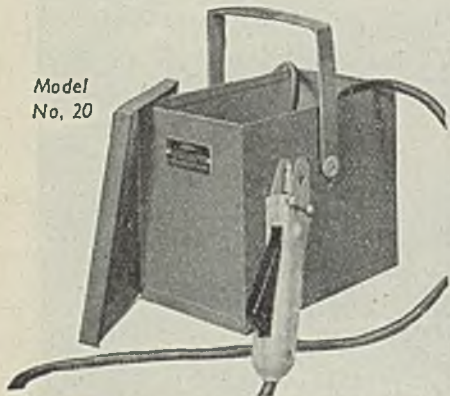
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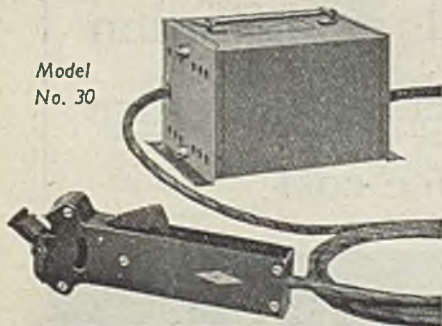
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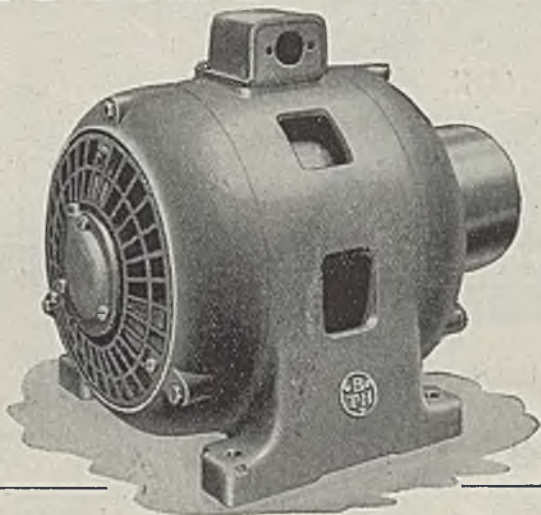
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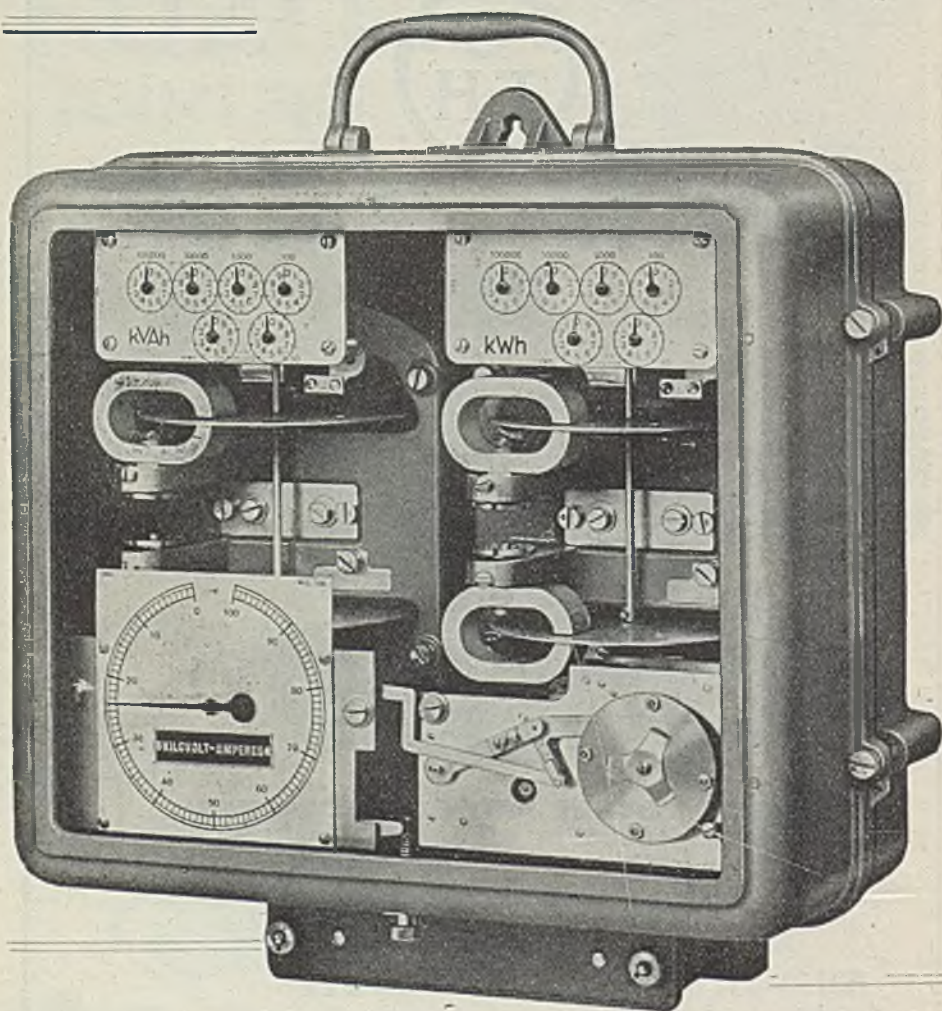
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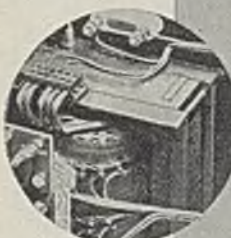
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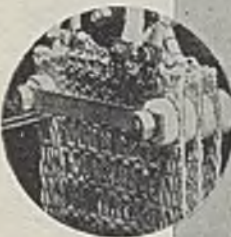
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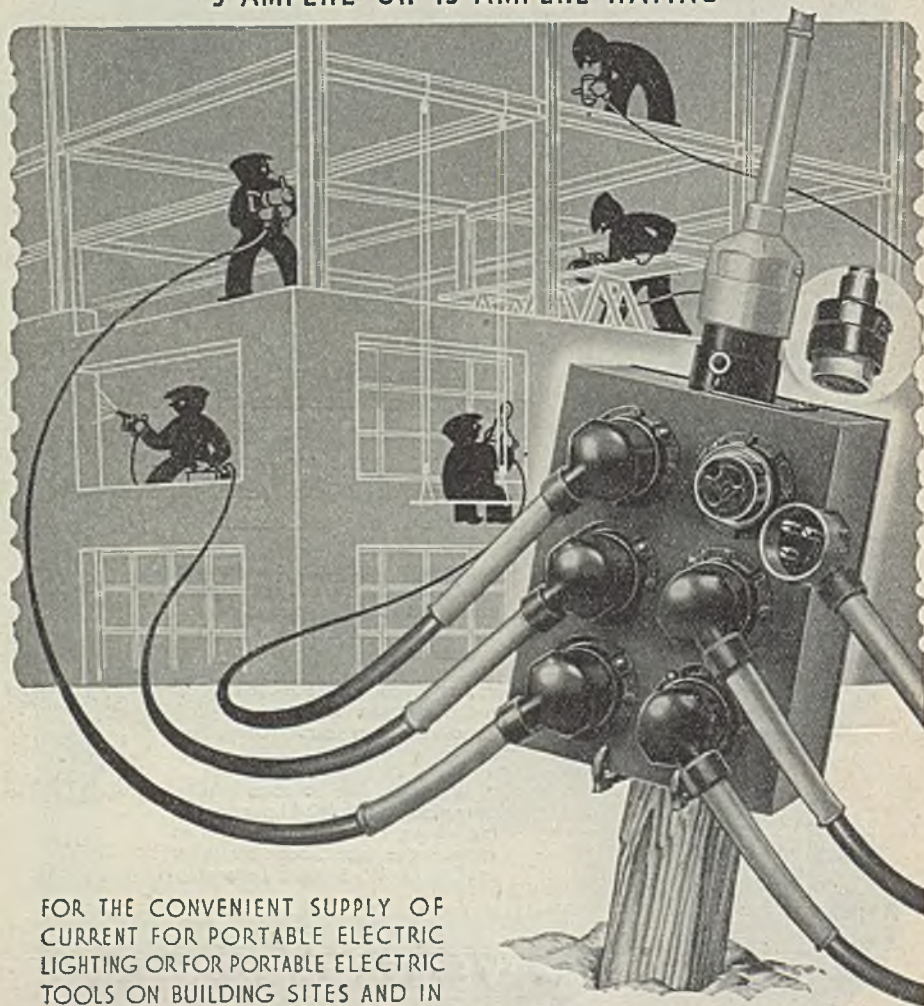
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EDWARD MOORE,
Town Clerk.

Town Hall, The Parade, Epsom,
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THE Governing Body invite applications for the appointment of Assistant Lecturer in Electrical Engineering. Applicants should have had a training in general electrical engineering and some industrial experience. Salary according to the London Burnham Scale. Further particulars from the Clerk to the Governing Body, by whom applications should be received on or before 5th July, 1945. **G. F. O'RIORDAN,** Principal.

BRADFORD EDUCATION COMMITTEE. TECHNICAL COLLEGE, BRADFORD.

APPPLICATIONS are invited for appointment as **ASSISTANT LECTURER** in **ELECTRICAL ENGINEERING** in this College.

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Further particulars of the appointment and forms of application may be obtained from the Director of Education, Town Hall, Bradford, and completed forms should be returned to the Principal of the College not later than 14th July.

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PATENTS

THE PLESSEY COMPANY LIMITED, of Ilford, Essex, have pleasure in announcing to the Trade that they are now manufacturing Mallory Vibrators under the following Patent Numbers:—549231, 550975, 566537, 568200; and Patent Application Numbers: 21759/43, 21760/43, 8614/44, 11936/44, 14460/44, 24972/44, 25335/44, 3350/45, 3545/45, 5343/45, 5344/45, 6372/45, 6373/45, 8406/45, 9416/45, 10254/45; and that enquiries are invited.

NOTICE is hereby given that A. H. Hunt Limited seek leave to amend the specification of Letters Patent No. 558,687 entitled "Improvements in or relating to the manufacture of electrical condensers."

Particulars of the proposed amendment were set forth in the Official Journal (Patents) No. 2942, dated June 15th, 1945.

Any person may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office, 25, Southampton Buildings, London, W.C.2, on or before the 13th July, 1945.

H. L. SAUNDERS,
Comptroller-General.

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Lecturer in Mechanical Engineering: J. Selwyn Caswell, M.Sc. (Wales), M.I.Mech.E., Assoc.M.Inst.C.E.

Lecturer: W. E. J. Farvis, B.Sc. (Bristol).

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Assistant Professor: R. Higgins, Ph.D. (Glasgow).

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Registrar.

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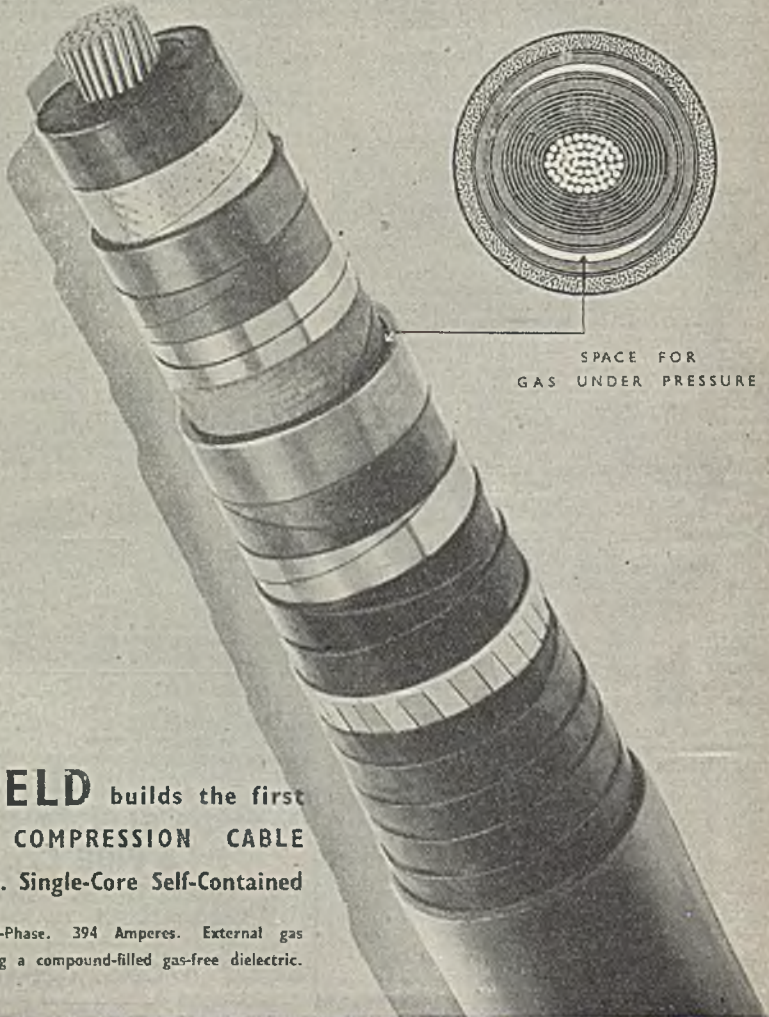
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No. 3499. [Vol. ^{No. 25} CXXXIV]

June 22, 1945

Annual Subscription 25s.
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Municipal Supply

THE large number of delegates who attended the annual meeting of the I.M.E.A. in London last week, made it clear that in spite of the motions on the agenda arising out of the two memoranda of the association with respect to the future of the industry, the Council have their full support and agreement. Apart from what might be termed the domestic interests of the meeting, covering the report, the accounts, and so on, the main attention of the delegates was centred about the motion, that the resolution adopted at the extraordinary general meeting of the association on April 26 last year, be rescinded so far as it relates to Part III of the White Memorandum.

When put to the meeting the majority of delegates present upheld the Council by voting against the motion, thus showing a sense of unity in the municipal supply industry which should do at least something to confound those who would have the public believe this not to be the case. The reason behind this thought is based on the fact that during the last few weeks the supply industry, as pointed out elsewhere in this issue, has been most

unfairly attacked by broadcasting politicians, while its operations have been "explained" by public speakers whose words on the subject make it obvious that they are hopelessly ill-informed on the matter. That being so, had the resolution adopted at the April 26, 1944, extraordinary meeting been rescinded last week, what then would have been more natural than that such speakers should at this time have seized upon something which took place in the proceedings of the annual meeting, divorce it from its atmosphere or context, and retail it in support of the view, already expressed, that the industry is in a state of chaos and muddle?

As it is the voting of delegates at the annual meeting was such that there can be no reasonable doubt that the majority are behind the Council so far as the memoranda are concerned, and though the recommendations made therein do not in every detail appear to be acceptable to every organisation associated with electricity supply, all, with only one exception perhaps, are opposed to nationalisation.

The meeting had about it an atmosphere of quiet confidence, and with Sir WILLIAM WALKER to guide the affairs of the association during the next year—following the good work carried out by the immediate past-president, Mr. W. P. LILWALL during the last difficult twelve months—that confidence was not misplaced. The new President is the first local authority representative to occupy the position, and the Council, in welcoming this change in leadership of the association have selected a man who, from his long experience and intimate knowledge of the industry, will uphold to the full the traditions of the office. The year just commenced will, by present indica-

tions, produce many problems affecting electricity supply, and though there is a certain amount of domestic disagreement as to how those problems can best be met, the country must be made to realise that such disagreement is purely a family affair and is in no way likely to undermine the industry, to retard its progress, nor delay its expansion. Future policy and ownership may be a delicate subject within the industry, but whatever argument may arise is private in character and warrants no interference from outside the immediate circle of electricity supply.

Birthdays Honours

FURTHER recognition of the achievements of the electrical industry which assisted in bringing the Allied Nations to VE-Day, is to be found in the Birthday Honours announced last week. The list includes names covering a wide field, and is representative of all grades of personnel—administrative, scientific technical, artisans and factory operatives. Modern warfare has been revolutionised largely by electrical devices, and their development and production by the industry, while not so spectacular as their use and operation by the Services, have been of equal importance. The number and wide distribution of the awards are indicative of the fact that the work of the industry is appreciated, and the recipients would no doubt be the first to admit that their fellows share the honours with them in equal degree.

Future Lighting of Aerodromes

AMONG the many fields of operation for the lighting engineer in the future will be that concerned with aviation, and more particularly the lighting of landing grounds. The development of aviation in this country will, we have been led to believe by the responsible authorities, in the future outstrip everything which was contemplated before the outbreak of war, and judging by the enormous advances which have been made in aviation as a result of war-time experience, such development may reasonably be more than an idle promise. With the increase in air transport, will open for the lighting engineer opportunities for illuminating new aerodromes and improving the facilities of the old, in a way which before the war was barred to him by the reluctance of the authorities to recognise more fully the important

part which lighting plays in the successful operation of an air-port. Pilots of civil aircraft, before the war were loud in their praise of the lighting arrangements made by Continental aerodrome authorities, but critical of the conditions which existed at some aerodromes in this country. This was not meant to be any reflection on the ability of British lighting engineers to provide equal facilities, but was due to insufficiency rather than inefficiency of equipment. Air transport has now assumed an importance out of all proportion to its pre-war position, and in order that we may not lag behind other countries in safety and convenience, the niggardly habits of the past where lighting was concerned will need to be forgotten.

Blind-landing of Aircraft

ANOTHER criticism of aerodromes in this country was that there were, before the war, few grounds fitted with blind-landing facilities of the Lorenz type. There again, the electrical industry offered to the aviation authorities, opportunities for making our airfields as up to date as any in the world, but the offer was in few cases accepted. As to the future, the inclement and changeable weather conditions of these islands, coupled with the increased number of aircraft which will use our airfields, suggest that blind-landing gear should be as much a part of our aerodrome service as café or hotel accommodation. The war will no doubt have done much to advance the development of equipment of this type, coupled with radio-location, and the chances are that the pilots of the world who use our airfields will look to this country for a lead. This is no idle thought for as the originators of the now world-famous system of radio-location we, as well as they, are entitled to expect, that our airfields will not only be the safest on which to land but also the easiest to find, irrespective of weather conditions. The close relationship which exists between aviation and electrical communications was never better demonstrated than during the European war; by the time the war with Japan is over, even better things may be offered to civil aviation. The application of the ingenuity of the electrical engineer to the needs of air transport is only possible, however, by the adoption of a more progressive attitude

of mind on the part of those who control our destiny in the air.

Belfast Electricity Undertaking

THE Belfast electricity undertaking by opposing the Ministry of Commerce has raised a situation of more than passing interest. The circumstances are that a proposal by the Electricity Committee to increase the plant at the Harbour power station met with the disapproval of the Ministry, but the City Corporation has decided to stand firm on the matter. An application to the Ministry for sanction to raise a loan to meet capital expenditure on an additional 30 000 kW turbo-alternator and three boilers was countered by the Ministry with proposals that the new plant should be installed at the Ballylumford station. The Corporation, having considered these proposals has confirmed the decision to extend the Harbour station and the Ministry has now intimated its intention to obtain a third opinion, from Sir JOHNSTONE WRIGHT, general manager of the Central Electricity Board.

Electric Power in Housing Drive

ELECTRICITY is to add punch to the housing drive and give assistance to the building operative if the aim of the Ministry of Works is realised in securing the full and proper use of those electrically-operated building tools, which step up output while reducing the strain on man-power. Because the magnitude and urgency of the Government's housing programme call for the greatest possible output on the part of every man in the comparatively small but growing labour force available, the Ministry has arranged for a series of demonstrations of power-driven hand tools to be given by a mobile unit which will tour the country. These will commence in a marquee on a bombed site in Watling Street, behind St. Paul's Cathedral on Wednesday next, when the Lord Mayor of London will preside at the opening proceedings. It is gratifying to know that with one or two exceptions, the tools to be demonstrated will be of British manufacture and this official advocacy of the use of electricity is yet another indication of the fact that at long last the need for modernising the methods of the builder is becoming more widely realised. If only the engineer were more closely listened to, the spectacular war-time achieve-

ments of the electrical industry might even be overshadowed by its accomplishments in the speedy re-establishment of our peace-time needs.

VE-Day Plus 45

AMONG the many pleasing things which have happened since VE-Day has been the dissolution of the National Gas and Electricity Committee, and the return to our daily newspapers of advertisements offering certain electrical domestic appliances for sale. The fading away of the National Gas and Electricity Committee does not yet apparently, mean that gas and electricity interests may enter into competition for public consumption of their fuels, nor is it clear whether the "gentleman's agreement" is still expected to be honoured. The fact that the Committee is no longer operative is, however, an indication that the natural condition between gas and electricity may come about at an early date; that is our hope at any rate. The return to the market of certain electrical appliances is doubly welcome, for the goods are being offered to the public at pre-war prices, and thus is demonstrated once again the desire of the electrical industry to give to every housewife the opportunity of testing for herself the claim that electricity is cheap.

The Loss of "Alert" and "Monarch"

MANY a good ship of the British Mercantile Marine has been lost during the last six years, together with many gallant seamen who manned them, and we learnt on Monday that to the Roll of Honour has been added the cable ships "Alert" and "Monarch." These two vessels were well known to seamen all over the world and their loss shortly before the end of the European war brought to an end a chapter in the history of communications. According to Mr. E. POWER, chairman of the Post Office Engineering Union, the "Alert" was lost with all hands with the exception of three members of her crew who were on shore leave. By a tragic coincidence two of these survivors were among those who were killed shortly afterwards when the "Monarch" was lost. The latter vessel was to some extent familiar to the public for in THE ELECTRICIAN of October 5, 1934, was reported its inspection during Telephone Week, a campaign designed to popularise the telephone.

I.M.E.A. Annual Meeting

Discussion on White and Brown Memoranda—Council Elections

THE annual general meeting of the I.M.E.A., was held in London on June 14, with the president, Mr. W. P. Lilwall (Fleetwood), in the chair.

In presenting the annual report, reviewed in our last issue, the President said that though the year covered by the report had not been spectacular, many important matters had been dealt with.

Questions on the Report

The report was discussed in detail and in reply to the few questions raised, the President said that the Council had no information, other than that given in the report, respecting legislation relating to radio-diffusion. Regarding the subject of Electricity Charges—Reserve Funds mentioned in the report, following the intimation by the Commissioners that they would consider proposals for the increase of tariffs where there was no coal clause, the Council had a successful interview with the Commissioners on June 13, when it was agreed that it should not be a condition of approval that reserve funds should be drawn upon unless such balances of reserve funds were substantial. It followed, therefore, that increases in prices might be approved to the extent necessary, up to the limit of 30 per cent. above pre-war to prevent any further deficiency falling on an undertaking. It had also been agreed that in suitable cases, where existing charges were low, that some margin might be allowed for the partial restoration of a reserve fund that had been wholly or largely depleted, or where there was not a sufficient balance to provide working capital.

In regard to the paragraph in the report stating that the National Gas and Electricity Committee had been dissolved, a question was asked whether the natural consequence of this was the end of the alleged truce between gas and electricity undertakings, and whether the Commissioners would consider removing the restrictions on extensions of undertakings.

The President said this point had not yet been taken up with the Commissioners and there still remained difficulties with regard to shortage of labour and materials. He had no doubt, however, that the Commissioners would give sympathetic consideration to this matter.

The report and accounts were then adopted.

Mr. W. Davies (Tredgar) then moved the resolution referred to in our last issue, respecting holding companies, and in support referred to what he called the

ramifications of such companies and urged that a Government Commission should be appointed to investigate their operations. Whilst municipal electricity supply undertakings were called upon to publish their accounts and were subject to certain limitations, such as contributions to rates, etc., such limitations being to safeguard the interests of the public, he asserted that the development of holding companies was a device for concealing the operations of a certain type of company-enterprise and was designed to extract profit from the industry without public scrutiny or criticism. As the law stood to-day, it was almost impossible to obtain reliable financial statistics concerning the operations of holding companies. They had no statutory powers and therefore had no statutory responsibilities, and they were outside the control of any Government department. Thus there was within the industry an elusive organisation of growing strength, and neither in the Electricity Supply Acts nor in the Companies Acts was there adequate provision for the control of the operations of these companies.

Mr. C. W. Dixon (East Ham) seconded the resolution.

The President pointed out that this matter was covered in the White Memorandum, already adopted by the I.M.E.A., where it was stated that the Special Committee under Lord Sankey should be asked to resume its consideration of the operations of holding companies.

The resolution was then put to the meeting and adopted without discussion.

Coun. A. Stephenson (South Shields) was to have moved a resolution consisting of three parts, but the President proposed that the first part should be taken separately and the other two parts would be dealt with after a decision had been come to on the first. Coun. Stephenson then moved in effect that the resolution adopted at the extraordinary general meeting of the association on April 26, 1945, with respect to electricity distribution, policy and practice, be rescinded in so far as it related to Part III of the memorandum.

Presenting his resolution, the full text of which was given in our last issue, Coun. Stephenson mentioned that the Council were giving way to private enterprise and he criticised the manner in which the vote was taken on the resolution passed at the April meeting, and also the manner in which the March meeting had been con-

ducted so far as the vote was concerned. At the March meeting there had been a show of hands, then a card vote and, finally, a poll, and all three votes were clearly against the adoption of Part III of the memorandum. In April there had been a show of hands and the vote reversed the March decision. Therefore, the object of his resolution was to obtain a clear decision with regard to the matter; he did not question the validity of the resolution already passed. Part III of the memorandum proposed to take away the rights of purchase now possessed by local authorities, and to leave it to an Area Committee to say to what extent any purchase powers should be exercised by local authorities before any application was made by the local authority to the Electricity Commissioners. He claimed that local authorities having such purchase rights should be able to make direct representations to the Commissioners and the South Shields Council and Electricity Committee regarded the intervention of the proposed Area Committee as a piece of time-wasting machinery which, in effect, put up a smoke screen behind which private companies could extend by way of purchase, or amalgamation or holding company. All this was against the principle of public-ownership which the I.M.E.A. had expressed itself in favour of. South Shields had certain purchase rights in 1946 but had agreed with the Commissioners to defer action for a further year, but his Council strongly objected to any control over those purchase rights being exercised by an Area Committee, notwithstanding the fact that it was stated that such Committee would act only in an advisory capacity.

Mr. R. C. Widgley (Dover) seconded.

Mr. F. Newey (Lincoln), who was president at the time of the March and April meetings when the two memoranda were discussed, viz., that which gave the I.M.E.A. views, and the other containing matters upon which agreement had been come to with the companies, said it had been made clear that this was a motion to rescind the action taken at the April meeting. In his view there was no inconsistency between the two documents, and the Council had all along maintained there should be public control of electricity supply. In the Brown memorandum it was stated that where there was to be a transfer, it should be to public-ownership. It had never been suggested that a local authority should lose its identity, but rather that local authorities should be given greater powers, not even limited to present local authority boundaries. That was the position which was envisaged 15 months ago and he personally had no reason to change his views on the matter.

Ald. Gillett (Oxford) supported the resolution.

The President said it must be borne in mind that in an association of 349 members it could not be expected that they would all agree. The majority supported both the White and the Brown papers, The minority had taken their case to the Minister of Fuel and Power and explained their position so that the Minister was aware of their views. What more could now be done? To suggest that the association should rescind the resolution passed last year was asking the I.M.E.A. to put itself in such a position that nobody in the future would take the slightest notice of it.

A vote was then taken on the resolution, when an overwhelming majority against it was declared on a show of hands. A poll was then demanded, and the necessary number of members supported the demand.

The President, in arranging for the poll, said that those who voted for the resolution would vote for rescinding what had already been done; if they voted against the resolution they would be voting in favour of the White memorandum. He repeated this explanation twice to make the position quite clear.

The result of the poll was 96 for the resolution and 337 against it.

Coun. Stephenson then moved the remainder of his original resolution, to the effect that the Minister of Fuel and Power be informed that the associations and groups mentioned in the memorandum had been unable to reach agreement on the advice to be tendered to the Minister on the principles to be observed in relation to (a) the ownership of distribution undertakings; (b) the ownership of generating stations; and (c) the establishment of a national standard bulk supply tariff; and that, in the circumstances, the Minister be asked to seek the separate views of the various associations and groups on these matters, also that the I.M.E.A. re-affirms its faith in the continuation and extension of public-ownership and control of the supply industry, as set out in the association's Memorandum of Association, and that the Council be instructed to proceed in the conduct of the association's affairs in accordance with this declaration.

Mr. Garfield Richards (Port Talbot) seconded.

Mr. J. Eccles (Liverpool) moved an amendment on behalf of the Council to the effect that the Minister of Fuel and Power having been definitely informed by the association of its views in the Brown memorandum, the association affirms its faith in the continuation and extension of public-ownership and control of the supply industry.

The amendment, he said, was in almost the same terms as the resolution but the point was that the Minister was already in possession of the views of the I.M.E.A. on the matters referred to in the resolution, having in May received a deputation, at his own request, to hear them explained.

Ald. G. B. Brooks (St. Marylebone) seconded the amendment.

The President asked Coun. Stephenson whether, in view of the vote on the first part of his resolution, he would be prepared to accept the amendment but the latter said that he had no authority from his Council to do so.

The meeting demanded that the vote should be taken, after Coun. Stephenson, and also his seconder, Mr. Garfield Richards, had spoken again, and on a show of hands the resolution was declared lost by an overwhelming majority; a demand for a poll did not receive the necessary support.

The amendment was then put as the substantive motion and carried.

The following elections to the Council were announced:

Group A: *Local Authority*—Coun. W. F. Walters (Abertillery). *Engineers*: Messrs. H. Breckell (Oswestry); O. G. Cok (Bingley). Group B: *Local Authority*—Ald.

W. F. Sowter (Bedford); Ald. C. A. Critchley (Blackburn). *Engineers*: Messrs. F. Newey (Lincoln); E. E. Hoadley (Maidstone). Group C: *Local Authority*—Ald. A. Critchley (Liverpool). *Engineers*: Messrs. J. Eccles (Liverpool); Edward Jones (Cardiff).

Sir William Walker was then invested with the Presidential Chain of office and after expressing his appreciation of the honour, proposed a vote of thanks to the retiring president, Mr. Lilwall. This was seconded by Mr. F. Newey who personally thanked Mr. Lilwall for supporting him as president during a period of 18 months.

The President announced that **Mr. J. S. Pickles** (Dumfries) had been elected vice-president for the ensuing year, and the announcement of the election of Mr. H. C. Lamb, formerly city electrical engineer and manager, Manchester, as honorary member followed.

Mr. Sutton (Bermondsey) asked if the Council would take up with the Minister of Fuel and Power the present restriction that a supply of electricity should not be given to any person who already had alternative supplies of heat and light.

The President said the matter had already been raised with the Council and they would see what could be done to have the restriction removed.

The meeting then closed.

I.E.E. Transmission Section

THE Transmission Section of the I.E.E. set what promises to be a popular precedent, likely to be followed by the other specialised sections of the institution, when it held a pleasantly informal dinner at the Connaught Rooms, London, on Tuesday evening. Mr. W. H. Grimmitt, chairman of the section, presided over about 240 members and guests.

The Chairman mentioned that the Transmission Section had 2 000 members, and that day they had elected 22 more.

Mr. T. G. N. Haldane, a vice-president of the institution, deputising for the President, said they were meeting at a time when there was certain exuberance in political circles. With that form of activity they were not concerned, but he would venture to predict two things, entirely regardless of what might be the result of the forthcoming General Election. In the first place he hoped and believed that whatever Government was returned to Westminster it would, as a result of our experiences during the last six years, meet with a far greater measure of national unity than we had known in the past. The second thing was that in the future we would approach our national problems in a far more scientific spirit than we had done in years gone by. He believed that the latter approach

would result in the Government making increasing use of the institution, and its two great sisters, as representing the opinions and knowledge of the engineering profession. If he was right in that prediction, then the Council of the institution must of necessity turn more and more to the specialised sections for knowledge, advice and guidance, and so their importance would increase to an even greater extent than at present. He thought the specialised sections were in the same relation to the Council as the senses were to the human mind. The Council must depend on them to supply its senses.

Mr. E. W. Moss, a past-chairman of the Measurements Section, speaking in humorous vein, voiced the thanks of the visitors for the section's hospitality.

L.N.E.R. Electrification.—Sir Charles Newton, L.N.E.R. chief general manager, has announced that work on the electrification of the Manchester-Sheffield rail route is to be resumed at the earliest possible date. He points out that the war interrupted a number of important schemes for improving L.N.E.R. transport. When these works were completed the problem of improving other standards of efficiency would be tackled.

Electrical Personalities

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

Mr. F. P. Bishop is to become as from July 1, joint managing director of Broadcast Relay Service.

Mr. S. Hunt, meter superintendent of the Central London Electricity, Ltd., is retiring on June 30, after 42 years' service.

Mr. Percy Moon, for over 20 years commercial assistant to the Fleetwood electricity department, is retiring on pension.

With the retirement of **Mr. Geoffrey Barford** from the board of Aveling Barford, Ltd., **Mr. FitzHerbert Wright** and **Mr. James Barclay**, have been appointed works and commercial directors, respectively.

Mr. F. R. Unwin, has been appointed manager of the instrument and switch-gear department at the head office of the General Electric Co., Ltd., after eighteen years as district manager of the company's branches in Ireland. He joined the firm in 1919, having served his engineer's apprenticeship with Crompton and Co., Ltd., at Chelmsford, a period of training in electrical engineering at Central Technical College, South Ken-



Mr. F. R. Unwin

sington, and two years with the British Thomson-Houston Co., Ltd. He was chairman of the I.E.E. Irish Centre in 1933, and later vice-president of the Belfast Association of Engineers.

On this page is reproduced a portrait of **Mr. I. R. Cox**, general sales manager of the Metropolitan-Vickers Electrical Co., Ltd., who, as announced in our last issue, has been appointed managing director of the company. **Mr. J. F. Perry** has been appointed general manager of the Metropolitan-Vickers Electrical Export Co., Ltd., and relinquishes his position as sales manager of the plant department. **Mr. F. J. E. Tearle** has been appointed a director of the Metropolitan-Vickers Electrical Export

Co., Ltd., and retains his appointment as principal representative.



Mr. I. R. Cox



Mr. J. F. Perry



Mr. F. J. E. Tearle

The marriage took place at Worthing, on June 9, of **Flt.-Lt. Rockliffe**, of Thornton Heath, Surrey, and **Section Officer Nora Brenda Mortimer**, W.A.A.F., daughter of **Mr. H. J. Mortimer**, borough electrical engineer and manager, and Mrs. Mortimer, of Worthing.

On his retirement from the position of Blackpool's electrical engineer, after 45 years in the service of the Corporation, **Mr. H. F. Shanahan**, on June 16, was presented with a silver salver by members of the Electricity Committee, the Chairman (Ald. Geo. Whittaker, J.P.), entertaining the Committee and officials of the electricity works. **Mr. F. J. Cole**, who is succeeding Mr. Shanahan, was a guest.

For health reasons, **Major H. G. Rowe** is relinquishing the managership of the turbine sales department of the British Thomson-Houston Co., Ltd., on June 30, but will continue to serve the company in a consulting capacity. He joined the company in 1911 and has been in charge of turbine sales, since March, 1919. His successor is **Mr. C. K. Bird**, assistant manager of the department.

Mr. J. Johnson Smith is relinquishing his position as London manager to Johnson and Phillips, Ltd., to manage the southern area sales of the Electric Construction Co., Ltd., as from July 2. He joined Johnson and Phillips, Ltd., in 1933. Mr. Johnson Smith was chairman of the A.S.E.E. for the year 1939-40.

Mr. John Horne has been appointed London branch manager for Johnson and Phillips Ltd. in succession to Mr. J. Johnson Smith. Mr. Horne has been associated with the company's London sales organisation for over twenty years.

By a printer's error the name of the late **Mr. L. R. A. Le Bouvier**, a director of the Jerusalem Electric and Public Service Corporation, was substituted for that of the late **Mr. W. H. Grieve**, chairman and general manager of Lightalloys, Ltd., in the death notices in our last issue.

Mr. A. E. Beezer has been appointed

works manager to the General Cable Manufacturing Co., Ltd., with whom he has been employed for the last ten years. He commenced his career with the Weston Electric Co., Ltd., before serving in the Great War. He then went to the Telegraph Construction and Maintenance Co., Ltd.

Birthday Honours

NAMES of electrical interest appearing in the list of Birthday Honours published last week were as follows:

Baron: Sir Eugene Ramsden. He is on the board of B.I. Cables, Ltd., Yorkshire E.P. and other companies. *Baronet:* Sir (Alfred) James Hawkey, a director of the Folkestone Electricity Supply Co., Ltd. and other supply companies. *Knights*

Bachelor: Mr. T. A. Eades, vice-chairman and managing director of the Automatic Telephone and Electric Co., Ltd., and on



Mr. T. A. Eades

the board of B.I. Cables, Ltd.; Mr. J. W. Gibson, a director of Pauling and Co., Ltd.; Prof. C. E. Inglis, F.R.S., lately Professor of Mechanical Sciences, University of Cambridge, and a director of the Cambridge Electric Supply Co., Ltd.

C.I.E.: Khan Bahadur Abdul Ghafoor Khan, M.I.E.E., Deputy Controller-General of Inspection (Civil Wing), India.

C.B.E.: Mr. L. E. Mather, chairman of Mather and Platt, Ltd., and Regional Controller, Ministry of Production. *O.B.E.:*

Mr. J. D. Gulick, electrical engineer, New Delhi Municipal Committee; Mr. A. B. Cowen, chairman and chief engineer, Electricity Supply Commission, S. Rhodesia; Mr. F. T. Jackson, chairman and managing director, Telephone Manufacturing Co., Ltd.; Mr. A. W. Montgomery, technical director, Standard Telephones and Cables, Ltd.; Mr. C. Riley and Mr. T. G. Travis, sales managers, General Electric Co. Ltd.

M.B.E.: Mr. H. J. Brewster, works manager, Mawdsley's, Ltd.; Mr. I. M. Lyon, superintendent, Babcock and Wilcox; Mr. V. S. Riseo, director, electrical engineering, Indian Department of Supply; Mr. Frank Ashton, works manager, Bulpitt and Sons, Ltd.; Miss A. Cook, deputy to the general manager, Belling and Lee, Ltd.; Mr. H. R. Forrest, honorary fuel technologist to the Regional Controller, London and S.E. Region,

Ministry of Fuel and Power; Mr. B. H. Hemming, chief engineer, A. C. Cossor, Ltd.; Mr. H. E. Humplries, manager, Siemens Brothers and Co., Ltd.; Mr. C. P. Johnson, machine development section, Johnson Condenser Co.; Mr. H. Nutton, principal, Wimbledon Technical College; Mr. G. W. Preston, manager of the Copper Development Association; Mr. A. D. Priestland, works manager, Mullard Radio Valve Co., Ltd.; Mr. H. L. Satchell, manager, British Thomson-Houston Co., Ltd.; Mr. R. R. Strand, assistant, first class, National Physical Laboratory. *B.E.M.:* Mr. C. R. Appleby, general foreman, B.T.H. Co., Ltd.; Mr. H. G. Calder, fitter, Ultra Electric, Ltd.; Mr. H. Cooper, foreman, Laurence Scott and Electromotors, Ltd.; Mr. J. Ditchborne, charge-man electrician, Sunderland Forge and Engineering Co., Ltd.; Mr. F. A. Fossey, section leader, drawing offices, B.T.H. Co., Ltd.; Mr. D. Foster, tool room charge-hand, Salford Electrical Instruments, Ltd.; Mr. E. Furnell, senior operator, M.O. Valve Co.; Mr. W. Heslop, toolmaker, Standard Telephones and Cables, Ltd.; Mr. L. W. Holborn, plumber jointer, Hull electricity department; Mr. E. C. Housley, machine shop foreman, Marconi-Instruments, Ltd.; Mr. J. Jobling, foreman, Electroflux, Ltd.; Mr. J. J. Kirkham, foreman fitter, Radio Transmission Equipment, Ltd.; Mr. D. McMillan, foreman electrician, Tilford, Grier, Mac Kay and Co., Ltd.; Mr. R. Milton, supt., B.T.H. Co., Ltd.; Mrs. A. Meredith, behinder, sheet rolls, B.I. Cables, Ltd.; Mr. W. E. Payton, general maintenance engineer, A. C. Cossor, Ltd.; Mr. E. Baden Powell, tester, English Electric Co., Ltd.; Mr. T. Robinson, assembly general foreman, Metropolitan-Vickers Electrical Co., Ltd.; Mr. J. Thomson, chargehand, Scottish Cables, Ltd.; Miss R. Thornton, capstan operator, G.E.C. Ltd.; and Miss F. A. Wheeler, radio assembler and adjuster, Automatic Telephone and Electric Co., Ltd.; Mr. G. A. Billings, chargehand, G.E.C. Ltd.; Mr. G. W. Marshall, horizontal borer, Fraser and Chalmers' Engineering Works; Mr. W. Price, instrument maker, Aeronautical and General Instruments, Ltd.

Lighting of Aerodromes

By G. A. T. EURDETT, A.M.I.I.A.

THE development of commercial aviation in the years preceding the outbreak of hostilities brought with it a new phase of illumination, viz., aerodrome and airway lighting. In the years ahead this aspect of lighting will be even more important.

Indications are that aviation will be developed as to lead to round-the-clock flying of both passenger and freight aircraft, and this will mean that the illumination of airfields will need to be developed at the same rate as the operational side of the industry.

The problems connected with this form of lighting are many, for aerodrome illumination must function by day as well as by night. In fact day-time lighting of airfields in and around Great Britain is of primary importance, chiefly owing to the rapid changes in weather to which these islands are subjected.

Factors To Be Considered

Among the number of factors which must be taken into account when designing aerodrome lighting installations, the chief is obviously the safety of the aircraft. Others may be summarised as: (a) Each system must conform to agreed international standards. This is so that there is no possibility of confusion on the part of pilots when attempting to land at, taxi over, or take off from an unfamiliar aerodrome and landing field. (b) The system of illumination must be as simple as practicable so that pilots may easily memorise procedure. This is particularly important where planes arrive from long distance flights, sometimes during bad weather. (c) The layout of systems must be such that there is no possibility of confusion from the air with other forms of illumination such as advertisement signs and other non-navigational lights. (d) All lighting fittings and equipment must be suitably designed and installed so as not to cause obstruction to aircraft upon landing, taxiing and taking off. Particular importance should be paid to this factor to ensure that lighting equipment which is not regarded as a normal obstruction is also not a potential obstruction in the event of a pilot making a false landing, viz., over-shooting or under-shooting of runways or unavoidable swinging off the runway upon landing. (e) In addition to aerodrome illumination there is also airway illumination which serves as a navigational guide throughout the journey of aircraft. All permanent obstructions should therefore be suitably illuminated

and other lights suitably placed as guides so that an aircraft may always maintain its track by visual means, or the pilot ascertain his position should he unavoidably drift from his right course. (f) All local lighting systems should be controlled from one central position at each aerodrome to ensure that they are put into operation instantly they are required and, for reasons of economy, switched off when no longer needed. (g) An emergency system should always be available. For aerodromes along important routes, this should consist either of a standby supply or generating plant in addition to emergency equipment, that is hand-operated by trained personnel in the event of the electricity supply system failing.

Aerodrome illumination to-day is largely in abeyance. First because all or most airfields are under direct control of the respective Service Authorities in the various countries, and secondly, because civil flying is practically at a standstill.

So far as future policy is concerned, international standards will, in all probability, be based upon pre-war systems, after weighing up their advantages and limitations, experience gained during war-time when large numbers of aircraft have been handled during conditions of severe black-out, and the extent to which civil aviation will develop during the years to come.

War-Time Experience

During the European war a considerable amount of experience has been gained by most countries, but especially by this and the United States, and the pooling of information derived from the following sources is anticipated: (1) The illumination specialists of the Air Councils or their equivalent in each country engaged in operational aviation during the war. (2) Pilots and air crews who handled aircraft during that period. Such information from air crews will be of the utmost value since they, more than anyone else, are aware of the limitations of existing systems, and should be in a position to suggest what improvements might be made to aid the local control of aircraft. (3) Ground personnel, e.g., controllers with years of experience in handling large numbers of aircraft in the face of weather hazards, black-out conditions and enemy action during take-offs and landings.

Though the majority of both airmen and ground personnel may not be expected to be conversant with the technicalities from the illumination viewpoint, since they are not lighting specialists, their opinions

will be most valuable in that they will represent the broad view. When sufficient evidence has been collected and sifted, the international design and layout may then be decided upon.

To encourage research, all ideas from manufacturers and users should be carefully examined by the appointed standards committees, when trials may be arranged before the ideas are incorporated into standard practice.

Conditions Governing Future Policy

Where deviations from standard are desirable at any particular aerodrome, due to geographical or topographical considerations, standard markings should be installed to indicate to the pilot that non-standard conditions apply, and should he not be aware of the exact difference he should be able to request information by radio telephone or, if practicable, land at another airfield.

Although at present it is not possible to envisage future policy of any country, certain aerodromes may probably function differently. For example, should glider flying develop, either for freight or passenger traffic, landing systems at these aerodromes would differ from those dealing solely with powered aircraft and the illumination system would therefore differ.

Others may take heavy aircraft only and some all types of aircraft. Further, some aircraft land more satisfactorily with a straight approach to the runway, while others need a curved approach. Such factors also require consideration.

Experience in pre-war days showed that small aircraft of the Tiger Moth type must land direct into the wind, while it is known that other aircraft may land satisfactorily and with safety with a fairly high cross wind up to a specific angle.

The system of illumination will be affected by these varying characteristics, particularly where concrete runways are installed so that the direction of landings, and therefore, the layout of the flarepaths, are strictly limited by the direction and number of the existing runways.

Such points as these indicate that the successful aerodrome illuminating engineer must either know at least the rudiments of aviation or, which is more satisfactory, systems must be designed in collaboration with recognised experts on aviation.

Although during the years of war, aerodrome lighting was limited to the barest possible minimum, it was, in some respects, more satisfactory than many peace-time installations. During war-time most lights visible from the air are connected in some way or other with aviation, so that the pilot of an aircraft is easily able to distinguish one from another. In peace-time, with the whole country ablaze with light,

it is not so easy to distinguish aerodrome lights from other lights, e.g., streets, advertisement signs and so forth.

With the possible increase in the near future of the number of aerodromes and the probable increase in the number and intensity of other forms of illumination, the aerodrome illuminating engineer will be confronted with the task of making the aerodrome lighting easily discernible.

Before the war all important and regular airways or air routes were illuminated during the hours of darkness. In the U.S.A. alone there were over 20 000 miles of illuminated air routes, the illumination consisting of beacons from 10 to 20 miles apart.

The recognised standard for aerodrome and airway lighting in Great Britain up to the outbreak of war was B.S.S. 563—1937, the preparation of which was authorised by the Illumination Industry Committee in 1929 and, based on the decisions of the International Commission on Illumination, was later revised.

Question of Colour

One of the chief factors upon which agreement should be reached is colour. Appendix A to B.S.S. 563 gives four standards, namely, aviation red; aviation yellow; aviation green; and aviation white, and while these colours were considered sufficient to meet requirements before the war, there is little doubt that others will be introduced. For instance, there is no aviation blue as yet laid down, though for some years blue has been employed on airfields in the U.S.A. and on the Continent.

Little or no discrimination has been shown with the use of red. This colour is accepted throughout the world as indicating danger. Obstruction lights on aerodromes, gasometers, electric pylons, wireless masts, tall trees and hills are always red and should remain so. On the other hand, in peace-time it was a general practice to instal an aerodrome flashing beacon on certain airfields. This was mounted either on top of a central tower or on a pylon, and red flashes were transmitted at frequent intervals. In sparsely populated areas where few, if any, flashing advertisement signs were installed, the beacon was easily discerned, but in built-up areas confusion sometimes resulted, particularly as the flashing beacon usually consisted of a number of "red" neon tubes. It is possible in the future that in the interests of safety, restrictions may be placed on the use of flashing signs installed in the vicinity of an aerodrome, in which case the most simple solution would be to screen such signs to prevent them being visible at or above the horizontal at a predetermined distance.

Heating by Refrigeration

A Review of its Possible Applications

IT is not commonly appreciated that the refrigerator is primarily a device designed to extract heat from the air and to dissipate such heat when extracted. In doing this, the refrigerator delivers about three times as much heat to its condenser for dissipation as the actual heat equivalent of the electrical power used to drive the compressor motor of the plant. This is a remarkable fact which can be applied to obtain heat from the plant in a most economical way.

Consider the refrigerator as used commercially. In a large plant the electric motor drives an ammonia compressor and uses about 2.2 kWh to produce each hundredweight of ice. The heat equivalent of 2.2 kWh is 7 350 B.Th.U's, and the amount of heat which must be extracted from a hundredweight of water at 32° F. to change it into ice is 14 400 B.Th.U's. It follows that by an electrical power input equal to only 7 350 B.Th.U's, no less than 14 400 B.Th.U's have been taken from the water at 32° F. Therefore, the actual coefficient of performance of the refrigerator as a freezing device =

$$\frac{\text{heat absorbed}}{\text{heat expended}} = \frac{1.96}{1.0}$$

In the process of refrigeration, the heat obtained at the condenser is virtually the sum of the heat absorbed from the ice, added to the heat equivalent of the electrical input to the motor. If, then, the refrigerator is being considered as a heater or heat pumping device, its coefficient of performance is 2.96.

Reversed Refrigeration Cycle

We owe the appreciation of the potentialities of the refrigerator as a form of heat pump to Lord Kelvin who drew attention to the reversed refrigeration cycle as far back as 1852. He realised that if we use the latent heat of a volatile liquid refrigerant to set in motion a heat extraction and dissipation process, the system can be used either to cause a decrease of temperature in one place or an increase of temperature in another. If the object of the process is freezing, the evaporator is placed inside a confined space. The heat is extracted from the air in this confined space or cabinet through the evaporation of the refrigerant which absorbs latent heat from its surroundings. The heated gas passes through the compressor and is delivered to the condenser, where it gives up its heat to be dissipated into the surrounding air. But, if the evaporator is placed in the outer air, it will continue to extract heat of a low grade from the atmosphere as long as the

refrigeration cycle continues. The compressor receives this low-grade heat and raises it to a higher level by doing work on it. This heated air can be used to warm a building by distribution through ducts instead of being wasted as a by-product of refrigeration. The two processes are similar, since the cycle of operations is identical, but the source of heat is made continuous when heating is desired.

The Heat Pump

The term "heat-pump" has been given to the reversed cycle refrigerator and it is evident that it is a very economical means of producing heat. The primary source of heat is the atmosphere which contains low-grade heat, even at such temperatures as 0° F. This heat does not use electrical energy for its production but is obtained through the evaporation and condensation of a liquid. So, the heat pump delivers more heat at its condenser end than is the equivalent of the electrical energy used to drive its compressor. The coefficient of performance will always be greater than unity or 100 per cent. because of this fact.

A number of heating plants embodying this principle have been installed in various buildings in Switzerland, the United States and in South America. While the plants appear to have a fairly high capital cost, since they are suited ideally to all-the-year-round air conditioning work, they have shown coefficients of performance of about 3 to 1 for several years. This is an average figure for operation throughout the year since the external temperature affects the efficiency of this heating plant. The coefficient of performance is expressed by the final temperature at the condenser end, divided by the difference between this temperature and the temperature of the outside air. These figures are expressed as absolute temperatures.

When the outside air is coldest, the heat pump is least efficient. This is a difficulty about the plant and some installations have either had an auxiliary source of heat for the coldest days—such as lake or river water—or have used well water as the main source of heat. One large office building in the U.S.A. has been heated for some years by a heat pump which secures an almost constant temperature of 57° F. from this water throughout the year, although the outside air temperature drops to 25° F. or less in winter.

The theoretical coefficients of performance obtainable from the heat pump may be as high as 8:1 but, in practice, the various

losses and mechanical inefficiencies reduce the theoretical figures by about half. Still, this remains an important item for the efficiency of combustion of coal in a generating station is comparatively low, around 25 per cent., and there are transmission and distribution losses on the way to the consumer's point of use. Here, over-all efficiency may be about 21 per cent. If, therefore, electrical energy is applied to the heat pump at this point and it has a coefficient of performance of, say, 3.5 to 1, the pump will yield about 75 per cent. of the heat equivalent of the coal burned at the generating station and used to this end.

This energy conservation aspect of the plant deserves more attention from heating engineers than it has had in the past. The principle is simple and does not mean "getting something for nothing" as sometimes alleged for, the latent heat principle is well known. The fact that there are huge quantities of unused or almost unusable heat in the earth's atmosphere and rivers is also well known. The heat pump solves the problem of collecting this low-grade heat and pumping it up to a higher temperature at which it can be used.

The British Thermal Unit

This point may be elaborated for it is not always appreciated that all British Thermal Units are not equal. Mr. Oscar Faber, in his paper read before the Institution of Mechanical Engineers last April ("The Value of Heat with Special Reference to the Heat Pumps") illustrates this point. The common definition of the British Thermal Unit is that it is the heat required to raise one pound of water through 1° F. He considers this definition in relation to levels of temperature. 1 000 B.Th.U's given up by 1 000 lbs. of water from 61° F. to a basic temperature of surroundings assumed to be 60° F. is practically useless for it cannot be applied to heat a room or to heat water and it cannot be converted into mechanical energy. Now, 1 000 B.Th.U's given up by 10 lbs. of water dropping from 160° F. to 60° F. has exactly the same value from the viewpoint of heat measurement as 1 000 B.Th.U's given up by 1 000 lbs. of water dropping through 1° F. But, the B.Th.U's moving from 160° F. to 60° F. can be applied to heat a room or heat water, although they are not of any practical use for conversion into mechanical energy. Taking a third instance—that of 1 000 B.Th.U's given up by 5 lbs. of water dropping from 260° F. to 60° F.—now these B.Th.U's are still more useful for, not only can they do all that the 160° F. water could do, but by release of pressure, the water at 260° F. can convert part of

itself into steam. It can thus heat buildings and water and can convert part of its heat into mechanical energy.

This illustration shows that while the B.Th.U is a useful measure of heat for such purposes as calorimetry, it does not give any real indication of the value of heat for other purposes. It is interesting to note this point for the whole secret of the reversed cycle refrigerator, or heat pump, is its function of raising or pumping-up quantities of low-grade heat to a temperature at which the B.Th.U's collected in this way can do a useful job of work. In the surrounding atmosphere at 32° F. or thereabouts, the B.Th.U is not as effective as it is at a temperature of 132° F. This, incidentally, explains why the heat pump cannot be turned round as a form of perpetual-motion machine, for this means re-conversion or de-grading of heat to the level at which it can neither usefully heat nor become converted into mechanical energy.

Considering the most outstanding feature of this device, its capacity to use one unit of electrical energy to produce the heat equivalent of three or four units, it seems remarkable that so little attention has been given in this country to this adaptation of a well-known principle. Actually, attention was drawn to the heat-pump by Mr. T. G. N. Haldane as far back as 1930, in a paper delivered to the Institution of Electrical Engineers, but possibly the unorthodox character of the apparatus did not attract the interest of conventional engineers. However, there are certain drawbacks to the heat-pump, just as there are certain conditions in which it should prove highly efficient and useful.

Air-Conditioning

It is most efficient when applied to both cooling and heating; i.e., for air-conditioning throughout the year. In Great Britain, the need for air-conditioning is far less than in the U.S.A. where greater extremes of temperature are experienced. But in circumstances where air-conditioning is necessary, the heat pump may prove an ideal solution to the problems of heating and cooling. The conditions favourable to its operation are: in mild or temperate climates and where a supply of water is available at a reasonably constant temperature. Further, where a refrigeration service is needed, the heat pump can be applied effectively. For example, catering establishments require a constant refrigeration service and they require ordinary heating during the cold months. These operating conditions are ideal for the heat pump. The heating of public baths is another operation having advantageous conditions for this apparatus.

It is difficult to predict actual perform-

ance with this type of apparatus since it is a form of heating system which depends on the external temperature for its operating efficiency. In fact, the average difference between external temperature and the internal temperature required is a major factor determining the amount of power needed to pump the heat up to the necessary level. This again determines the size of the plant required. Extremely cold spells of weather cause overloads on the plant which reduce its efficiency greatly at such periods. At such times, an auxiliary source of heat such as a tank or well may be needed to boost the plant. During the mild periods, too, heat may be stored in such tanks in readiness to meet sudden and extreme demands on the plant. A further possibility is some combination of the heat pump principle with normal thermal storage heating in order to utilise to the maximum every source of heat in a building, including those which are often allowed to run to waste unused.

So far, it appears that the heat pump has been applied with success to the heating of a number of office and similar buildings in climates far less temperate than that of Great Britain. There are probably not more than 30 or 40 installations in the U.S.A. and a smaller number in Switzerland. Such information as is available on these plants indicates that they are composed of ordinary refrigeration appliances adapted to heat-pump working and that they have produced operating coefficients of about 3:1 on an average. The opinion has been expressed by some engineers that a deliberate attempt to improve the efficiency of the various parts of the refrigerating plant for reverse-cycle operation, especially the compressor, would result in a heating equipment of higher efficiency, probably reaching a coefficient of 4 or 5 to 1. Certainly, it seems that there are valuable possibilities in this unconventional plant and that developments are needed to get the best out of the heat pump principle.

Belfast Electricity Undertaking

IN his report on the work of the Belfast Electricity undertaking for the year ended March 31, 1945, Mr. W. J. McC. Girvan, city electrical engineer and general manager, states that the revenue from the sale of electricity and from hire of appliances, etc., amounted to £1 537 870 13s. 3d. The total working costs, including the cost of energy purchased, amounted to £1 042 100 0s. 10d. The year's operations resulted in a gross profit of £495 770 12s. 5d. and the net surplus on the year's working was £107 227 15s. 2d.

There was an increase in income of £169 831 8s. 10d. over the previous year. On the other hand, working costs increased by £118 173 11s., and capital charges and sundry expenditure increased by £51 283 11s. 7d.—a total increase of £169 457 2s. 7d. The total net capital outlay at March 31, 1945, amounted to £5 617 464 14s. 6d. and the net debt on the undertaking was £2 366 634 5s. 1d. The total number of units sold was 388 836 658, an increase of 30 398 178 on the previous year, equivalent to an increase of 8.48 per cent. Of the total number of units sold in bulk, 34 728 608 were sold to the Ministry of Commerce and 107 488 273 to the Electricity Board for Northern Ireland. The number of consumers connected to the supply network at March 31, was 88 202, an increase of 1 047 on the previous year.

The Harbour power station generated 342 798 100 kWh, an increase of 1.48 per cent. on the previous year, and East Bridge Street station generated 454 000 kWh, as

compared with 235 200 kWh during the previous year. The total coal consumed was 224 112 tons. The average cost per ton of coal consumed was 10.81 per cent. higher than during the previous year and 107.8 per cent. higher than pre-war. During the year the Government's generating station at Ballylumford was in service and 96 292 630 kWh were purchased therefrom. In addition, it was necessary during May, 1945, to operate the Larne generating station to enable plant repairs to be carried out at Ballylumford, and again to enable the system peak load to be met. The Larne station delivered 2 769 480 kWh, of which 275 744 kWh were imported into the department's system.

Application had been made to the Ministry for sanction to raise a loan to meet the capital expenditure on an additional 30 000 kW turbo-alternator and three additional boilers at the Harbour power station. Counter proposals were made by the Ministry that the additional plant should be installed at Ballylumford station. The Corporation, having considered the Ministry's proposals, re-affirmed their decision that the Harbour power station should be extended in preference to Ballylumford station. The Ministry had intimated its intention to obtain a third opinion from Sir Johnstone Wright, the general manager of the Central Electricity Board.

Cheltenham.—The power company is to erect an overhead 11 000 V branch line to Wincombe Mill.

Electricity Supply

Coventry.—The Electricity Committee is seeking sanction to borrow £3 256 for modifications to the circulating water discharge pipework at Longford power station.

Winnipeg, Manitoba.—Central electric station generated 177 189 000 kWh in January, compared with 163 039 000 kWh in January, 1944.

Southport.—The Electricity Committee has obtained sanction to borrow £2 031 for mains, £1 655 for sub-station equipment and £2 260 for supply to the Russell Road housing site.

Birkenhead.—The Electricity Committee has obtained sanction to borrow £3 500 for mains to temporary houses, and is seeking sanction to borrow £1 500 for sub-station equipment, and £2 000 for consumers apparatus.

Plymouth.—The electricity mains are to be extended so as to afford a supply to the housing estate at Eford, and the Electricity Committee is to carry out the scheme at a cost of £5 700. The latter has obtained sanction to loans of £12 380 for sub-station equipment, and £9 775 for mains extension.

Birkenhead.—Consultants have informed the Birkenhead Electricity Committee that as the result of a further investigation of the scheme for a proposed new power station on the banks of the River Mersey at Bromborough, they have had to revise the original estimate of £3 500 000. The new estimate is £4 291 000.

Cardiff.—The Works Committee has asked the City Engineer to confer with the Electrical Engineer regarding a suggestion for the provision of separate switches for use in connection with wireless apparatus in the specification for electrical installations in new houses.

West Perthshire.—It was decided at the quarterly meeting of the Western District Committee of Perthshire C.C. to communicate with the Grampian Electricity Co. in order to ascertain whether, if the unit charge was reduced to a general one of $\frac{1}{4}$ d., the districts of West Perthshire which had entered into an agreement on a rate of $\frac{3}{4}$ d. would enjoy the reduction. Failing this the suggestion was made that the company might consider the inclusion of a "rise and fall" clause in the agreement.

Southwark (London).—The Electricity Committee reports that some months ago the Electrical Engineer submitted a scheme for a change-over and for post-war development, the entire scheme being spread over 20 years. Whilst the Committee is in favour of the principle of changing-over, it does not think that at the present time it should commit itself to a 20-year project. It feels, however, that a gradual change-over would be possible by a series of short-term schemes, say, for three years, and has asked the Electrical Engineer to report on the practicability of achieving the change-over in the manner suggested.

Contracts Open

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

Dunfermline T.C.—Electric lighting installation work in connection with the proposed erection of 60 houses at Headwell additional housing site. Particulars from the Town Clerk, City Chambers, Dunfermline.

Wrexham Electricity Department, June 22.—Supply of two 750 kVA and one 300 kVA transformers for a 6 600 V, 50 cycle system. Specification from Mr. J. W. Williams, Electricity Offices, Willow Road, Wrexham.

Manchester Transport Committee, June 26.—Supply and delivery of trolley wire (cadmium copper). Specifications from the Manager, Transport Department, 55, Piccadilly, Manchester 1.

Whittingham Mental Hospital, June 27.—Electric wiring of certain farms and buildings in or near Haighton Green Lane. Particulars from Mr. W. A. Higgs, Whittingham Mental Hospital, near Preston, Lancs.

Gellygaer U.D.C., June 30.—Supply and delivery of house service units for one meter per consumer. Specifications from the Electrical Engineer and Manager, Electricity Offices, Hanbury Road, Bargoed, Glam.

Hazel Grove and Bramhall U.D.C., June 30.—Supply and delivery of three 250 kVA transformers fitted with externally operated off-load tap-changing gear. Specification from the Chief Electrical Engineer, Chapel Street, Hazel Grove, Ches.; deposit, £1 1s.

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

News in Brief

Electric Vehicle Purchase.—The Cardiff Electricity Committee is to purchase four 10-cwt. electric vans with large batteries, one 5-ton electric tipping lorry, one 8 h.p. van and a 15-cwt. van.

Blackburn Street Lighting.—The Corporation has authorised the conversion of two experimental high powered street gas lamps to electricity. A similar conversion may be made with six other gas lamps in the centre of the town.

Blackpool Illuminations.—It has been announced by the Electricity Committee that autumn illuminations will not be possible this year. The opinion is based on the restrictions on fuel.

Looe Lighting Contract.—A new five-years' contract with the Cornwall Electric Power Co. for street lighting, at a considerable reduction on the 1936 contract has been signed by the Looe U.C.

School Lighting.—The Woolwich L.C.C. is to instal electric lighting at the Gordon School, at an estimated cost of £1 000.

Rate Relief Allocation.—The Burton-on-Trent Electricity Committee has decided to allow £2 500 for rate relief for the year.

Fleetwood Domestic Equipment Decision.—The Electricity Committee has decided to discontinue the hire of domestic electrical apparatus, owing to the high cost to which purchase tax is an important contributory. The view of the Committee is that this tax should be abolished from all domestic equipment. It was stated that immersion heaters which cost £2 10s. before the war were now £8 10s., while electric clocks had advanced from £3 to £9 5s. 6d.

Rural Electricity Development.—Replying to questions asked recently, in the House of Commons, Major Lloyd George said it had been necessary during the war to restrict the development of electricity supply to war needs and cases of exceptional hardship. The relaxation of these restrictions was at present under consideration, but, even if some relaxation were found possible, shortages of materials and man-power would continue for some time to limit the rate of development.

Electricity Looks Forward.—In connection with the "Electricity Looks Forward" Exhibition, now being held in Manchester, there was a brains trust held on the subject of cooking by electricity in canteens. Mr. E. Binns, of Oldham electricity department, was question master. Amongst those who took part were Mr. W. E. Swaley, sales manager, Manchester Corporation, and Mr. F. P. Fysh of the General Electric Co., Ltd.

Orders from S. Africa.—Orders for railway equipment placed in Great Britain by the South African Government include 10 electric locomotives. Orders have also been placed in Britain for telephone equipment worth £1 357 700.

Domestic Fuel Consumption.—In a written answer to Mr. C. Lloyd, Major Lloyd George said that between 1940 and 1944 domestic consumption of coal had fallen by 11 000 000 tons. There had, however, been some increase in the same period in the domestic consumption of coke, gas and electricity, which, when put into terms of coal and deducted from this 11 000 000 tons, gave a net decrease of 8 500 000 tons.

Belfast Electricity Charges.—The increase of 10 per cent. on electricity charges in July, 1940, to meet increased cost, will be abolished as from July 2. The 5 per cent. increase to shipyards, imposed at the same time, will be abolished on the same date.

Scholarships in Electrical Housecraft.—Twenty-one years ago the Electrical Association for Women was formed—and now in order to honour its founder and director, Miss Caroline Haslett, an Educational Fund is being created for establishing scholarships and other educational projects in electrical housecraft. The leading organisations of the electrical industry are contributing, and funds are also being given by the many branches of the E.A.W. The scholarships will be open to suitable candidates from the Women's Services, the Women's Land Army, industry and other war services and also from selected students from recognised girls' schools.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN of June 18, 1920: The lighting arrangements of the Albert Hall have been modernised, and the old flickering arc lamps, which in the past have distracted the attention and strained the eyes of music-loving audiences have disappeared. The present lighting is provided by sixteen 1 000 W half-watt type lamps in large metal reflectors. These units are fixed high up in the centre of the dome, from which position they shed an intense illumination over the whole auditorium, and the audience are able to read their programmes and papers with perfect ease.

Answers to Technical Questions

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

In a transformer, neglecting losses and magnetic leakage, what factors govern the ratio of (a) the primary and secondary voltages and (b) the primary and secondary currents?

A single turn linked with the alternating flux Φ in the core of a transformer has an e.m.f. induced in it given by:

$$E_1 = 4.44 f \Phi \text{ volts per turn}$$

where Φ = flux in webers (1 weber = 10^8 maxwells or lines)

f = frequency of the alternating flux and of the induced e.m.f.

It is assumed in the above that the flux is varying sinusoidally with time as is generally the case. Since magnetic leakage is to be neglected the same flux will link every turn on the transformer both in the primary and secondary windings and so every turn will have the above e.m.f. induced in it, and, further, all these e.m.f.s. will have their maximum values at the same moment, i.e., they will all be in phase with each other.

If there are T_1 turns in series on the primary winding the total primary e.m.f. E_1 will be $E_1 T_1$ volts and the total secondary e.m.f. will be $E_2 = E_1 T_2$ volts.

As there is no loss or magnetic leakage, i.e., no resistance or reactance to the windings, the terminal voltage V_1 applied to the primary winding will be equal (and opposite) to the induced e.m.f. E_1 and the voltage V_2 appearing at the secondary terminals will be equal to the secondary e.m.f. E_2 . Thus

$$\frac{V_1}{V_2} = \frac{E_1}{E_2} = \frac{T_1}{T_2}$$

The voltage ratio is thus determined by the ratio of the numbers of primary and secondary turns. If the resistance and leakage reactance of the windings are not neglected the effect of the resulting voltage drops will, except when the load power factor is leading, cause the ratio V_1/V_2 to be slightly higher than T_1/T_2 .

If, as is assumed in the question, there are no losses of any kind the secondary volt-ampere output will be equal to the primary volt-ampere input, i.e., $V_1 I_1 = V_2 I_2$, so that

$$\frac{I_1}{I_2} = \frac{V_2}{V_1} = \frac{T_2}{T_1}$$

i.e., the current ratio I_1/I_2 is determined by the inverse of the turns ratio.

In practice there will always be some volt-amperes required to magnetise the core so that $V_1 I_1$ will, at full load, be slightly greater than $V_2 I_2$ and the ratio I_1/I_2 will be slightly greater than T_2/T_1 .

At low loads, of course, the secondary current decreases, but the magnetising volt-amperes remains constant (assuming a constant voltage supply) so that the ratio becomes considerably greater than T_2/T_1 as the load approaches zero. E.O.T.

Book Review

Industrial Electric Furnaces and Appliances. Volume I. By VICTOR A. PASCHEKIS (New York: Interscience Publishers, Inc.). Pp. x + 232. \$4.90.

This book comes at an opportune moment when an exchange of ideas regarding new problems arising from recent fundamental changes in industrial heating can be of very great value in the sound direction of development. Emphasis is placed upon the thermal aspects of furnace design and operation, particularly in relation to uniformity of the product to be heated; the frequently unrecognised interrelations of thermal and electrical factors associated with such equipment is stressed. Principles of design are discussed in detail and many types of practical furnaces are illustrated in diagrammatic form. The formulae included should prove useful to designers. The work is planned in two volumes. In the first volume a general chapter covers the thermal, electric and economic principles applying to all types of furnaces. The second volume will cover induction, capacitance, and resistance heating.

COST OF EQUIPMENT

Prices of domestic electrical appliances were referred to on June 14, at the "Electricity Looks Forward" exhibition, Manchester, by Mr. Oliver Howarth, of the Lancashire E.P. Co. Mr. Howarth, who presided at a lecture on "Planning for Building," given by Mr. Noel Hill, the Manchester city architect, said that future prices would depend to some extent upon standardisation of components, and there was, already in the electrical industry, a move in that direction. Arrangements had already been made for the components of electric cookers to be completely interchangeable, while wartime developments in the technique of production should also enable costs to be reduced. Purchase tax was an important item, for the addition of about £5 5s. to the list price of electric cookers represented a considerable increase in their cost.

Industrial Information

Electric Boiling Ring.—The Central Price Regulation Committee has approved the following selling prices in respect of the "Walco" electric boiling ring, manufactured by Wells, Ltd.: Boiling ring with stove enamel finish, 11s.; with vitreous enamel finish, 12s. 6d. These prices are exclusive of purchase tax.

Jute Insulated Cables.—A new specification for jute insulated cables has been issued as B.S. 1216:1945. This specification deals with sizes, resistances, voltage tests and identification of cores, but the composition, quality or durability of the insulating material is not dealt with.

Electric Fences.—In order to ensure that the energy supplied to an electric fence shall be so limited and controlled that under the most extreme conditions it shall not cause danger, a British standard specification (B.S. 1222:1945) has been issued. This specification is restricted to electric fences energised from batteries. Copies may be obtained from British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. each, post free.

Emergency Regulations and Orders.—Supplement No. IX to the Summary of the Emergency Statutes, Regulations and Orders Affecting the Electricity Supply Industry has now been published by ar-

May 31, 1945. The index includes Supplements IV to IX. The price is 4s.

Siemens' Magazine.—The sixth and last article of the series dealing with the equipment of the automatic trunk network for the State of Victoria appears in the Engineering Supplement to the April-May issue of "Siemens' Magazine." It describes the special features of the automatic routine equipment, and some further features not covered in previous articles. It also gives a summary of the equipment supplied.

B.E.T.R.O.—Among firms who have applied recently for founder membership of the British Export Trade Research Organisation are Dennis Bros., Ltd., M.C.L. and Repetition, Ltd., and the New Insulation Co., Ltd. In the list of ordinary members not hitherto published are the following: the British Thomson-Houston Co., Ltd., Chance Bros., Ltd., Crompton Parkinson, Ltd., Falk Stadelmann and Co., Ltd., the Hackbridge Electric Construction Co., Ltd., the Metropolitan-Vickers Electrical Export Co., Ltd., Herbert Morris, Ltd., Murex, Ltd., A. Reyrolle and Co., Ltd., and Ultra Electric, Ltd.

Lighting an Instrument Factory.—In a factory designed and built to produce special equipment, and in which very fine work has to be carried out, the firm responsible for management realised that the question of lighting was of great importance. Early contact was made with the British Thomson-Houston Co., Ltd., and this enabled an installation to be designed to allow the best possible lighting to be applied to each process. In the assembly department, assembly benches are arranged on one side of a screen, on the other side of which is the inspection department. Use was made of the screens to mount a continuous line of Mazda Lux F.136 open-top reflectors, providing an illumination of approximately 80-100 f.c. on the benches. The whole area is finished in light colours, including the tops of the benches which have a reflection factor of approximately 50 per cent. The installation was designed by the British Thomson-

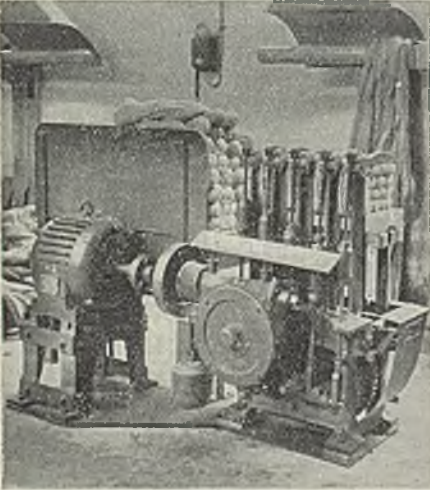


B.T.H. fluorescent lighting in an assembly department

range with the Joint Committee of Electricity Supply Organisations. The editors have dealt with new and amending regulations, orders, etc., issued between the date of the VIIIth Supplement and

Houston Co., Ltd., and erected by Electrical Installations, Ltd.

Flax Drying.—In a Belfast flax mill, where a Marr dryer has been installed,



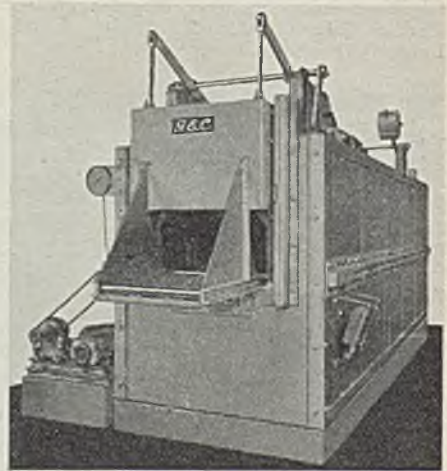
Type of press used for bundling flax yarn after drying.

there are, in addition to the main fan drives, two cooler fans driven by totally-enclosed squirrel-cage motors rated at 2 H.P., 950 r.p.m. A vee-rope transmission reduces the speed to 605 r.p.m. at the fan shaft. The control consists of a D.O.C. 70 starter. For the travelling motion a 1 H.P., 950 r.p.m. squirrel-cage motor, also totally enclosed, is provided. It is mounted on a roof truss and transmits through a vee-rope drive, the driven shaft running at 240 r.p.m. After drying, the flax is bundled in a press, such as that shown in the illustration. The drive for this machine is a Metropolitan-Vickers totally-enclosed squirrel-cage motor, rated at 4 H.P., 725 r.p.m. A worm and spur gear reduction brings the shaft speed down to 5.5 r.p.m. It is push-button controlled from a contactor starter, of the same make seen on the wall beyond the machine. A foot switch starts the motor, which is tripped automatically by a limit switch when the moving platform has reached the pre-selected position representing the desired degree of compression of the flax yarn. Acknowledgments are due to the Metropolitan-Vickers Electrical Co., for these particulars, and to Wm. Ross and Co., Ltd., Belfast, for permission to publish them.

Automatic Furnace Discharge Indicator.

—The use of a photo-electric amplifier to give automatic indication when a charge travelling through a 100 kW roller hearth

electric furnace arrives at a position near the door and is ready for being discharged, has been tried recently with complete success. The type of unit used is the G.E.C. M.D. photo-cell relay amplifier. This is a.c. mains-operated and incorporates a C.M.G. 8A photo-cell which controls the anode current of an Osram L.63 valve, in the anode circuit of which is a relay of the telephone type. A projector lamp unit mounted on the opposite side of the furnace provides the necessary light beam, and so long as this beam illuminates the photo-cell the grid of the L.63 valve is maintained at a negative potential, and the valve anode circuit is zero. As the charge passing through the furnace, interrupts the beam, so the photo-cell control of the valve grid is removed, the anode current rises and operates the relay. This causes a warning buzzer or bell to sound. The addition of extra switchgear operated through the relay contacts, enables a load of practically any size to be controlled. In an alternative scheme the photo-cell unit can be made to operate through relays and contactors to stop the movement of the furnace hearth until the charge is withdrawn. Provision is made for more than one independent circuit to be controlled through extra contacts, space for which is available in the relay.



This illustration shows how an automatic discharge indicator is mounted.

The projector lamp is fed from a l.v. winding of a transformer and provision is made for checking the emission of the valve whilst in service.

The interior temperature of the furnace can be raised to 1 000° C., but suitable heat resisting glass windows protect the photo-cell from being adversely affected.

Correspondence

The Editor welcomes the free expression in these columns of genuine opinions on matters of public interest, although he disclaims responsibility alike for the opinions themselves and the manner of their expression.

Electricity Supply and the Election

[TO THE EDITOR]

Sir,—With reference to the broadcast statement made on June 12, by the Rt. Hon. A. V. Alexander as to the alleged chaotic state of the electricity supply industry and to the difference in the rates for supply on either side of the Thames, the following letter, dated June 13, has been addressed to Mr. A. V. Alexander by the Joint Committee of Electricity Supply Organisations:—

"Sir,—I beg to confirm the telegram which I was directed by the Joint Committee of Electricity Supply Organisations to send you from the meeting of the Committee held yesterday afternoon as follows:—

"Deplore broadcast statement re differing rates for electricity supply. The Joint Committee of Electricity Supply Organisations unable to trace such an instance, can you kindly furnish particulars."

"The Joint Committee consist of representatives of all branches of the electricity supply industry and are, of course, entirely non-political. They were, however, most concerned to hear that it had been stated publicly by a gentleman of such outstanding national eminence as yourself that the electricity supply industry was in a chaotic condition and that electricity was being sold at 9d. per unit on one side of the river and 1d. per unit on the other.

"While the Joint Committee feel that there must be some foundation for such a statement, otherwise you would not have made it, it is apparent to them that there must be some misunderstanding in the interpretation of the facts, and I am to say that they would greatly appreciate it if you would be good enough to give them further particulars of the cases which you quoted.

"I am also to express the Joint Committee's strong disapproval of the statement that the electricity supply industry is in a chaotic state. This does not conform to the view expressed by the Minister of Fuel and Power, who has, of course, an intimate knowledge of the industry and who addressed, as recently as the 18th May, the following communication to Mr. A. J. Fippard:—

"Dear Mr. Fippard,—At the end of the first stage of our war effort I would like to convey to everyone in the electricity supply industry our appreciation of the services which they have given to the nation.

"The industrial production, on which our war effort has been based, would have been impossible without the electricity industry's part in making a supply available wherever it was needed. The increased load carried by ageing plant and the hard work which kept the number of breakdowns so very small was done despite reductions in man-power, the difficulties of the black-out and the efforts of the enemy's Air Force.

"I must particularly praise your organisation and the mutual self-help which worked so efficiently that the public were made aware of the importance of the

electricity supply to industry and of the need, therefore, for everyone to economise, which was in no small degree due to your co-operation with my Ministry.

"I should be grateful if you would pass on my congratulations and thanks to all who worked in this vital industry.

"(Signed) G. LLOYD GEORGE."

Yours faithfully,

H. F. CARPENTER,

June 14.

Hon. Secretary.

Electricity Administrative Association

[TO THE EDITOR]

Sir,—The Electricity Supply Administrative Association held its first annual conference on June 2, in London. The conference was occupied mainly in setting up a national constitution. Mr. J. E. Robertson (Hackney) was elected its first president, and Mr. R. C. Forster (Battersea) its first honorary general secretary. The President reminded members present that the principal object of the association was to assist in raising the standards of commercial practice and administration throughout the electricity supply industry, and to provide members with a means of discussing and investigating administrative problems.

Until the association came into being, there was no appropriate organisation to deal with these questions, and no facilities for administrative officers collectively to meet for the purpose of investigating mutual difficulties. The association has already examined a number of problems and members are finding it increasingly helpful. It was pleasing to note the welcome which had been given to the association in many quarters.

Yours faithfully,

R. C. FORSTER,

Honorary General Secretary.

Electric House,
Lavender Hill, London S.W.11.

Cables Laid by Plough.—To facilitate the supply of electricity to some 80 temporary houses at Clarence Avenue, Stratford, to the order of the Ministry of Works, the County of London Electric Supply Co., Ltd., are using the method of laying cables by a special plough provided by the Lower Thames Land Development and Construction Co., Ltd. This method has been extensively used by the C.L.E.S. Company for several years and was employed in connection with the "Pluto" operation.

Company News

ENFIELD ROLLING MILLS LTD.—Div. for 1944, 5% (same).

INTERNATIONAL COMBUSTION LTD.—Intm. div. 5% (same).

BRITISH COLUMBIA POWER.—Qtrly. div. 40 cents per sh. on Class A shs.

ROMAC MOTOR ACCESSORIES LTD.—Fst. and fin. div. 7½% (same), and bonus 2½% (same). Pft. £15 554 (£22 311).

CABLE AND WIRELESS (HOLDING).—Div. on ord. 4%, less tax. Net pft. is stated as £1 999 079 (£1 220 976).

FRANCO SIGNS LTD.—Fst. and fin. div. 10% (same). Net trdg. pft. of operatg. subsid. cos. after taxn. £30 970 (£28 577).

VACUUM BRAKE CO. LTD.—Div. 10% (same) and bonus 5% (2½%) for yr. to Jan. 31 last.

SKEFKO BALL BEARING CO., LTD.—Net pfts. 1944 £180 594 (£178 082). Fin. div. 10 5 6ths% tax free, inkg. 17½% tax free.

WEST GLOUCESTERSHIRE POWER.—A drawing of £8 700 4% fst. mort. sinkg. fund deb. stk. has bn. made for repaymt. at 103 on Sept. 15 next.

CABLE AND WIRELESS (OPERATING CO.).—Fin. div. 2½%, less tax, inkg. 4% for 1944 (same). Net pft. is stated as £1 237 757 (£1 228 892).

MARCONI WIRELESS TELEGRAPH CO. LTD.—Fin. div. on ord. 3½%, less tax, mkg. 7% (same). Net pft. after prov. for taxatn. is stated as £210 381 (£244 829).

CITY OF WINNIEG HYDRO ELECTRIC SYSTEM.—Rev. 1944, \$4 075 040 (\$4 039 468), operatg. pft. \$752 576 (\$537 836), surplus \$421 895 (\$132 350).

B.E.T. ELECTRICITY SUPPLY.—Divs., int., etc., to Mar. 31 £79 456 (£79 339). To res. £12 000 (£12 457), div. 5% £18 725 (same), fwd. £31 889 (£30 189).

SIEMENS BROS. AND CO.—Fst. and fin. div. on ord. for 1944, 7½%, less tax (same). Net pfts. are stated as £340 041, includg. £30 000 from taxatn. res. not required.

STOERTH AND PITT LTD.—Resolutns. providg. for an increase in cap. from £350 000 to £500 000 by the creation of 150 000 £1 ord. shs. have been approved.

NATIONAL ELECTRIC CONSTRUCTION LTD. (subsid. of British Electric Traction).—Net pft. 1944 £25 500 (£24 246), after £27 500 (£26 500) for tax. Fst. and fin. 10% (same).

AMERICAN GAS AND ELECTRIC.—Operatg. revs. 1944 \$119 810 183 (\$111 841 183). Net inc. \$12 089 136 (\$11 683 832), earned per com. sh. \$2.32 (\$2.22), pd. \$1.80 (same), surplus \$55 955 381 (\$63 272 565).

PATENT LIGHTING CO. LTD.—After deprecn. £2 783 (£2 913), inc.-tax and E.P.T. £9 727 (£18 750), defd. repairs

£1 500 (nil), etc., net pft. to June 30, 1944, £684 (£1 951). Adverse blnce. brot. in £2 831 reduced to £2 147.

KEITH BLACKMAN LTD.—Div. on ord. 20%, less tax (same). Pft. for yr. to Mar. 31 is stated as £135 684 (£192 451). Prov. for taxatn., £93 500 (£150 000) and trans. to res. £10 000 (same), leavg. carry-fwd. £45 181 (£43 497).

ROTHERMEL CORPN.—Div. for 1944 20% (same). Net pft. for six mos. to Dec. 31, 1944, £6 544 includg. one yr.'s divs. of £5 000 net from subsid. (net pft. for prev. 18 mos. £9 916, also includg. one yr.'s divs. £5 000 net from subsid.).

EAST AFRICAN POWER AND LIGHTING CO.—Consent has been received from the British Treasury for an issue of 357 083 £1 ord. shs., which will be offered to pref. and ord. shareholders on the Nairobi and London registers in the near future.

YORKSHIRE COPPER WORKS LTD.—Net trdg. pft. 1944 £71 155 (£68 179). To contngs., pensions, etc., £5 000 (£10 000), gen. res. £40 000 (£30 000), ord. div 10% (same) and bonus 5% (same), fwd. £21 214 £20 865).

NORTH BRITISH LOCOMOTIVE CO., LTD.—Pft. for 1944 after placg. £35 000 (£30 000) to deprecn., was £242 343 (£203 891). Taxatn. takes £150 000 (£120 000) and res. £50 000 (£25 000). Carry fwd. £51 380.

LOTHIANS ELECTRIC POWER CO.—Net rev. 1944 £110 957, inc. £1 672. To tax £69 500, writtn. off apparatus on hire £615, leavg. £42 514. Brot. in £19 076, mkg. avail. blnce. £61 590. To res. £23 075, div. 6% (same) £15 300, fwd., subject to war dngc., £20 215.

ST. AUSTELL AND DISTRICT ELECTRIC LIGHTING AND POWER CO. LTD.—Net pft. for 1944 £18 673 (£16 411). Pref. divs., intm. on ord. and prov. for tax and gen. res. £16 982 (£14 553). To fin. of 6% on ord. £1 500 (again mkg. 10%), fwd. £7 892 (£7 701).

BRAZILIAN TRACTION, LIGHT AND POWER CO. LTD.—Gross earngs. from Apr. operatn. totalled \$5 114 262, \$479 682 increase. Net earngs. at \$2 534 700 show an increase of \$92 119. Aggregate gross earngs. from Jan. 1, \$20 004 279, \$1 655 617 increase. Aggregate net earngs. \$9 848 434, \$382 845 increase.

LONDON ELECTRIC WIRE CO., AND SMITHS LTD.—Pft. 1944 (after exes. and tax) £96 107 (£97 491), plus investment res. written back £25 000 (same), fees £24 (£23), mkg. £121 131 (£122 514). To dirs.' fees £11 050 (same), gen. res. £10 000 (£7 500), spec. res. nil (£7 500), addit. superannuatn. £25 000 (same), pref. div.

£30 000 (same), ord. div. 7½% £51 305 (same), fwd. £132 193 (£128 417).

MERTHYR ELECTRIC TRACTION AND LIGHTING.—Rev. 1944 £42 329 (£39 089). To exes. £11 996 (£12 246), employees' funds £389 (£377), tax £20 227 (£16 210), leav. pft. £9 716 (£10 256). To gen. res. £7 000 (same), pref. div. £750, ord. div. 6% £1 950 (both same), fwd. £5 142 (£5 126).

HARLAND ENGINEERING Co. LTD.—Subject to audit net pft. 1944, after deprecn., taxatn., defd. repairs and dirs.' fees, £16 678 (£15 593). Brot. in £13 996 (£14 312), ord. div. 7%, less tax, £4 900 (6%, £4 200), pref. divs. £3 000 (same), to res. £7 000 (same), off war damage £974 (£1 261), off A.R.P. nil (£448), fwd. £14 800.

ASCOT DISTRICT GAS AND ELECTRICITY.—Income for 1944 £64 931, to deb. int. £7 668, sundry int. £2 523, retired engineers' annuity £830, pensions £1 046, employees' bonus £2 021, tax £8 509, intm. pref. div. £3 205, intm. ord. div. 2½% £5 054, law charges £799, fin. pref. div. £3 205, fin. ord. div. 3½% £7 075, fwd. £22 997.

BEYER PEACOCK AND Co., LTD.—Trdg. pft. 1944, after tax, £50 484 (£50 549), transf. fees £89 (£64), gross divs. recd. £5 625 (same), mkg. £56 198 (£56 238). To legal charges £778 (£488), dirs.' fees £3 500 (same), deb. trustees' fees £105 (same), int. £7 346 (£7 585), leav. £44 469 (£44 560). To deb. int. £5 172 (£5 207), deprecn. res. £15 000 (same), net pft. £24 297 (£24 353), fwd. £71 762 (£63 965).

SIMMS MOTOR UNITS LTD.—Trdg. pft. 1944 £140 609 (£169 193). To deprecn. £15 316 (£12 631), war damage £619 (£880), deb. int. £434 (£4 522), dirs.' fees £1 401 (£1 250), leav. net pft. £122 839 (£149 910). Tax £105 500 (£137 750), deb. redemptn. premium £111 (nil), pref. div. £3 750 (same), ord. div. 10% (same) £8 842 (£8 597), dirs.' addit. remun. £528 (nil), fwd. £21 591 (£18 316).

WINNIPEG ELECTRIC.—Gross earnings from operatn. 1944 \$11 278 444 (\$10 518 043). Deduct operatg. exes. \$5 608 160 (\$5 037 196), leav. net operatg. income \$5 670 283 (\$5 480 847), plus miscell. income \$331 507 (\$302 129), mkg. \$6 001 791 (\$5 782 976). Deduct debt. int. taxes, etc., \$4 710 552 (\$4 581 704), leaves \$1 291 239 (\$1 201 271), plus accum. surplus \$537 643 (\$555 447), mkg. \$1 828 883 (\$1 756 719) before int. on Series "B" bonds 1944.

JOHNSON AND PHILLIPS LTD.—Pft. 1944 after £66 321 (£62 141) for maintenance of buildgs., plant, etc., £458 402 (£510 223); deduct dirs.' remun. £3 250 (£2 839), auditors' and trustees' fees £787 (£682), deb. int. £16 056 (£16 312), deprecn. machy.,

plant, etc., £41 663 (£41 999), pensions, staff prov. fund £13 382 (£9 925), payments to men in H.M. Forces £2 240 (£2 499), tax £180 000 (£280 000), A.R.P. expend. £20 698 (£10 406), leav. net pft. £180 325 (£139 873, after £5 688 deb. skg. fund). To intm. div. 7½% (same) £30 000 net, to research and devt. acct. £25 000 (£15 000), special contng. res. £80 000 (£30 000), fin. div. 7½% (same), £30 000 net. fwd. £108 340 (£116 242).

Company Meetings

BARCOCK AND WILCOX LTD.—The annual meeting was held in London on May 29, Lieut.-Col. Sir John Greenly, the chairman, presided. In the statement circulated with the report and accounts, the chairman said that by the end of March this year the volume of orders in hand for future delivery exceeded by a substantial amount the previous highest figure ever achieved in the history of the company. This was most satisfactory, as it would ensure continuous full employment for a long period and help the transition from war to peace production. In order, however, to obtain maximum efficiency and output, both for the home and export markets, it would be essential for the Government to release as many specialists and skilled workers as possible at an early date; otherwise the productive effort was bound to

(Continued on page 368)

Metal Prices

	Monday, June 18.	
	Price.	Inc. Dec.
Copper—		
Best Selected (nom.) per ton	£62 10 0	—
Electro Wirebars ...	£62 0 0	—
H.C. Wires, basis ... per lb.	9½d.	—
Sheet	11½d.	—
Phosphor Bronze—		
Wire(Telephone)basis ..	1s. 0½d.	—
Brass (80/40)—		
Rod, basis	—	—
Sheet	—	—
Wire	11¼d.	¼d.
Iron and Steel—		
Pig Iron (E. Coast Hematite No. 1)... per ton	£7 13 6	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in.	£28 5 0	—
Mild Steel Tape (Cable Armouring) basis 0.04 in.	£20 0 0	—
Galvanised Steel Wire No. 8 S.W.G.	£26 0 0	—
Lead Pig—		
English	£31 10 0	—
Foreign or Colonial ..	£30 0 0	—
Tin—		
Ingot (minimum of 99.9% purity) ...	£303 10 0	—
Wire, basis... .. per lb.	3s. 10d.	—
Aluminium Ingots ... per ton	£85 0 0	—
Spelter... ..	£31 5 0	—
Mercury (spot) Ware-house per bott.	£69 15 0	—

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

suffer at a time when it would be of vital importance that the trade of this country, particularly the export trade, should get into its stride with the least possible delay.

EVER READY CO. (GT. BRITAIN), LTD.—The annual meeting was held at Hadley Common, Barnet, on June 4. Mr. Magnus Goodfellow, chairman and managing director, presided. In the statement issued with the report it was shown that there was a reduction of net profit of £33 000 compared with the previous year, the fall being due to the reduction of the E.P.T. capital structure owing to the writing off on the plant establishments account. During the past five years the company had operated fifteen factories in England and since 1942 one in Scotland. Of these factories, 12 were established in North and North-East London, in which area some

5 000 people had worked throughout the war.

SIEMENS BROS. AND CO., LTD.—The annual meeting was held in London on June 18, the Rt. Hon Lord Queenborough, the chairman, presiding. The latter in the statement, which had already been circulated with the accounts, said that with the Japanese war still in progress the company would continue to be engaged on contracts to meet the requirements of the nation until victory was finally achieved, and when the total change-over from war-time to peace-time production had to be carried out the company would need large cash resources to re-equip their factories with new plant to replace that which had been subject to such severe strain during the past six years, and to provide extensions to their premises to meet post-war needs.

Commercial Information

Mortgages and Charges

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

CLAYTELEC LTD., London, N, electrical contractors.—June 2, mort., to Midland Bank Ltd. securing all moneys due or to become due to the Bank; charged on moneys under contract.

LEONARD J. IVE LTD. Watford, electrical and radio dealers.—May 11, mort., to Halifax Bldg. Soc. securing £2 250 and further advances; charged on 179, 179a and 179b, Queens Road, Watford. *£1 000. Dec. 21, 1938.

PAGE AND MILES LTD. Brighton, electrical engineers.—May 31, mort., to Barclays Bank Ltd. securing all moneys due or to become due to the Bank; charged on 60, Western Road, and 43, Castle Street, Brighton. *£1 678. Nov. 9, 1944.

County Court Judgments

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

LYMBERY, E. (male), 80, Station Street, East Kirkby, radio dealer. £161 6s. 11d. May 3.

DAVIE, Llewellyn, 22, Clifton Road, Weston-super-Mare, electrical engineer. £40 12s. April 11.

BUCKLE, A. C. (male), 11, Spon Street, Coventry, wholesale radio and electrical supplier. £34 19s. 3d. April 24.

Application for Discharge

MAUND, Thomas, 37, Earle Road, Bramhall, Chester, lately carrying on business at 80, Wellington Road North, Heaton Norris, Stockport, Lancaster, electrical engineer, under the style of "Beacon Electrical Company." Date of hearing, July 4, 1945, 11 a.m., The Court House, Vernon Street, Stockport.

Notice of Intended Dividend

WEBB, Cecil Robert Golden (trading as Southern Electrical Mechanical Co.), 146A, Eastern Road, Brighton, Sussex, and formerly carrying on business at 94, St. Georges Road, Brighton, as an electrical engineer. Claims to be sent by June 29, 1945, to the trustee, Mr. Alfred Clarke Williams, 8, Old Steine, Brighton 1, Official Receiver.

COMING EVENTS

Saturday, June 23.

I.E.E., WESTERN CENTRE.—Bath. Summer outing to the engine factory of the Bristol Aeroplane Co. Ltd. Annual meeting 12.35 p.m., followed by lunch at 1 p.m.

Friday, June 29.

E.P.E.A. SOUTHERN DIVISIONAL METER ENGINEERS' GROUP.—Room 19, Livingstone House, Broadway, Westminster. Paper, "Some Experiences in Servicing A.C. Meters." 6.30 p.m.

ELECTRICAL INDUSTRIES BENEVOLENT ASSOCIATION.—2, Savoy Hill, Strand, London, W.C.2. Annual meeting. 11.30 a.m.

Saturday, June 30.

I.E.E., S. MID. STUDENTS' SECTION.—Visit to Hams Hall Power Station. Buses leave Easy Row, Birmingham. 2 p.m.

WHEN CHANGING YOUR FACTORY LAYOUT

plan to use

Rawlplug

Fixing Devices



Rawlplugs, Rawldrills, Rawlbolts, Percussion Tools, Rawldrives, Rawlplastic, White Bronze Plugs, Bolt Anchors, Screw Anchors, Cement-in Sockets, Boring Tools, Tile Drills, Electric Hammers, Mechanical Hammers, Soldering Irons, Toggle Bolts and many products of Industrial and Domestic utility.

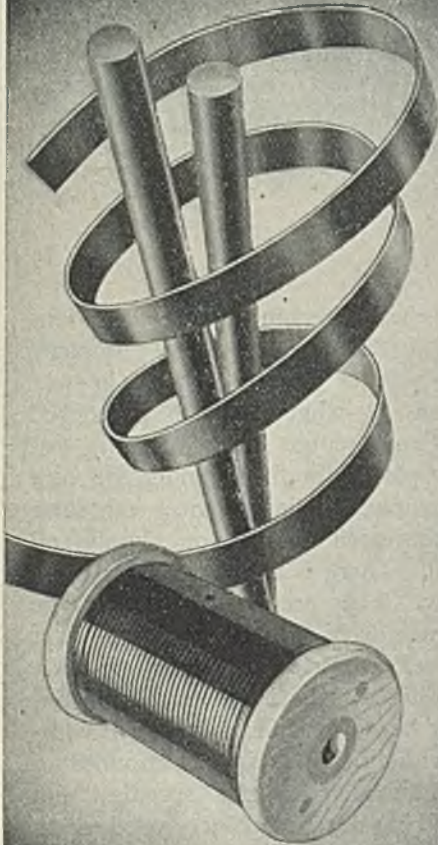
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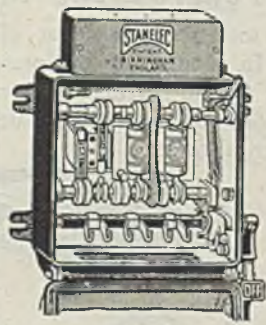
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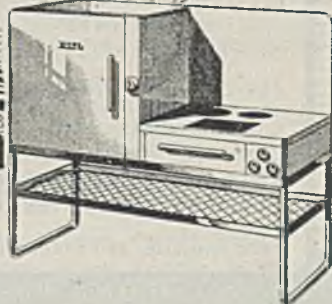
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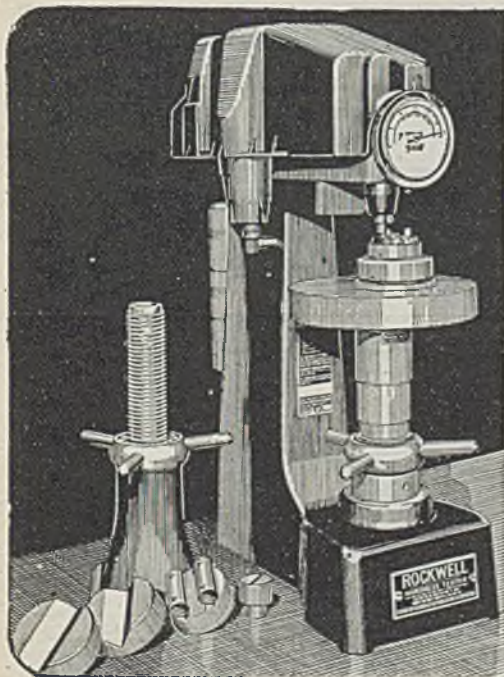
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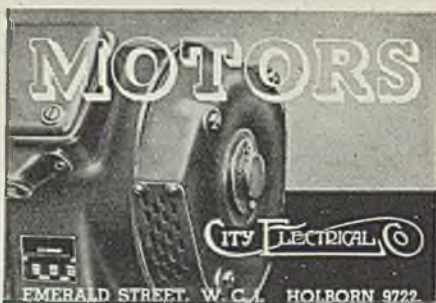
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