

THE

# ELECTRICIAN

Vol. CXXXIV. No. 3492.

Friday, May 4, 1945.

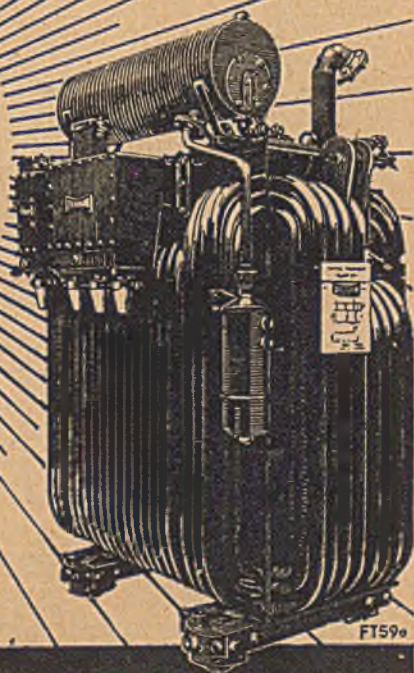
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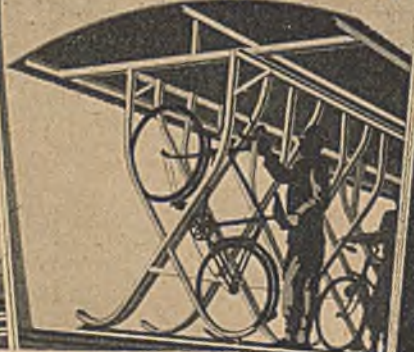
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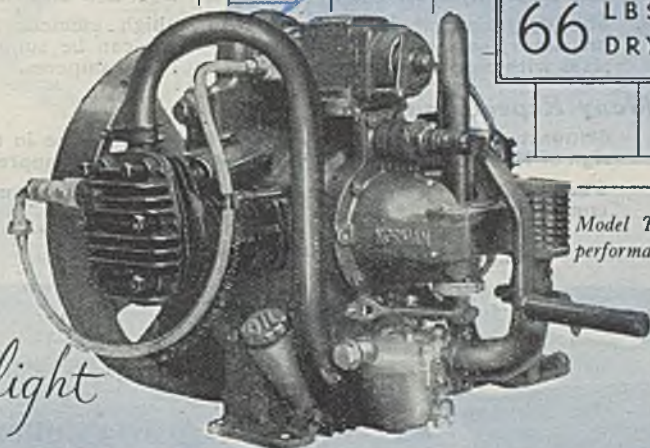
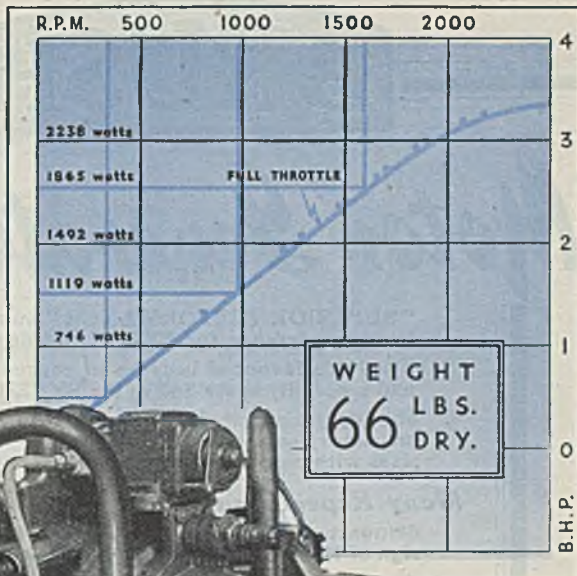
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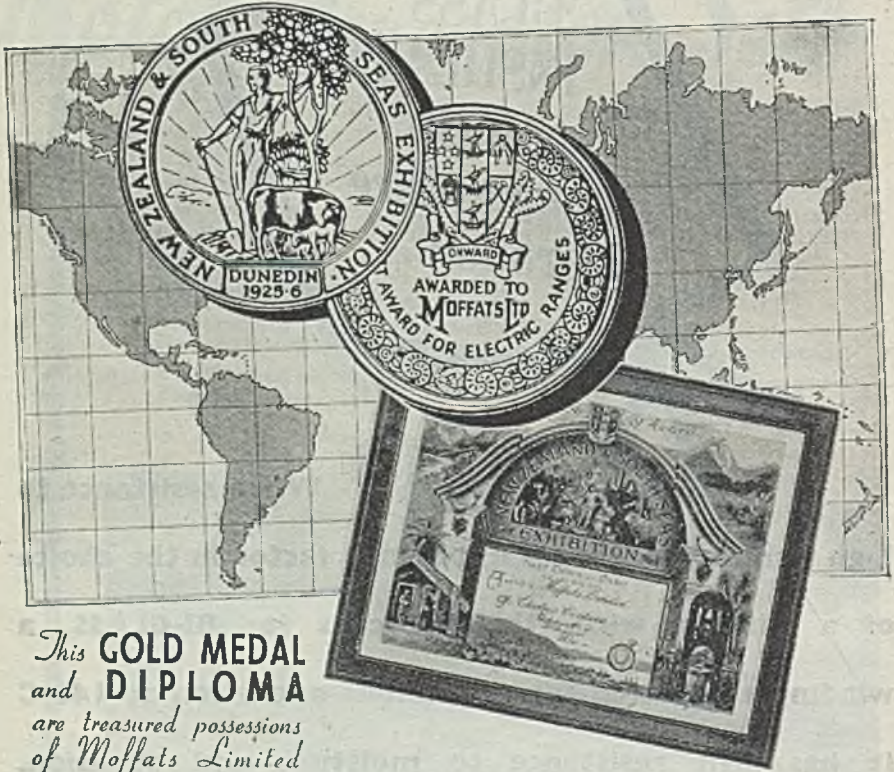


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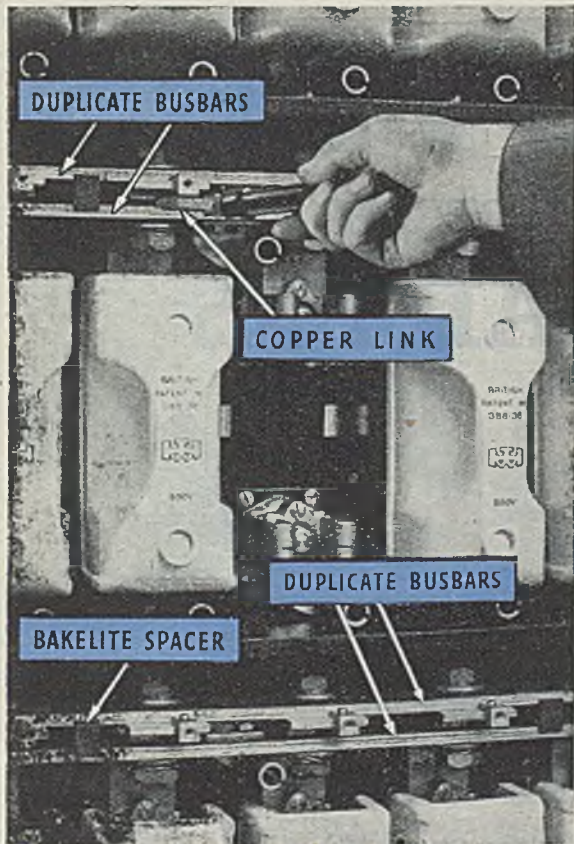


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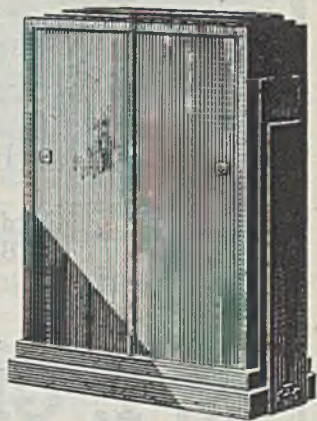


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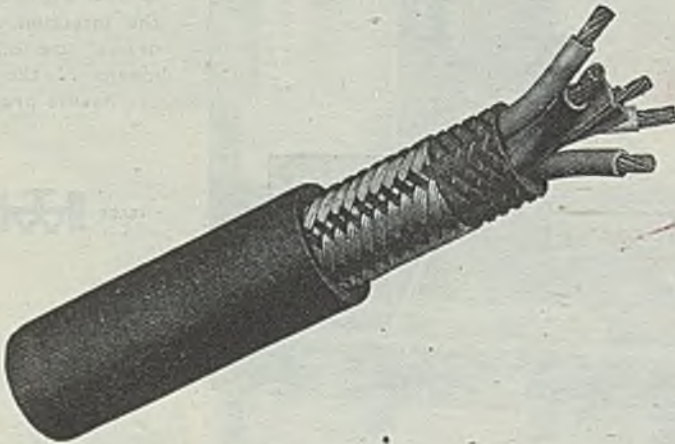
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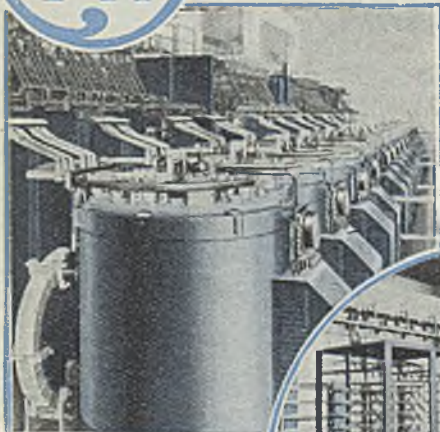
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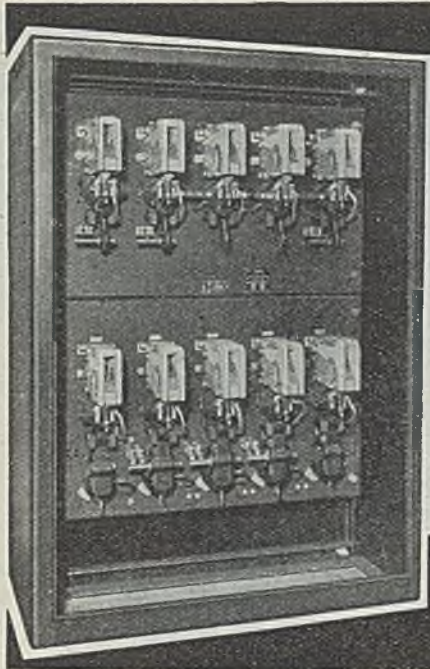


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Type 50 B Variac handling 7 kVA at 230 V in represents a valuable addition to the Variac range, and will find many applications in industry.

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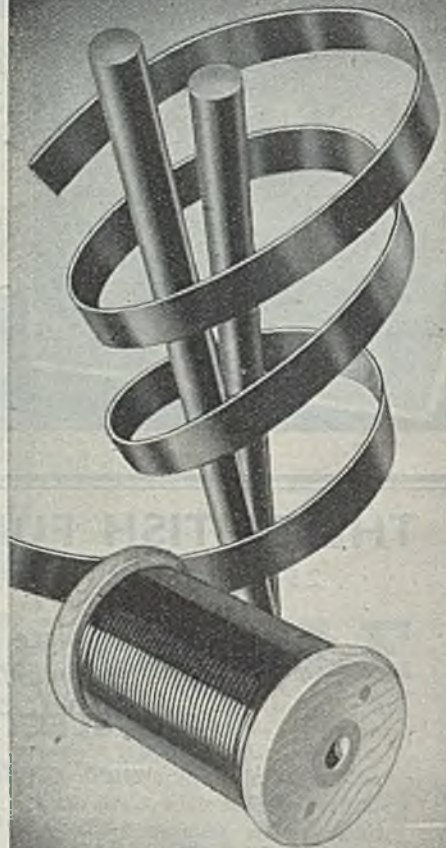
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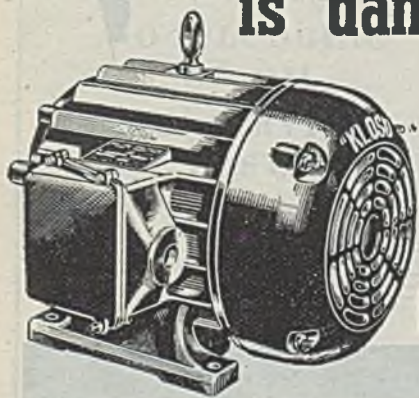
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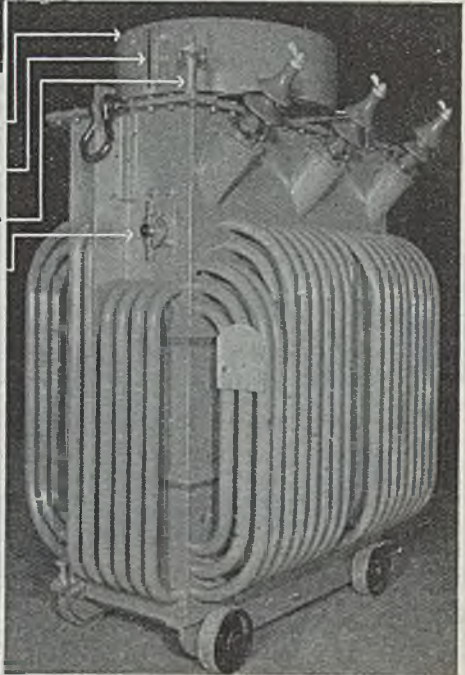
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PART OF A GOVERNMENT CONTRACT  
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Designed to give  
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- (a) 66 000 VOLTS SWITCHGEAR.
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- (e) 440 VOLTS SWITCHGEAR.
- (f) 100 kW MOTOR GENERATOR SETS AND BATTERIES.

Specification, General Conditions of Contract and Form of Tender may be obtained upon application to The Agent-General for Western Australia, Savoy House, 115/116, Strand, London, W.C.2, or to the Western Australian Government Tender Board, Perth, Western Australia.

Any further information required by Tenderers may be obtained from the above. Tenders are to be lodged with The Agent-General for Western Australia, Savoy House, Strand, London, or The Chairman, W.A. Government Tender Board, Perth, Western Australia, not later than noon on Thursday, 21st June, 1945.

Specifications and General Conditions of Contract may be obtained from the above on payment of one guinea for each copy of the Specification, such amounts being returnable on receipt of bona-fide tender.

C. C. HILLARY, Secretary,  
Office of The Agent-General for  
Western Australia,  
Savoy House,  
115/116, Strand,  
London, W.C.2

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COUNCIL.****ELECTRICITY DEPARTMENT.**

TENDERS are invited for the SUPPLY, DELIVERY, ERECTION and LAYING and JOINTING of:

- (a) E.H.T. Steel Wire Armoured Cable.
- (b) L.T. Steel Tape Armoured Cable.
- (c) 250 kVA 3 300/400/230 volt Indoor Transformer.

- (d) L.T. Sub-station Distribution Panel.

Copy of Specification and Form of Tender can be obtained from the Electrical Engineer and Manager, Electricity Department, Church Lane, Adwick-Le-Street, nr. Doncaster.

Tenders must be enclosed in a PLAIN SEALED envelope, endorsed "HIGHFIELDS," and addressed to:

The Clerk to the Council,  
Electricity Department,  
10 and 12, Church Lane,  
Adwick-Le-Street,  
Nr. Doncaster.

not later than the First Post, 19th May, 1945. The Council do not bind themselves to accept the lowest or any Tender, and reserve the right to accept the whole or part of any Tender.

C. R. MARSHALL,  
Clerk to the Council,  
10 and 12, Church Lane,  
ADWICK-LE-STREET,  
Nr. Doncaster.

**SITUATIONS VACANT****CITY OF PORTSMOUTH.****APPOINTMENT OF ENGINEER AND  
MANAGER, ELECTRICITY UNDERTAKING.**

THE Council invite applications for the position of Engineer and Manager of their Electricity Undertaking from applicants who are Corporate Members of the Institution of Electrical Engineers, and experienced in the management and administration of an Electricity Undertaking. The salary for the position will be in accordance with the agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941, and in accordance with Clause 10 of the agreement, the salary for the first year will be 85 per cent. of the full salary and for the second year 92½ per cent. thereof.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to determination by the giving of three months' notice in writing on either side. The successful candidate will be required to pass a medical examination.

Applications, on the forms provided, enclosed in an envelope endorsed "Engineer and Manager, Electricity Undertaking," must reach the undersigned not later than 10 a.m. on Tuesday, the 22nd day of May, 1945.

Canvassing either directly or indirectly will be a disqualification.

FREDERICK SPARKS,  
Town Clerk.

Municipal Offices, Royal Beach Hotel,  
Portsmouth.  
19th April, 1945.

**THE BOMBAY GAS COMPANY, LIMITED.****APPOINTMENT OF PUBLIC LIGHTING  
SUPERINTENDENT.**

THE above Company invites applications for the position of Public Lighting Superintendent.

Applicants should be preferably under 35 years of age and will be required to pass a medical examination.

At present there are 9 095 gas lamps in the area of supply, mostly low pressure, the Company being responsible for the lighting and extinguishing (according to the prescribed Schedule), also for the maintenance, of the lamps and the illumination to a specified standard.

Applicants should be experienced in the duties appertaining to the above matters, including the administration of the department and the control of lampfitters and maintenance fitters. He should be familiar with the principles and practice of illumination, and preferably have some knowledge of medium-pressure gas lighting. He will also be responsible for the costing of the work of his department in collaboration with the accountant.

The engagement will be for four years in the first instance, of which the last six months will be on leave at full pay. Passage out and home will be paid, including wife and children (if any).

The basic salary offered is approximately £900 per annum, plus a war-time cost of living allowance of £180 (if no children) or £225 with children. In addition, free gas, coal and electricity is allowed. The official will pay his own Income Tax (the present effective rate being about 2s. 6d. in the £), and will



pay the Company £60 per annum for unfurnished accommodation.

Applications should be accompanied by copies of two testimonials or names to whom reference can be made, and should be addressed to The Chairman, Bombay Gas Co., Ltd., 279/281, Gresham House, Old Broad Street, London, E.C.2.

By Order of the Board,  
E. COMBER,  
Secretary.

**THE BOMBAY GAS COMPANY, LIMITED.**

**APPOINTMENT OF ASSISTANT MANAGER.**

THE above Company invites applications for the position of Deputy Engineer and Manager. The total output is about one thousand millions of cubic feet per annum. Applicants should be preferably under 35 years of age and will be required to pass a medical examination.

Applicants should have had experience in carbonization with horizontal or vertical retorts and water gas manufacture, Works Maintenance, handling of labour, and some knowledge of administration.

The engagement would be for four years in the first instance, of which the last six months would be on leave at full pay. Passage out and home would be paid, including wife and children (if any).

The basic salary offered is approximately £1250, plus a cost of living allowance, the present allowance being £180 without children or £225 with children, together with free gas, coal and electricity. If the Company provide unfurnished living accommodation a deduction of £120 per annum will be made, and the official will pay his own income tax, the effective rate of which is now about 3s. 6d. in the £.

Applicants must give details of training, experience, present position held, and state their position under the Essential Works Order.

Applications should be accompanied by copies of two testimonials or names to whom reference can be made, and should be addressed to The Chairman, Bombay Gas Company, Limited, 279/281, Gresham House, Old Broad Street, London, E.C.2, not later than the 28th May, 1945.

By Order of the Board,  
E. COMBER,  
Secretary.

**CITY OF BIRMINGHAM EDUCATION COMMITTEE.**

**ASTON TECHNICAL COLLEGE,**  
Whitehead Road, Birmingham, 6.

Principal: D. Dudgeon Stockley, B.Sc.,  
M.I.Mech.E.

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P. D. INNES, Chief Education Officer.

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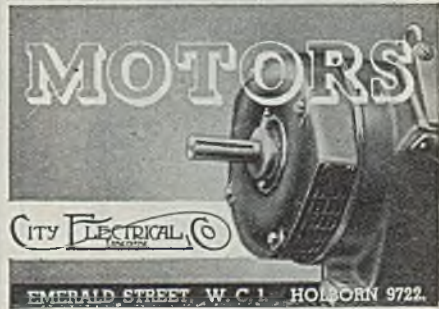
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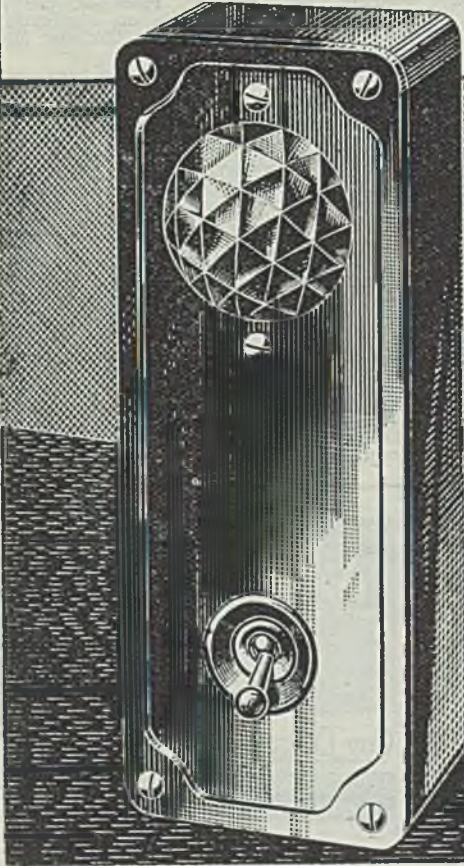
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# Visible Contact

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# THE ELECTRICIAN



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## Next Winter

THE concern of the supply industry with respect to coal stocks next winter, will not have been lessened by the views expressed by the Minister of Fuel at the luncheon of the Provincial Electric Supply Association, last week, for instead of offering the hope of a solution he did no more than issue a warning that the winter of 1945/46 will tax our resources even more than did the last. Further, while recognising that the industry is suffering from a shortage of generating capacity, that the public demand for current is ever-growing, he held out little prospect of new plant finding its way to our stations to meet the insistent calls made upon them.

Coal stocks which were last winter eaten into as never before, may, if we are lucky, be built up during the summer months to their former volume, but even so, the public demand for current will by

then have increased upon its present figure. In the circumstances, therefore, the difficulties of the industry may reasonably be expected to grow with the ability of a rolling snowball, and until the coal industry increases the volume and raises the quality of its output, the danger attendant upon another winter as cold as the last must haunt the country.

Plant which was already old last year will next winter be older still, and though certain extensions may be said to be as much on their way as officialdom will allow, it is problematical whether any substantial new generating capacity will be available to help out the old. The reasons for this, apart from manufacturing difficulties of labour and materials, are due to the fact that after the Central Board have obtained approval of their programmes and have issued appropriate directions for extensions, it still remains necessary for the authorised undertakers concerned to secure the various consents required by statute. The delay which this necessarily causes has been aggravated during the war by the lack of suitable official priority for the work, and the consequent impossibility of securing adequate labour. To these difficulties there has recently been added the expectation of those interested in town and country planning, that developments of the grid and the selected stations connected with it, should conform to their wishes, which, as yet, lack definition, and so far as electricity is concerned do not always appear to be consistent with technical and economic requirements. At the beginning of last year the total installed capacity of selected stations was 10 984 656 kW, and though by the end of the year this had been increased to 11 254 081 kW, there still remained to be commissioned plant amounting to some-



thing like 250 000 kW, authorised by the Government as long ago as 1942.

#### Fuel Scarcity and Public Demand

IN the circumstances outlined above, it would seem reasonable to suppose that in order that the highest possible thermal efficiency might be obtained, the Ministry of Fuel would see that the existing generating plant was served by the best steam raising coal in the country. As it is, however, power station engineers have complained with monotonous persistency that the low grade fuels on which they are required to operate their stations are not only poor in quality, but, what is worse, inconsistently so. The Minister of Fuel may recognise the fact that next winter will be one of sacrifice where coal is concerned, and we sympathise with him in his difficulties, but since the public will, for reasons of scarcity of domestic supplies and rising prices, more and more turn to electricity as a substitute for coal, we suggest that he ensures that our power stations are able to burn fuel of a type which will permit of the best output being obtained from their generating capacity. It should be borne in mind, too, that during next winter there will still be in operation, some 2 000 000 kW of plant which by 1947 will be over 20 years old, with 347 000 kW of it over 25 years of age, while a further 281 000 kW will reach that age in the following year. Any undue strain upon this plant, should, we submit, be avoided.

#### Repeat of Kelvin Lecture

AS indicated in our last issue the popularity of this year's Kelvin Lecture was such that the capacity of the I.E.E. building was unable to cope with all the demands, and the Council have arranged, therefore, for Sir EDWARD APPLETON to make a second delivery on May 17. Those attending are advised to occupy their seats as early as possible. Apart from the interest which Sir EDWARD was able to put into his address last week, the demonstrations of radio-location he was able to stage were outstanding in their ability to convey to the audience the practical utility and fascinating accuracy of the development so far. National security prevents us—as no doubt it prevented Sir EDWARD to a certain extent—from going into too great a detail, but those who were present to hear the address gained an understanding of the subject more than sufficient in

volume to appreciate the enormous contribution which those who have worked on radio-location have made to the war effort, to say nothing of the safety of sea and air transport in the years to come. The lecture was a remarkable addition to a remarkable series and its interest will be long remembered, despite the fact that memory of it cannot yet—for security reasons—be assisted by the abstract which we would normally give in this issue.

#### Southern Railway's War-time Example

THAT place referred to by the national Press as Southern England was, until a few weeks ago, a favourite reception area for German "exports" of the explosive kind, and though the railway network in the area is largely made up of the electrified lines of the Southern Railway, it speaks volumes for the efficiency of electric service when it is considered how little the travelling public was inconvenienced by delays. Bombing of the area served by the Southern Railway commenced before the Battle of Britain and was continued until a few weeks ago, and though little has been published, some indication of how the railway engineer successfully maintained a comparatively normal service is given this week with respect to the reconstruction of Streatham and Purley sub-stations. No one is more appreciative of what the railways have done during the war years, than the public living in the dormitory areas South of the Thames, for though they often saw the damage which the enemy had caused, in relatively few cases were they called upon to transfer their patronage to road transport.

#### Phototelegraph Development

ONE of the many outstanding developments in British enterprise during the war has been the progress of wireless transmission of photographs, drawings, documents and plans. Before the war, Cable and Wireless, Ltd., operated only three phototelegraph circuits, with Melbourne, New York and Buenos Aires; traffic, however, was negligible, except on the New York circuit, on which about 45 pictures were handled every month. Today, although the whole of the London phototelegraph apparatus was lost in the fire which destroyed the company's central telegraph station in May, 1941, 11 services are being operated with Empire and foreign countries, and nearly 2 000



photographs and facsimile documents a month are being transmitted and received. In addition, transmission is now three times speedier than before the war. Priority given to material required directly for war needs has prevented further development, but a post-war possibility is a phototelegraph service of pictures in colour.

### Electricity in its Regional Setting

THE Association for Planning and Regional Construction has prepared, and "The Architectural Review" has published, a well illustrated series of articles bearing the title which heads this note. The series warrants careful reading by the electrical engineer for there is in it much that may be criticised. In the introduction, for instance, it is claimed that the apparent lack of planning in the development of our technical resources is tragic, and while it will be agreed that electricity "is altering and will alter the whole industrial face of Britain," the claim that electricity "could be generated almost everywhere," needs for reasons of economics, some qualification. It is also stated, apart from national and regional aspects, that "the siting of both thermal and hydro-electric power stations, their location, design and appearance, has consistently been unintelligent," because "the engineer has no knowledge of, or training in, the wider problems of industrial location, town and country planning, architecture or aesthetics." Contributors put the case for a plan for electricity in its wider regional setting, and though unanimous in demanding a social and economic assessment of all the implications, they insist on the need for clear-headed thought on the pros and cons of establishing extractive industries in the Highlands as well as "power stations alongside cathedrals."

### Theory and Fact

IT will be appreciated from the preceding note that electrical readers of "Electricity in its Regional Setting" may want to answer the various challenges which have been made, and though space prohibits us from dealing with the subject as we would wish there are certain implications which must not go unnoticed. In the first place the engineer has never claimed to possess any knowledge of the wider problems of industrial location—whatever that may mean—but

he is very conscious of the fact that the location of industry is not a matter of blueprints but of economics, and it is hard to see how the deliberations of the post-war planners can hope to change it. There has been created during the war years an impression that we shall, after the war, find ourselves in circumstances so filled with opportunity to change the old world into something new, that industrial blocks may be moved, that populations may be uprooted to serve them, that the supply industry may be revolutionised, and that a good time will be had by all. The fact is that industry will for many years to come be faced with a period of hard work and sacrifices in order to regain lost trade, and instead of enthusing over theories and blueprints as are the planners, those engaged in it will have little time to do anything else but make the most of things as they are. The ambitions of the planners may be desirable, but for pity's sake let it be realised that we shall come out of the war, not with the opportunity for industrial upheaval but with the need for industrial consolidation.

### Switchgear and Measurements

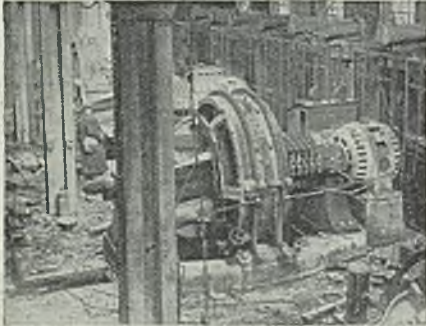
TWO developments of technical interest were mentioned in the report of the C.E.B. for 1944. One is the extension of the use of air-blast switchgear, which has shown itself more rapid in action than the oil-filled type. At the end of the year, an installation of such 132 kV switchgear, comprising two circuit-breakers, was approaching completion and arrangements had been made for two other installations of similar type, but of different makes—one a single circuit-breaker, and the second comprising seven circuit-breakers. Previously air-blast switchgear had been installed on the grid system for operation only at 66 kV or lower voltages. It is claimed that this type of switchgear is likely to prove inherently less costly than other types for higher voltages and rupturing duties. The other development is by the Board's own staff and relates to methods of measuring and indicating at the control rooms the outputs of individual generating stations, and thereafter summing them to determine the total amount generated at those stations. Trial installations have given satisfactory service in two areas and the system will, it is anticipated, be extended.



# New Southern Sub-Stations

## Reconstruction of Streatham and Purley Units

OF the 43 attended rotary converter sub-stations supplying traction current for the Southern Railway Company's train

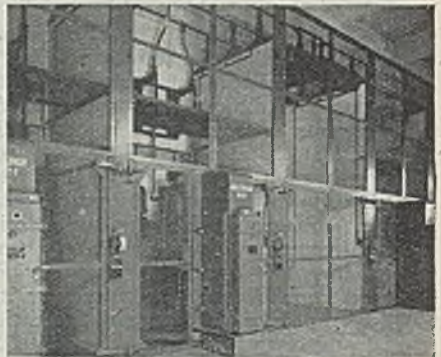


**Burnt-out rotary converters and transformers at Streatham sub-station**

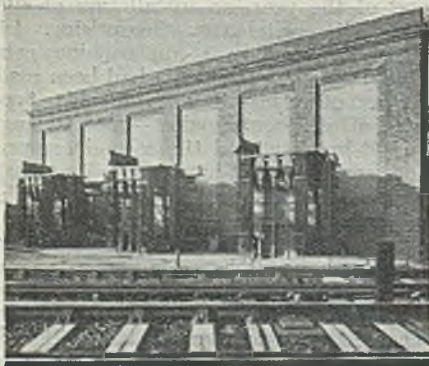
services to the suburban area, one was destroyed by enemy action during the "blitz" period of 1940-1941, Streatham sub-station receiving a direct hit at 12.30 a.m. on October 2, 1940. Splinters from the transformer tanks and caused the oil to become ignited. The ensuing flood of burning oil, released from the punctured tanks, resulted in the sub-station being gutted, and the loss of traction and sig-

two of the Tulse Hill sub-station feeders, the third Tulse Hill feeder being arranged temporarily to give a supply of signalling current from this latter sub-station. These were completed by 5.38 p.m., thus making available electric traction supplies only 17 hours after the sub-station was wrecked. Train services were restricted, but they were maintained.

Streatham sub-station had contained four 1 500 kV rotary converter equipments, including 12 single-phase transformers, together with associated groups of 11 kV switchgear in stonework cell structures, and 660 V d.c. switchgear, all of which had been destroyed. It was decided to reconstruct the sub-station in its original form, and to obtain the necessary



**33 kV switchgear at Purley**



**Rectifier transformers at Purley sub-station**

nalling current supplies. The 11 kV supply to Sutton sub-station was also interrupted.

Emergency cable repairs were immediately instituted, and while the sub-station still burned, work was commenced on joining the two 11 kV Sutton feeders to

rotary converter plant from Purley sub-station, replacing that plant with mercury arc rectifiers. Purley sub-station could only provide three rotary converter equipments, so the fourth was obtained from the adjacent Warringham sub-station, where it had acted as a spare.

Simultaneously consideration had been given to the problem of converting Purley sub-station to accommodate mercury arc rectifier equipment and 33 kV switchgear, without interrupting the 660 V d.c. traction supply from the sub-station. This was achieved.

The main features of the new plant erected at Purley were the installation for the first time for traction service on the Southern Railway of 33 kV indoor type cellular switchgear with circuit-breakers of the oil minimum type, and rectifiers of the humpless air-cooled steel tank type.



# The Kelvin Lecture

## Presentation of I.E.E. Awards—Private Address on Radiolocation

**I**N the lecture theatre of the Institution of Electrical Engineers on April 26 an audience of some 1 000 engineers and physicists, including those at an overflow meeting to which the proceedings were relayed by the public address system, gathered to hear the thirty-sixth Kelvin Lecture which this year was delivered by Sir Edward Appleton, F.R.S., on "The Scientific Principles of Radiolocation."

### Tribute to President Roosevelt

At the commencement of the proceedings the president, Sir Harry Railing, proposed a resolution—approval of which the meeting signified by standing in silence—expressing sorrow and irreparable loss in the death of Mr. Franklin Roosevelt. A message of condolence was despatched to the American Institute of Electrical Engineers and the Institute of Radio Engineers of America, trusting that the governing bodies of these two sister institutions would permit them to express through them their profound sympathy with Mrs. Roosevelt and the members of her family, and with all the people of the United States of America.

The delivery of Sir Edward Appleton's lecture was preceded by the presentation to Mr. J. S. Highfield (past president) of the Certificate of Honorary Membership and to Dr. C. C. Paterson, F.R.S. (past president), of the Faraday Medal.

The presentations were made by the President, who stated that the distinction of Honorary Membership had been conferred upon Mr. Highfield in appreciation of his work in the development of the supply and application of electricity. Mr. Highfield became chief engineer to Stafford and St. Helens, Lancashire, after which he was appointed chief engineer and manager of the Metropolitan E.S. Co. As senior partner in the firm of Highfield and Roger Smith, he later acted as consulting engineer for the Central Board and various electricity undertakings and industries in this country and abroad, and he also became a director of a number of undertakings. Mr. Highfield originated the metal enclosed busbar system for switchgear, discovered the reason and developed a remedy for the failure of high-voltage alternator windings, and introduced to England the Thury system of high-voltage d.c. constant-current generation and distribution. He carried out original experiments on air insulated single core cables which were tested successfully at 60 000 V a.c. During the last war he demonstrated

at sea the use of shrouded hydroplanes for submarine detection.

On receiving the Certificate, Mr. Highfield, in the course of his reply, expressed deep appreciation of the honour which had been conferred upon him by the Council.

The President then referred to the twenty-third award of the Faraday Medal of which Dr. Paterson was this year the recipient, for conspicuous services rendered by him in the advancement of electrical science, particularly in the field of electrical research.

The exigencies of the war had required in recent years that the medal should be struck in silver, but this year it was possible to revert to bronze, the metal originally chosen when the medal was founded. This metal was selected rather than gold because it was particularly desired that there should be no suggestion of any intrinsic value in the medal itself, but rather that it should owe its value, first to the fact that it was instituted to commemorate the foundation of the institution, and secondly that it was offered for world-wide services to electrical science and engineering.

Dr. Paterson was on the staff of the National Physical Laboratory from 1903 till 1919, and was responsible for building up the electro-technical and photometric departments of that laboratory. During the 1914/18 war he participated in the inception and development of electrical apparatus which provided an automatic record of the height of aircraft. He received the O.B.E. in connection with this work.

After the war he was charged with the responsibility of creating the G.E.C. Research Laboratories, one of the largest industrial research organisations in the country, which have helped to set a standard in British industrial research.

### Research in the Present War

During the present war the Government had entrusted to him the solution of some of the most urgent and important problems which could not be mentioned at this juncture, but in regard to which he and his associates had done work of outstanding value to the country. His great achievement had been the creation of an organisation which consisted of a body of scientists working as a close knit team and doing fundamental research which ranged from the heavy engineering field to electronics. At the same time he had been successful in securing that the results of such work had been translated in a practical form for application in industry, the building up of a dual organisation of this



character and with the record which he and his laboratories had obtained, constituted work of the highest national importance.

On receiving the medal Dr. Paterson thanked the Council for the award, which he regarded as an honour all the more to be valued as it had been conferred upon him by his own colleagues in the institution.

The President introduced Sir Edward Appleton as one of the leaders of British physics who, at a time when work in sub-atomic fields attracted so many of our best scientists, turned his attention to those regions which he discovered as forming such a surprising ceiling to our world's electrical atmosphere.

He made his discoveries, not by chance, but by patient experiment and brilliant deduction, and took a worthy place in the line of British electricians which started with Faraday and continued with Maxwell, Kelvin and Heaviside.

His inspiration and wise guidance of our use of science in so many fields of national activity became a major factor in the success of the scientific effort of this country, both in peace and in war.

It was fitting that Sir Edward Appleton should deliver the Kelvin Lecture on this particular subject in the lecture theatre of the institution and it was symbolic that the lecture should be given, three days after the lights of London had been re-lit—these lights which might well have been extinguished for ever, and the world's lights with them, had not British scientists—Sir Edward amongst them—established the principles of radiolocation, and had not British engineers worked out their application. It was a matter for pride that Sir Edward, in this Kelvin Lecture, lifted the veil for the first time on an engineering achievement, in which this country led the world and which had contributed so much to the downfall of the forces of evil.

Sir Edward Appleton then delivered his Kelvin Lecture, after which a cordial vote of thanks proposed by Sir Stanley Angwin and seconded by Sir Arthur Fleming was accorded to the lecturer with acclamation.

It was announced, during the meeting, that Sir Edward had agreed to deliver the lecture again at an additional ordinary meeting to be held on May 17, at 5.30 p.m.

## The Radio Industries Club

The fourteenth annual general meeting of the Radio Industries' Club was held at the Connaught Rooms, London, on April 24.



**Sir Robert Renwick**

The annual report was introduced by the chairman, Mr. H. de A. Donisthorpe, who dealt with some of its outstanding points, referred to the Radio Industries Club of Wales and Monmouthshire, an affiliated club formed since the last annual meeting, and wished it success. He also paid a tribute to Sir Noel Ashbridge, who had been president for the past two years, and thanked him for his guidance and help during that period. Mr. Donisthorpe also announced that a special victory meeting of the club would be held.

Col. V. Z. de Ferranti, proposing the adoption of the report, said that a spontaneous society such as the R.I. Club was much more successful than one which suffered from too much organisation. It showed the advantages of co-operation without coercion. He expressed the thanks of the club to Mr. Donisthorpe and the Committee, and also referred to the

great help that had been received from Sir Noel Ashbridge.

In seconding the motion, Mr. Elliot Macintosh, conveyed the sincere good wishes of the Scottish members.

Sir Noel Ashbridge then proposed the election as president for 1945-6 of Sir Robert Renwick, Controller of Communications, Air Ministry, and Controller of Communications Equipment, Ministry of Aircraft Production. He said Sir Robert was almost uniquely placed, having been in charge of the development of radio for war purposes. It was largely due to his efforts that many new devices saw the light of day, and he had made an extraordinary contribution to the advance of wireless.

Sir Robert was elected by acclamation, and, on taking the chair, said that during the war he and the radio industry had got to know one another very well. The radio industry had fought a trying war, and had come through with flying colours. But its labours were not yet over, for there was the coming battle of competition and trade survival. Manufacturers had to compete not only with each other, but also unitedly for the export markets, and they must win that battle, which was vital to the Empire.

The postal ballot to fill five vacancies on the Committee resulted in the following elections: Messrs. A. G. Beaver, H. de A. Donisthorpe, C. H. Hunt, W. E. Miller and R. F. Payne-Galloway.



# Provincial Electric Supply

## Annual Meeting of the P.E.S.A.—Ministerial Views on Coal

THE annual meeting of the Provincial Electric Supply Association was held in London on April 25, when the chairman, Mr. Selwyn S. Grant, presided. In his address with respect to the activities of the association, Mr. Grant announced that changes in the executive committee involved the resignation of Mr. Frank Christy and the election of Mr. H. J. Aylott in his place; Sir John Dalton had joined the committee, and Mr. E. G. Baker had been appointed secretary.

Further remarks of the chairman were to the effect that the Edmundsons' Electricity Corporation group of companies had withdrawn from membership, and Mr. Towers and Mr. Mekié had resigned from the executive committee.

### The J.I.C. and Joint Board

The association was indebted to Mr. Parkinson for the amount of time spent in their interests on the National Joint Industrial Council and the National Joint Board. A further increase of 1d. per hour in the war bonus had been granted and a demand for a further increase was recently made by the trades' union side. The claim was referred to the Industrial Court and turned down. The proposal to secure agreement between public utility employers on a uniform sick pay scheme for electricity, gas, road transport and water services ended in failure, due to the defection of certain other interests.

The Chairman in referring to the association's relationship with other bodies, in particular to the Joint Committee of Electricity Supply Associations, explained that every supply association was represented on this body with the exception of the Incorporated Association of Electric Power Companies, and even there, eleven power companies had formed a group to work with the joint committee, of which the association's vice-chairman, Mr. Fippard, had been elected chairman for the current year.

Last year the association was approached by the National Farmers' Union for an increase in wayleave payments for compensation for interference with agriculture. An increase was eventually negotiated by the joint committee in respect of poles and stays on arable land and cultivated grassland. The recommendations were generally acceptable to the members. There was nothing conclusive to report on the proposed amendments to the Commissioners' Prescribed Form of Accounts. This involved a good deal of detail work and it was hoped to place the views of the

association before the joint committee so that an agreed report could be submitted to the Commissioners.

Suggestions had been put before the Central Board with respect to modifications in the form of grid tariff. The association had intimated that the most equitable method of those suggested by the Board would be to base the kilowatt charge on the average of the highest half-hourly demands in January, February, November and December. It was apparent to the executive committee that this method was the most suitable to members, and the I.M.E.A. was of the same opinion.

The number of Parliamentary Bills requiring scrutiny increased with every session, but the joint committee, the goodwill of the Commissioners and other departmental bodies had been successful in ensuring that their statutory rights had not been unduly prejudiced. The Town and Country Planning Act alone, for example, provided the public utility associations with a formidable amount of work. With the end of the war in sight, it was naturally hoped to see a diminution in the flow of Parliamentary Bills and Regulations and it would be refreshing to be relieved of the constant necessity of keeping one eye on legal affairs and the other on the main business of development and supply of electricity.

### Conjoint Conference

Time did not permit of full justice being done to the many activities of the Conjoint Conference of Public Utility Associations, the chairman of whose Council was Mr. H. Berry. Representing, as it did, water, gas, and road transport in addition to electricity, the views of the conference must command respect in all quarters, and it was surprising how many matters there were of common concern to two or more of those interests. Through the Conjoint Conference further representations were made during the year on the subject of war damage to public utility undertakings but there was still nothing of consequence to report.

With respect to the extension of supply to rural areas and the development of the agricultural load, the association represented undertakings which had covered a vast amount of ground, but even so, it was realised that there was still much to be done in the outlying districts. At the same time, the Chairman drew attention to the fact that the rate of connection of new consumers of electricity before the war was in the region of 800 000 a year; if connections continued at that rate after



the war, all but the most isolated premises would be supplied with electricity within a very few years. The association members were ready and anxious to proceed with the drive which was so noticeable in the immediate pre-war years, but they were faced with two handicaps; first there had been a considerable rise in the cost of fuel, materials and labour, and secondly there was the uncertainty as to the future structure of the industry. As to the first point, there was no indication that costs of production would decrease; in fact, signs pointed the other way. In spite, however, of the increases in prices of commodities during the war, other than those which were subsidised by the State, the price of electricity to the domestic consumer had largely remained at pre-war level. This reflected great credit on the industry and in no small measure on the long view adopted by the company-owned undertakings in the years between the wars. If ever the private enterprise side of the industry needed to prove its value, it had undoubtedly done so during the war. As to the second factor, there were in the association large and small undertakings, and as an association they had consistently maintained that size was no criterion of efficiency. It was to be hoped that when the authorities considered the question of reorganisation they would measure the solid achievements of the past against the abstract estimates and hopes of the future trumpeted by political theorists.

#### Views on Coal

Prior to the annual meeting, members were entertained at luncheon, with Major Gwilym Lloyd George, Minister of Fuel and Power, as the chief guest, who at the invitation of Mr. Selwyn S. Grant, addressed the gathering in the following terms.

Since the beginning of the war, the amount of coal consumed by the industry had increased by some many per cent., but with such consumption had been generated sufficient current to meet every demand of the country. It was, last winter, abundantly clear what that demand had become, and it was a tribute to the industry that in spite of all its war-time difficulties the public had sufficient faith in it to still expect light, heat and power any and every time a switch was dropped.

As to the future, the problem was one of plant and coal stocks. of the first there was a definite shortage, and as the war came to an end, current demand would increase. Existing plant was not of sufficient capacity to meet the anticipated demand, while the prospects of new plant were not hopeful. During the war, we had had to take risks and the fact that the country

had only this last winter felt the pinch, and then only for a short time, had justified the Government's attitude with respect to extensions. Because of the present shortage of plant and labour there would for a time need to be a measure of control, and he had suggested that such control could best be administered by the industry itself. The suggestion had been acted upon and a committee, representative of supply, manufacturing and other interests had been set up.

#### A Dismal Prospect

As to coal stocks, at no time had these been so eaten into as during last winter. His Ministry intended doing its utmost to build up such stocks, but even so, the industry must accept the fact that it will not be able to meet unlimited demands. There was every indication that next winter would be a bad time, but with the co-operation of the supply industry and intelligent usage of current by consumers, we may reasonably be expected to overcome our coal difficulties. The removal of black-out restrictions and the resumption of street lighting had not been helpful and he urged the industry to preach the gospel of current economy wherever possible.

As to rural electrification, a subject in which the association was especially interested, the problem as he saw it was one of cost. The country should, however, be made conscious of the good work which had already been done, exceeding as it did the availability of public water supplies in rural areas. Agriculture and coal were the two basic industries of the country, yet were the two most neglected. Agriculture could benefit enormously from electricity supply, which in its turn was dependent upon coal. For this and other reasons it was imperative that the coal industry should be reorganised, but not until the public thoroughly understood the coal industry and its problems could such reorganisation be done with profit. There was no doubt that the country would be faced with a difficult period after the war, but in meeting the problems to be solved the supply industry had a most important part to play, both at home and in the expansion of our manufacturing facilities for exporting goods.

**Improved Telephone Equipment.**—A new type of equipment at the trunk exchanges in London, Bristol, Birmingham, Edinburgh, and other large cities now enables switchboard operators to connect subscribers at a distant centre directly, without the services of a local operator. To find whether there is any delay on a trunk circuit, operators now plug in, and a speaking clock arrangement gives them the information they need.



# Depreciation and Interest on Capital

By S. HOWARD WITHEY, F.C.I., M.I.Ec.

IN addition to the trade purchases and wages, the periodical trading account will be debited with the various management and working expenses and business charges incurred, leaving such items as depreciation of land and buildings, engines, boilers, economisers, fixed machinery, shafting, loose plant, tools, and patterns, to be debited to profit and loss. The cost of machinery and building repairs, and pattern making will be shown in the trading account, but it should be borne in mind that if the book value of any displaced asset has been written off, the full cost of the replacement should be debited to the particular assets account as a direct posting from the cash book, or from the "capital outlay" section of the purchases journal.

## The "Annuity" Method

Items to be capitalised can readily be collected in the form of monthly or other periodical totals for ledger posting purposes, by using a pattern of purchases journal having separate sections for the systematic classification of the various units and groups of engineering equipment. In addition to these records, an inventory of the entire productive layout should be kept, this being preferably divided into sections to correspond with the different types, specifications and capacities. Each entry made in the inventory should give the date shown on the invoice or other debiting document, the name of the constructor or supplier, and a sufficiently detailed description to enable the installation to be quite readily identified.

In some instances, interest on the amount of capital outlay is one of the most important factors to be taken into consideration when deciding the amount to be charged under the heading of depreciation.

When capital is raised for the specific purpose of acquiring additional machinery or tools, provision should be made in the engineering costs for interest on the sum expended. Failure to do this might have some very disastrous consequences by reason of the inaccurate, or misleading, costing of special processes. By adopting what is known as the "annuity" method of computation and accounting, a fixed rate per cent. can be added to the opening balance of the asset account each year, thereby increasing, for the time being, the amount of un-recovered investment shown in the books. In this way, the total cost can be spread over a definite period in the form of equal annual instalments against profits,

while credit is taken for the amounts of annual interest.

For example, say, in January, 1941, the sum of £5 000 was borrowed by an engineer carrying interest at the rate of 5 per cent. per annum, and the entire sum was expended on electrical equipment. It was decided to include interest in the depreciation computations, and to write off the total capital expenditure, plus interest, in equal annual instalments over a period of ten years. The only real difficulty consisted of determining the precise sum to be charged each year *after* interest at the rate of 5 per cent. had been added to the debit balance of the asset account, and reference was eventually made to the following table which gives the decimal part of £1 required to extinguish £1 over periods ranging from 4 to 10 years after providing for interest at the rate of 3 per cent., 4 per cent. and 5 per cent. per annum, respectively:—

Years.	3 per cent.	4 per cent.	5 per cent.
4 ...	.269028	.275490	.282012
5 ...	.218354	.224627	.230975
6 ...	.184597	.190761	.197017
7 ...	.160506	.166609	.172819
8 ...	.142456	.148527	.154721
9 ...	.128433	.134493	.140690
10 ...	.117230	.123291	.129504

The amount to be written off was ascertained by multiplying the decimal 0.129504 by £5 000, giving £647 (excluding shillings and pence). Consequently at the end of ten years the private ledger account will show the following entries.

ELECTRICAL EQUIPMENT.					
Debit.		£	1942.		Credit.
1942.			1942.		£
Jan.	To Capital	5 000	Dec. 31	By Depcn.	
	Cost ...			writ. off	647
Dec. 31	To 5% Int.	250	Dec. 31	By Balance	4 603
		£5 250			£5 250
1943.			1943.		
Jan. 1	To Balance	4 603	Dec. 31	By Depcn.	
				writ. off	647
Dec. 31	To 5% Int.	230	Dec. 31	By Balance	4 186
		£4 833			£4 833
1944.			1944.		
Jan. 1	To Balance	4 186	Dec. 31	By Depcn.	
				writ. off	647
Dec. 31	To 5% Int.	209	Dec. 31.	By Balance	3 748
		4 395			4 395
1945.			1945.		
Jan. 1	To Balance	3 748	Dec. 31	By Depcn.	
				writ. off	647
Dec. 31	To 5% Int.	187	Dec. 31	By Balance	3 288
		3 935			3 935
1946.			1946.		
Jan. 1	To Balance	3 288	Dec. 31	By Depcn.	
				writ. off	647
Dec. 31	To 5% Int.	164	Dec. 31	By Balance	2 805
		3 452			3 452



1947.		1947.			
Jan. 1	To Balance	2 805	Dec. 31	By Depcn. writ. off	£ 647
Dec. 31	To 5% Int.	139	Dec. 31	By Balance	2 297
		<u>2 944</u>			<u>2 944</u>
1948.		1948.			
Jan. 1	To Balance	2 297	Dec. 31	By Depcn. writ. off	647
Dec. 31	To 5% Int.	114	Dec. 31	By Balance	1 764
		<u>2 411</u>			<u>2 411</u>
1949.		1949.			
Jan. 1	To Balance	1 764	Dec. 31	By Depcn. writ. off	647
Dec. 31	To 5% Int.	87	Dec. 31	By Balance	1 204
		<u>1 851</u>			<u>1 851</u>
1950.		1950.			
Jan. 1	To Balance	1 204	Dec. 31	By Depcn. writ. off	647
Dec. 31	To 5% Int.	60	Dec. 31	By Balance	617
		<u>£1 264</u>			<u>£1 264</u>
1951.		1951.			
Jan. 1	To Balance	617	Dec. 31	By Depcn. writ. off	647
Dec. 31	To 5% Int.	30			
		<u>£647</u>			<u>£647</u>

Although the sum of £647 would be transferred to the debit side of the depreciation account each year, making a total of £6 470 for the ten years, the sum of £1 470 would be credited to profit and loss during the same period under the heading of interest, made up as follows:—

1942	...	£ 250	1947	...	£ 139
1943	...	230	1948	...	114
1944	...	209	1949	...	87
1945	...	187	1950	...	60
1946	...	164	1951	...	30
					<u>£1 470</u>

The balance of net profit shown in the periodical profit and loss account of the electrician in business on his own account may be transferred to the credit side of his capital account and retained in the business as additional working capital, or it may be credited to his current or drawings account to be withdrawn from the business for private purposes as and when required. In the case of two or more partners, however, the amount of net profit will have to be shared between the partners in accordance with the terms of the deeds or other agreements which have been entered into.

In order that the rights of the partners between themselves may be adjusted in a fair and equitable manner, a number of matters will demand special attention. In some cases, for example, the capital of the partners is fixed, and when this is so, the capital accounts will remain unaltered during the term of the partnership, all sums representing partners' salaries, share of profits, private drawings and interest on capital being shown in the separate current accounts.

Sometimes one or more of the partners in an electrical engineering business is paid a definite salary in consideration of whole-time services. The amounts paid as salary are then usually posted direct from the cash book to the debit side of the general salaries account kept in the nominal ledger, the effect being to charge the partner's salary before arriving at the balance to be shared. Instead of paying out the salary in actual cash, however, the amount may be credited to the partner's current account and debited to profit and loss, and when a junior partner with little or no capital invested in the business is granted fixed remuneration, the amount may, in accordance with an agreement, be debited to the firm's salaries account and credited to the partner's capital account instead of being actually paid out. The principles involved can best be illustrated by a consideration of typical examples.

#### WHEN INTEREST IS CREDITED.

1942.		1941.			
Dec. 31	To Balance	£ 6 500	Dec. 31	By Balance	£ 6 000
			Dec. 31	By 5% Int.	300
			Dec. 31	By Half sh. of £400 (viz., £800 less £400)...	200
		<u>6 500</u>			<u>6 500</u>

1942.  
Dec. 31 By Balance 6 500

#### B's ACCOUNT.

1942.		1941.			
Dec. 31	To Balance	£ 2 300	Dec. 31	By Balance	£ 2 000
			Dec. 31	By 5% Int.	100
			Dec. 31	By half sh. of £400 (viz., £800 less £400)...	200
		<u>2 300</u>			<u>2 300</u>

1942.  
Dec. 31 By Balance 2 300

#### WHEN INTEREST IS IGNORED.

1942.		1941.			
Dec. 31	To Balance	£ 6 400	Dec. 31	By Balance	£ 6 000
			Dec. 31	By half sh. of £800	400
		<u>6 400</u>			<u>6 400</u>

1942.  
Dec. 31 By Balance 6 400

#### B's ACCOUNT.

1942.		1941.			
Dec. 31	To Balance	£ 2 400	Dec. 31	By Balance	£ 2 000
			Dec. 31	By half sh. of £800	400
		<u>2 400</u>			<u>2 400</u>

1942.  
Dec. 31 By Balance 2 400

If A and B are partners, trading under the style of A, B and Co., A's capital account at the end of December 1941, being £6 000 while B's capital was only £2 000, and a net profit of £800 is realised during 1942, it would be unnecessary to credit each



partner with interest providing A receives three-quarters of the profit, and B one-quarter. But if the profit is shared equally between the partners, regardless of the unequal capitals, it would be necessary to credit each partner with interest at an agreed rate to avoid any unfair adjustment at balancing time. Assuming interest at

the rate of 5 per cent. per annum, the results of providing for interest, on the one hand, and of ignoring interest, on the other, would be as opposite.

It will be seen that failure to credit each partner with interest on capital in such a case would have the effect of benefiting B to the extent of £100 at the expense of A.

## All-Electric Houses

By F. D. PARKER, A.M.I.E.E.

THE word "all-electric" is perhaps the most abused in the supply engineers' vocabulary. Instead of implying—as it should do—total usage of electricity to the exclusion of all other fuels, its more general meaning among supply engineers has now become, at least in the domestic sphere, usage of electricity to the exclusion of gas, coal for basic space heating being accepted as a matter of course. Here it is obvious, however, that in non-technical circles the term "all-electric" may be taken literally and much confusion result, especially when dealing with running costs. Recently, for instance, the writer has seen numerous unqualified statements to the effect that the consumption of post-war all-electric houses of the 4/5-roomed variety would be in the neighbourhood of 2 000/3 000 units per annum. To the experienced such figures obviously imply usage of coal for basic space heating, especially during the winter months. The uninitiated, however, might gain an entirely different impression, hence the necessity for less "careless talk" in this direction.

Actually, future development of all-electric houses of the non-luxury type has not received the attention which might have been expected during the war years. Many supply engineers seem only too willing to surrender their birthright in this direction in favour of the easier route via the coal-electric compromise; justification for continued use of coal fires usually being on aesthetic grounds—cheerfulness, etc. Surely at a time when labour-saving advantages of electricity and also the necessity for better thermal insulation in building construction, etc., are being increasingly recognised, it would seem suicidal to barter the all-electric ideal to gas or coal interests, or a combination of both under the guise of expediency. Here there can be no doubt that many of the staunchest theoretical advocates of all-electric houses—in office hours—return to homes in which coal fires are more the rule than the exception. In this respect employers should realise both in this and other directions, that they cannot expect the best from their staffs dealing with such matters if the latter are not themselves convinced of the ideal they are called upon to preach.

From experience the cheerfulness-of-the-coal-fire complex, although very often sincere, especially when expressed by those who do not have the ashes and dust to cope with, is invariably a thin veneer easily penetrated by a little experience of electric heating. Sometimes the perennial half-truth, such as the conception that coal fires and good ventilation are synonymous, that electric heating "burns the air" and other misdirected impressions, do complicate the issue. It is significant that there are few users of electric heating in the domestic sphere, who, after experiencing its advantages over a few months, return to other methods of space heating. The difficulty is in providing facilities for such experience to be gained. In the future, the route may be through more enlightened housewives, strongly disinclined to a life of domestic servitude and drudgery, closer study of the theory of space heating in its various aspects, radiation and convection, relative to the various requirements, and fuller recognition of the value of thermal insulation. Generally speaking the writer does not consider the coal fire complex a material deterrent to all-electric progress in the smaller type of house reasonably suited to electric space heating. Development in this direction, however, will always be subject to the restrictive influence of the British temperament, which, as compared with the American, is singularly unresponsive to changes, and particularly to the adoption of new ideas and abandonment of out-of-date methods of cooking, space heating, etc. For this reason those who express anxiety regarding the too rapid development of all-electric houses, and especially space heating and its effect on supply economics, should realise that such fears have little substance in practice, as human nature will always supply sufficient friction against over-development—however forcefully the ideal is pursued.

Returning to the question of coal fires, it is hoped that when production gets under way and new designs of electric fires emerge, manufacturers will have discarded the imitation coal fire complex and launched out with new and original designs of a far different character. To emulate electricity's



contemporaries in this direction is neither sound nor progressive development policy. In point of fact, it rather suggests bankruptcy of new ideas on the part of electricity.

In pre-war days absence of suitable wiring in many houses was a definite stumbling block to progress. In some instances the difficulty was capital costs, in others the disturbance involved by its installation, and in many a combination of both. In the future, there can be no excuse in this direction. The labour-saving advantages of electricity are recognised, and housewives are more inclined to see to it that houses and appliances are more sensibly designed and suitably wired; and opportunity when present is being taken to modernise the houses of yesterday.

#### Result of Housing Shortage

Unfortunately the acute housing shortage in immediate post-war years is likely to make house seekers forget their good resolutions in this respect, and be less discriminating than they might have been in different circumstances—a position which, if not watched, may cause a reoccurrence of the one-lighting-point-per-room-and - no - plugs disease on the part of builders, so prevalent in pre-war days. Under pressure of the housing shortage, cutting of the wiring installation might even receive some encouragement in official quarters. If such a short-sighted policy emerges it should be resisted in full measure.

The question of running costs for all-electric houses has always presented difficulties, partly due to the absence of comparative figures, and even when these are available, getting potential consumers to consider them in detail and without bias, and, at the same time, making reasonable allowance for the indirect advantages electricity offers. Here it is true that attempts have been made in the past to inflate the value of such indirect advantages to such an extent as to justify almost any running cost, even in circumstances where it was clearly obvious, that however widely recognised and appreciated, it could not be afforded by the prospective consumer on the rates then available. Obviously the value of the indirect advantages electricity offers in the way of labour-saving, etc., is a variable factor dependent upon local circumstances; moreover it should be appreciated that on a pure cost basis alone, seldom will the all-electric proposition work out lower than the coal-gas-electric type of installation. But on the other hand the extra margin is nothing like the amount usually visualised, especially in areas where the rates in pre-war days offered an average price of  $\frac{1}{2}$ d. per unit for consumption in the 5 000/10 000 units per annum range. Usually when comparative figures are avail-

able for small modern houses the extra margin for the all-electric proposition is only very slight, even on a cost basis alone, and, in view of the importance of labour-saving, should not constitute a material obstacle in the future.

A further factor likely to promote extended usage of electricity in the larger type of houses is that the day of cheap and plentiful domestic labour is now drawing to its close. A housemaids "charter" is likely to emerge in the near future, in which reasonable working conditions and wages, etc., are laid down. As a result, labour-saving appliances, electric space and water heating, etc., may be in increasing demand where difficulty is experienced in obtaining housemaids, even for houses, in which, by virtue of their design, electricity cannot be most efficiently employed, especially for space heating. From this view point, although appliances such as domestic dish-washers and potato cleaners are often considered beyond the range of the smaller type of house with only a few persons in residence, one can visualise that in the future, even in the face of comparatively high capital cost, their use may prove justifiable. On the same basis, if the use of electricity saves, say, the employment of one maid, then the consumer should not object to, but indeed expect, a proportionate increase in the electricity bill.

#### LONDON STUDENTS' SECTION

ON April 16 Mr. G. S. H. Mogford read a paper before the I.E.E., London Students' Section, entitled "The Lumen Method of Illumination Calculation."

The classic inverse square and cosine laws; he said, were tedious to use, and no account was taken of wall and ceiling reflections. To obtain quicker and more accurate results the lumen method was used, one lumen per sq. ft. being equal to one f.c. The loss due to absorption depended on the type of candle-power distribution, the room proportions, and the reflections of the room surfaces, and it could be accounted for by the use of a room utilisation factor. In addition, there was a loss due to the fitting itself, and normal practice grouped the room utilisation factor and the unit efficiency into a coefficient of utilisation. A rapid decrease in illumination due to depreciation must also be allowed for. The effect of room proportions could be accounted for by means of room indices, but ultimately the amount of light absorbed by walls and ceiling depended on the distribution from the lighting units. Following this theoretical outline, the paper dealt with the practical considerations for determining the various factors, and typical values were tabulated.

The lecture was illustrated.



# 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*

The Philco-Radio and Television Corporation of Great Britain, Ltd., announce the return to the company of Mr. "Jerry" J. S. Bush, as area manager for London and South Eastern England.



**Mr. J. S. Bush**

member of the staff of Messrs. Merz and McLellan, consulting engineers.

**Sir Summers Hunter** has been elected president of the N.E. Coast Institution of Engineers and Shipbuilders.

**Mr. Percival J. Robinson**, city electrical engineer of Liverpool, left £25 443 (net £19 809).

**Mr. S. J. Harley**, formerly Controller of Jigs, Tools and Gauges, Machine Tool Control, Ministry of Supply, has been appointed Technical Controller of the Machine Tool Control.

The Minister of Fuel and Power has appointed **Air Commodore O. R. Gayford** to be Regional Controller for the Eastern Region of his Ministry, with effect from May 1, in succession to **Mr. W. W. Marsh**, who has resigned.

The Southern Railway Co. have appointed **Mr. C. M. Cock** as chief electrical engineer of the company as from May 1, when **Mr. A. Raworth** retired from the service. **Mr. Raworth** will act as consulting electrical engineer for a period of twelve months.

Sheffield Electricity Committee has appointed **Mr. W. H. Smith**, senior and relief shift charge engineer at Blackburn Meadows power station, as an assistant power station superintendent at a salary of £683 per annum.

At the forty-sixth annual meeting of the Town and Country Planning Association **Sir George Nelson**, president of the F.B.I. and chairman and managing director of the English Electric Co., Ltd., and **Mr. D. B. Williamson**, were elected to the Council. The **Earl of Lytton**, chairman of

Central London Electricity, Ltd., is president of the association.

The General Electric Co., Ltd., announce a number of changes in their organisation in India, the General Electric Co. (India), Ltd. For health reasons **Mr. E. J. Warren**, general manager in India, and **Mr. C. E. Cutting**, manager of the Madras branch, have retired. **Mr. A. J. Emery**, who has been in charge of the Bombay branch, succeeds **Mr. E. J. Warren** as general manager in India, and **Mr. T. G. May**, who was in the Calcutta branch, has been appointed manager at Bombay. **Mr. J. Meek**, who was engineer at Madras, has become manager of that branch.

**Mr. C. A. Russell** has been appointed manager of the British Thomson-Houston Co.'s Sheffield district office, in succession to the late **Mr. H. W. E. Hall**. After receiving technical training in Sheffield, and then gaining practical engineering experience, **Mr. Russell** joined the B.T.H. Company in 1912.

**Mr. E. C. Holroyde**, the new chairman of the B.E.A.M.A., has been a member of the Council since 1934.

He was born in Auckland, New Zealand, in 1887, and educated at Sydney Grammar School, Australia. In 1903, he joined Noyes Bros. (Sydney), Ltd., and in 1918, was appointed a director, a position he still holds. In 1921, he became chairman of Parkinson (Australia), Ltd., and later came to England to join Crompton Parkinson, Ltd., becoming sales director in 1932 and joint managing director in 1943. **Mr. Holroyde** served as industrial adviser to the Director of Gun and Carriage Production, Ministry of Supply, for 1940-41.

## Obituary

**Mr. Sumner Felstead**, representative of British Ropes, Ltd., Doncaster, on April 26, aged 68 years.

**Mr. E. J. Davidson**, head of the lighting service bureau of the Irish Electricity Supply Board. He was formerly in charge of the showrooms of the Dublin electricity department, before its absorption by the E.S.B.



**Mr. C. A. Russell**

# B.E.A.M.A. Annual Meeting

## Post-War Problems and Peace-Time Production

**T**HE thirty-fourth annual meeting of the British Electrical and Allied Manufacturers' Association was held at the Connaught Rooms, London, on April 19, Sir Harry Railing, chairman of the Council, presiding.



Mr. E. C. Holroyde

In presenting the report, the Chairman referred to the change in the constitution of the Council and said he believed it would be of mutual assistance to members in putting their problems before the Council, and equally so to the Council in discharging its duties when considering and advising members on their problems. Although the industry had been engaged largely on war work during the year, there had been an opportunity of considering certain aspects of the future and preliminary discussions had taken place with the appropriate Government departments on a number of problems. The association had been in close touch with the Ministry of Works, and, as a result, the interested members made arrangements collectively to supply the necessary electrical equipment for the immediate housing programme. In those negotiations the manufacturers received the closest support from the Electrical Development Association, and a joint committee of the E.D.A. and manufacturers, had been of the utmost value.

Another problem which would be the concern of all members in the near future was the method of the disposal of the vast stocks of electrical equipment which the Service and other departments of the Government had accumulated. Negotiations were well advanced with the Ministry of Supply and the Board of Trade, whereby there would be put into operation a scheme which they hoped and believed would result in surplus electrical equipment being released for commercial use in a manner which would disturb the normal working of the industry as little as possible, and would avoid the disastrous consequences of the methods of disposal adopted after the 1914-18 war. Members would receive full details of the proposals at the earliest possible moment.

Relations with the British Engineers' Association continued to be most cordial,

and their director and the director of the B.E.A. were in constant touch over the problems affecting the engineering industry as a whole, in addition to the meetings of the joint B.E.A./B.E.A.M.A. Committee, which had been held during the year. The joint meetings of the I.M.E.A./B.E.A.M.A. Committee had continued throughout the year and had resulted in several problems being rapidly and amicably disposed of.

The establishment of the Professional Engineers' Appointments Bureau would be of the greatest value to a large number of professional electrical engineers, and to manufacturers.

In conclusion, Sir Harry Railing said that the reconstruction and post-war problems would require the same qualities that had been shown during the long years of war. They required that each firm and each unit should do its utmost to develop its needs individually and with great efficiency, and that they jointly, as members of that association, should concentrate always on the great aims that united them rather than over emphasise points of detail. This applied to their industrial problems in the same manner as it applied to national and international questions. He had no doubt that if they worked in that spirit they would continue to fulfil their responsibilities to the industry.

### Members of Council

The Chairman then announced the result of the ballot electing twelve members of the association to be members of the Council for the session 1945-6, namely: Belliss and Morcom, Ltd.; Bruce Peebles and Co., Ltd.; Brush Electrical Engineering Co., Ltd.; Chloride Electrical Storage Co., Ltd.; English Electric Co., Ltd.; W. T. Glover and Co., Ltd.; Hick Hargreaves and Co., Ltd.; Jackson Electric Stove Co., Ltd.; Johnson and Phillips, Ltd.; Micanite and Insulators Co., Ltd.; Nalder Brothers and Thompson, Ltd.; J. H. Tucker and Co., Ltd.

At the subsequent meeting of the Council the following firms were co-opted members of the Council:—Allen West and Co., Ltd.; Crompton Parkinson, Ltd.; Lancashire Dynamo and Crypto, Ltd.; Quasi Arc Co., Ltd.; A. Reyrolle and Co., Ltd.

Mr. E. C. Holroyde, (joint managing director of Crompton Parkinson, Ltd.) and Sir Harry Railing (chairman and joint managing director, the General Electric Co., Ltd.) were unanimously elected chairman and vice-chairman, respectively, for the next session.



# Radio and Television Sets

## Probable Trend of Post-War Design

THE subject of discussion at a meeting of the I.E.E. Radio Section on Tuesday, April 17, was "Design of Broadcast and Television Receivers for the Post-war Market."

The discussion was opened by Mr. L. H. Bedford, who stated that during the war there had been little scope for the development of domestic sets. Two main factors would have a profound influence on design and manufacturing trends after the war, namely: (a) An alteration in the balance on the pre-war market between simple and elaborate sets, which would be brought about by the expansion of television. This might be expected to result in elaborate radio sets being replaced by television receivers, the broadcast sound receiver being eventually regarded as the "second set." (b) Owing to the relative boom which the radio industry had enjoyed during the war, it was probable that on economic grounds its labour costs had increased more than the average increase for industry as a whole. The industry would, therefore, be faced with the problem of offering its products to the public at price levels which were regarded as "good value." The solution of the economic problem appeared to lie in a mechanisation of manufacturing methods, and in an economy in design without unnecessary elaborations and by the standardisation of components, including valves.

### Effect of Radar on Television\*

The tendency of sound-broadcast receiver designs immediately before the war was reviewed, and Mr. Bedford suggested that there was not likely to be a basic change in the trend of design.

The following subsidiary features were briefly discussed:—(a) Variable selectivity; (b) independent top and bass control; (c) compensated volume control; (d) band spread; (e) "magic eye"; (f) automatic frequency control; and (g) push buttons. An adverse judgment was expressed on the future of the "magic eye."

For the internal construction of the broadcast set, the rôle of miniaturised components was noted, and the absence of an agreed British standard range of valves for broadcast receivers was deplored by Mr. Bedford.

References to television were limited to receivers of the 405-line standard, which, it was now known, will constitute the basic television service for a considerable period. Radar and television might be regarded as different techniques developed on similar bases, namely pulse and cathode-ray-tube

techniques. The extensive development of radar during the war appeared to affect television only to a limited extent; apart from a much extended knowledge of pulse and time base circuits, the main advance appeared to be in the production of improved screens and electron guns for cathode-ray tubes.

### A "Magic Eye" Tuning Indicator

A lively argument developed on the desirability of including a "magic eye" tuning indicator. Several speakers claimed that it gave them satisfaction to know that they were accurately tuned, even if they could not detect any difference by ear. Others suggested that an ordinary broadcast receiver should be tuned by ear, and that provided the quality was acceptable the exact tuning point was immaterial.

On the question of providing higher quality of reproduction of sound transmissions, it was held that too much emphasis had in the past been given to high frequencies in the kilocycles region and that there was a tendency to overlook distortion at the lower end of the scale.

The opener's remarks on the limited contribution which radar technique had to make to the development of television receiver design were generally welcomed as a salutary check to popular misconceptions fostered by the lay Press. In the present state of the art, projection methods could not compete economically with direct viewing of the image on the fluorescent screen. There was a strong case for standardising ordinary cathode-ray tubes, and here they might give a lead to valve manufacturers. There was room for improvement in the brightness of direct viewing screens, so that they could be used in a normally lighted room. A tube face with a surface designed to discriminate against reflections from external sources would facilitate a solution.

Simplification of controls in post-war television sets was essential; both focusing and synchronising controls should disappear, leaving only those for main tuning, sound volume and brightness. The cost of the set to the purchaser should include any special aerial equipment needed. There would be a limited market for comprehensive instruments with provision for broadcast, television and gramophone reproduction. If housed in a single cabinet this would make an unwieldy piece of furniture, and it was worth while considering the possibility of building such equipment on the unit system.



# Lighting Progress in 1944

## Some New Developments in Discharge Lamps

**T**HROUGHOUT 1944, the Discharge Lamp Lighting (Control) Order was in operation, and therefore fluorescent lamps continued to be applied mainly to industrial purposes. Perhaps the most striking development in the use of fluorescent lamps was the extensive adoption of continuous troughing installations.

In the earlier part of the war, there was a tendency towards the installation of fittings of a strictly utilitarian character, such as that illustrated in Fig. 1. During 1944, however, fittings of a more robust type came into greater favour.

The aircraft industry continued to yield many interesting illumination problems and the use of fluorescent lighting, in most cases, proved to be the ideal method of solving them. Many special types of fittings were designed, but details of the applications cannot yet be released.

During the autumn and early winter the B.T.H. Co. was set the problem, difficult from both technical and production points of view, of designing and providing equipment for the improved street lighting, generally known as "moon" lighting, authorised by the Ministry of Home Security. In connection with this work a wish was expressed by the Ministry that the new lighting should be installed with the minimum expenditure of labour and material, and therefore the company devoted considerable time to designing equipment for the adaptation of existing lanterns, in the simplest and cheapest way.

The "Warm-white" fluorescent lamp, developed during 1944, gives an alternative colour of light which, while still apparently white, is of a rather more pleasing shade. The life rating of both this and the "Daylight" has recently been increased, and

instruments and, in particular, mention can be made of 250 W M.E. (Electric discharge) lamps which have been used extensively in the Vickers projection microscope. This lamp is illustrated in Fig. 2.

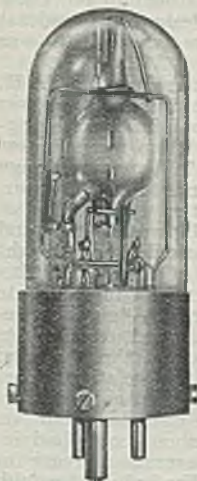


Fig. 2.—250 W compact source electric discharge lamp

During the year arrangements were made with the appropriate Government departments to begin working on the rehabilitation of normal street lighting, and some progress has been made in repairing and renovating lanterns that have been damaged or have proved faulty due to neglect. The B.T.H. engineers have given considerable service to the various Government departments on lighting problems in connection with aircraft, ships, road vehicles, and testing establishments, but details of this work must await the removal of censorship restrictions.

### FABRICATED HOUSES

The prototype of the 30 000 prefabricated houses that are to be sent from the United States under Lend-Lease arrangements, looked very attractive when inspected by Press representatives at the Ministry of Works experimental housing station in Hertfordshire.

Good daylighting is provided in all the rooms and artificial illumination is by bracket-type electric lamps. The living room is heated by a solid fuel grate, with a back boiler, which supplies the hot water for the bath and domestic purposes. The hot water tank has a 2 kW immersion heater and thermostat (supplied by the U.K.) for boosting purposes. This is the only electrical appliance in the dwelling. There are two 5 A plug and socket outlets, uprated at 10 A, at waist height in the living room, one in each of the bedrooms, and one in the kitchen for an iron or other portable appliance. There are no ceiling points, and the wiring chases for the conduit are provided in the wall units and have wooden capping. There is an extra lamp over the sink in the kitchen.

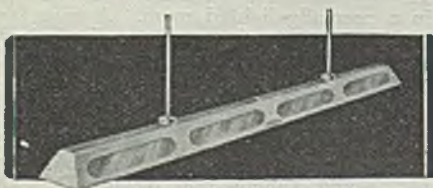


Fig. 1.—Industrial fitting, open top type, for use with 80 W Mazda fluorescent lamp

this, with the reduction of price announced in January of this year, means to the user a 40 per cent. improvement in lighting value.

Other special lamps which have been developed have found application in optical



## News in Brief

**Radio Industries Club.**—At a meeting of the Wales and Monmouthshire section of the Radio Industries Club, to be held at the Park Hotel, Cardiff, on May 16, at 1 p.m., Mr. W. E. Warriow is to give an address on "Radio—Past, Present, Future."

**Traffic Light Installation.**—The Northumberland C.C. proposes installing traffic lights at both ends of the bridge at Corbridge, Hexham.

**Lord Mayor's War Fund.**—The staff and employees of the Liverpool electricity department have presented a cheque for £240 to the Lord Mayor's War Fund.

**Glasgow Showrooms.**—The Electricity Committee has recommended the establishment of modern extensive showrooms in the shopping centre of Glasgow as distinct from the business centre so that the latest electrical equipment can be shown to post-war shopping crowds.

**E.D.A. Kitchens Exhibition.**—The E.D.A. electric kitchens, designed for low cost post-war homes, are to be exhibited in the provinces as follows:—Cardiff (Howells Stores, St. Mary Street), April 30 to May 19; Edinburgh, July 2 to July 21; Newcastle, September 3 to September 22; Sheffield, November 5 to November 24; and Birmingham, January 7 to January 26, 1946. The Cardiff exhibition was opened by Lady Herbert Lewis, on April 30.

**Hire of Apparatus.**—At a recent meeting of Portland Electricity Committee it was reported that for some months it had not been possible to meet the demand from consumers wishing to hire apparatus and it had been necessary to compile a waiting list. Circumstances were now arising which made it advisable that the Engineer should have a general direction whether apparatus on hire should be recovered on charge of tenancy or the new tenant given an opportunity of taking over any such apparatus. The Committee agreed that incoming tenants should be allowed to take over the apparatus.

**New Hammersmith Showrooms.**—The proposal of the Hammersmith Electricity Committee to purchase a site in Uxbridge Road, at a cost of £7 500, for the erection of new showrooms, offices and workshops for the electricity department, has been approved.

**Proposed Welding Course.**—Arrangements are being made to start a three-year course in welding at evening classes, beginning next winter, at the North-East (Tyneside) branch of the Institute of Welding.

**Institution Lighting.**—The Durham P.A.C. has approved the spending of £500 on the renewal of the electric lighting at Easington Institution.

**National Savings Award.**—The Pulsometer Engineering Co., Ltd., have won the challenge cup offered under the auspices of the Reading Savings Committee, for the greatest progress in national

savings during the last quarter.

**I.E.E. Annual Report.**—Copies of the annual report of the I.E.E. Council for the Session 1944-45 and of the accounts for the year ended December 31, 1944, to be presented at the annual general meeting on May 10, next, at 5.30 p.m., can now be obtained by members of the Institution on application to the Secretary.

**University College Lecture.**—A lunch-hour lecture, open to members of the public without fee or ticket, will be delivered at University College, Gower Street, W.C.1, by Prof. R. O. Kapp, on May 8, from 1.15 to 2 p.m. on "The Future of Domestic Lighting and Heating."

**I.E.E. Edinburgh Sub-Centre Proposed.**—A formal request for the formation of an Edinburgh I.E.E. Sub-Centre has been received by the Scottish Centre Committee. The Sub-Centre, if formed, would serve the East Lothian, Midlothian, West Lothian, Peebles, Selkirk, Roxburgh and Berwick. The southern half of Fife, now served by the Dundee Sub-Centre, might also be recommended for inclusion.

### TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN of April 30, 1920: Brighton Corporation has adopted a scheme prepared by Mr. Christie for the supply of electricity to the municipal houses at Moulsecombe. The consumer must enter into an agreement with the Corporation to take a fixed maximum demand each quarter, at the rate of 1s. a week in the summer six months, and 2s. a week in the winter six months, per 100 W of demand. Controls will be fitted, so that if a consumer is taking too much electricity at any time, the lights will flicker or go dim until they have been switched off and the load reduced to the agreed amount.

# 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.

**Will third harmonics appear in the line voltage of a 3-phase, mesh-connected alternator, the phase voltages of which contain third harmonics?**

The third harmonics will not appear in the line voltage when mesh connected for reasons which can be seen by considering

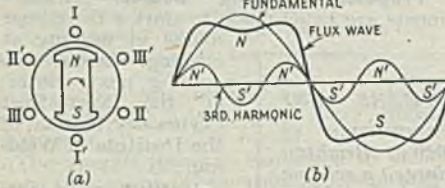


Fig. 1.

a 2-pole, 3-phase machine as shown in Fig. 1a, each phase being represented by a single coil. Suppose the flux distribution curve (flux wave) is as shown in Fig. 1b and made up of a fundamental and third harmonic. The fundamental e.m.f.s. are produced by the fundamental of the flux wave and the third harmonic e.m.f.s. by the third harmonic of the flux wave.

The fundamental e.m.f.s. are as shown in Fig. 2, being displaced from each other by 120° (1/3 of a pole pitch) because the maximum value of e.m.f. in a phase occurs when the centre of a pole is opposite that

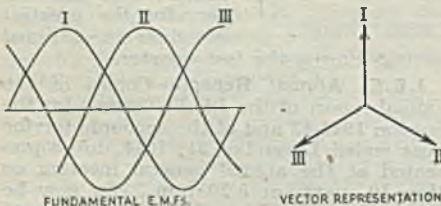


Fig. 2.

phase and this condition for phase II will occur when the pole has rotated 1/3 of a pole pitch beyond phase I. Similarly with phase III. If these three phases are connected in mesh (or series), as in Fig. 3, the sum of the e.m.f.s. added up round the mesh at every instant will be zero, and no current will flow. The voltage between the corners of the mesh will thus be the same as the voltage generated in the winding, i.e., the phase voltage.

Consider now the third harmonic flux; it can be seen from Fig. 1b that it has three times as many N poles as the fundamental flux and it can therefore be represented as in Fig. 4. From this it can be seen that a N pole is simultaneously opposite the

beginning of phases I, II and III so that a positive maximum value of e.m.f. will be generated simultaneously in each phase, i.e., the third harmonic e.m.f. in the

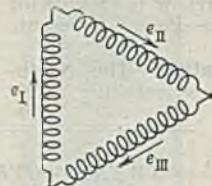


Fig. 3.



Fig. 4.

three phases are all in phase with each other as shown in Fig. 5.

If the three phases are connected in mesh the total third harmonic e.m.f. acting round the mesh, will no longer always be zero, but will be an alternating e.m.f. of three times normal frequency and equal to 3 times the 3rd harmonic e.m.f. of each phase. This e.m.f. will therefore set up a current which will circulate round the mesh and which will be of a magnitude of

$$I = \frac{3E}{3Z} \text{ amps}$$

where Z is the impedance of the winding to triple frequency currents.

Thus the voltage drop due to this third harmonic current in each phase is equal to the generated e.m.f. of that phase, i.e., the third harmonic e.m.f. is absorbed in voltage drop as soon as it is produced so that no third harmonic e.m.f. appears at the terminals or in any part of the winding.

Alternatively the winding may be considered to be short-circuited on itself so



Fig. 5.

far as third harmonic e.m.f.s. and currents are concerned.

The fact that these third harmonic currents flow in a delta-connected machine is one reason why a star-connection is generally preferred. In this connection the third harmonic e.m.f.s. in the two phases between any pair of line terminals will be in opposition to each other, so that there is again no third harmonic e.m.f. in the line voltage although there will be such e.m.f.s. in each of the line to neutral voltages.

E. O. T.



# Electricity Supply

**Sheffield.**—Mains are to be extended at a cost of £2 968.

**Tynemouth.**—The Electricity Committee is to extend supply at a cost of £3 230.

**Sheffield.**—The Health Committee is to renew wiring at King Edward's Hospital at a cost of £650.

**Cardiff.**—The Electricity Committee is to extend mains to a housing site at Crystal Glen at a cost of £2 818.

**Rawtenstall.**—The Electricity Committee is seeking sanction to borrow £16 659 for protective equipment.

**Exeter.**—Sanction to borrow £4 000 for sub-stations and equipment is being sought by the Electricity Committee.

**Manchester.** The transformer capacity at the Denton West sub-station is to be increased at a cost of £12 000.

**Birkenhead.**—Mains to supply more temporary bungalows at a cost of £3 075, are to be extended by the Electricity Committee.

**Salford.**—The Light, Heat and Power Committee is seeking sanction to borrow £4 000 for meters and £10 000 for sub-stations.

**Halifax (Nova Scotia).**—Central electric stations generated 53 124 000 kWh in January, compared with 49 457 000 kWh in January, 1944.

**Stoke Newington (London).**—The abolition of discounts is recommended by the Electricity Committee, the amount involved being £308.

**Portland.**—The Highways Committee has asked the surveyor to submit a scheme and costs of street lighting by electricity of the type recently demonstrated.

**Sheffield.**—Sanction to borrow £25 000 for mains for temporary houses and £25 000 for meters and transformers, is being sought by the Electricity Committee.

**Croydon.**—The Electricity Committee is to instal 17 new relay operating batteries at sub-stations at a cost of £616, and is to provide supply to a factory at a cost of £1 054.

**Coventry.**—The Electricity Committee is to modify the water screening plant at a cost of £6 416 and extend the coal handling plant at a cost of £6 127, at Longford power station.

**Hull.**—The Electricity Committee is seeking sanction to borrow £35 466 for mains and sub-stations to meet demands of industrial consumers and to provide electricity in schools.

**Birkenhead.**—The Electricity Committee has agreed in principle to the change-over in the second area and authorised the Electrical Engineer to prepare a scheme for a 33 kV feeder to Heswall.

**Durham Power Station Inquiry.**—Major Lloyd George stated in the House of Commons recently that an announcement regarding the inquiry held last December, with respect to the establishment of a power station at Kepier, would be announced shortly.

## 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.

**Plymouth City Council, May 5.**—Supply and delivery of 1.t. underground network disconnecting boxes. Specification from the City Electrical Engineer, Armada Street, Plymouth.

**Bury Electricity Department, May 7.**—Supply and delivery, for 12 months, of (a) meters, (b) p.i. cables. Particulars from the Engineer and Manager, Electricity Department, Market Street, Bury.

**Louth Electricity Department, May 11.**—Supply of (a) e.h.p. cables, (b) l.p. cables, (c) e.h.p. truck type switchgear and (d) transformers. Particulars from the Borough Electrical Engineer, Electricity Department, Cannon Street, Louth.

**Woolwich Electricity Department, May 11.**—Supply of one turbine-driven feed pump. Specification from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich.

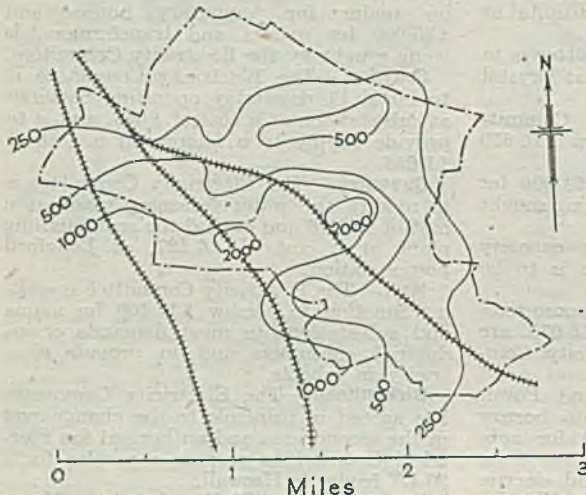
**Woolwich Electricity Department.**—May 11.—Supply of 22 kV and 6.6 kV switchgear. Specification from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich.

**Long Eaton Electricity Department, May 12.**—Supply and erection of main h.t. switchgear. Specifications from Mr. J. B. Feltham, Electra House, Market Place, Long Eaton; deposit £1 ls.

**Birkenhead Electricity Department, May 14.**—Supply and delivery of (1) e.h.t. and 1.t. p.i. cables (2) r.i. cables, (3) meters, and (4) general stores over a period of 12 months. Particulars from the Borough Electrical Engineer, Craven Street, Birkenhead.

# Industrial Information

**Change of Address.**—Hellerman Electric, Ltd., and Bowthorpe Electric Co., Ltd., announce that their London office is now at 138, Sloane Street, S.W.1. Telephone: Sloane 3579.



Specimen map in connection with atmospheric pollution showing lines of equal deposition of dry matter in tons per square mile per year

**Northern Ireland Wholesalers.**—The Electrical Wholesalers' (Northern Ireland) Association, which has been functioning for just over a year, has for its main object the establishment of a smooth transition period from war to peace by close collaboration with the various Government departments, transport and railway companies, kindred associations and manufacturers in an endeavour to secure adequate supplies of all classes of electrical products for distribution to the electrical trade. The association is also working in close harmony with the local E.C.A. and joint meetings are held regularly in Belfast.

**Diesel-Electric Locomotives.**—A new publication, T.D./101, on this subject has been issued by the English Electric Co., Ltd. It gives a brief history of the development of Diesel-electric traction and mentions that the first Diesel-electric shunting locomotive made by the company was put into service in Great Britain in 1934. In 1941 there were 178 locomotives in service. Details are given of four types of shunting locomotives, two main line general service locomotives and an express passenger unit with a speed of 100 m.p.h. Diesel-electric locomotives built by the company are operating in the Sudan, South Africa, Australia and Brazil.

**Atmospheric Pollution.**—The summary report of the Department of Scientific and Industrial Research Investigation of Atmospheric Pollution for last year states that the winter of 1942-3 saw the beginning of an increased national effort towards fuel economy, and it was shown in last year's summary report that during that winter there was a significant reduction, for the country as a whole, in both deposited matter (including sulphates) and sulphur dioxide. The reduction of sulphates in deposited matter was maintained for the whole of the year ended March 31, 1944, and after allowance had been made for the probable effect of differences in rainfall, the rate of emission of sulphates in 1943-4 was estimated to have been about 7 per cent. less than in 1941-2. Other forms of deposited matter were not significantly lower in 1943-4 than in 1941-2.

**Non-Ferrous Metals Federation.**—At a meeting in Birmingham, on April 24, over 150 firms were represented at the inauguration of the new British Non-Ferrous Metals Federation. Mr. Horace W. Clarke was elected president, and Mr. W. J. Terry and Mr. W. H. Henman were made vice-presidents. The aims of the federation are not confined to co-operative effort to ensure fair trading with the industry, nor simply to work for economic stability; its intention also is to promote and support study and research into methods of up-to-date scientific production, and to encourage all branches of technical, market and industrial design. Its activities will tend towards rationalisation and modernisation of plant and production methods to assist in the recreation of export trade. The first and founder members are: The Brass and Copper Tube Association, the Brass Wire Association, the Brazen Brass Tube Association, the Cold Rolled Brass and Copper Association, the Condenser Plate Association, the High Conductivity Copper Association, the Manufactured Copper Association, the Nickel Silver Association, the Zinc Rollers Association.

**Barrow - in - Furness.**—The Electricity Committee is to change over in the Forshaw Street area to a cost of £584.



# Company News

**BUTLERS, LTD.**—Intm. div. 2½% (same).  
**MUREX, LTD.**—Intm. div. on ord. 7½% less tax.

**MOSS GEAR Co., LTD.**—Intm. div. 7½% on ord. (same).

**CORNWALL POWER Co.**—Blec. of rev. 1944 £17 718. Brot. in £5 556. Ord. div. 3%, fwd. £5 274.

**SOUTHERN AREAS ELECTRIC.**—Fst. and fin. on ord. 5% (same). Net pft. 1944, £27 667 (£21 620).

**GEORGE SWIFT AND SONS (HOLDINGS).**—Intm. 7½% on ord. (same), also ptg. 1½% on pref.

**PROJECTILE AND ENGINEERING Co., LTD.**—Fin. div. 12½% (same), mkg. 20%, less tax (same). Pft. for 1944 £89 687 (£92 545).

**SOUTH WALES POWER STATION.**—Receipts 1944 £50 923. To exes. and fees £867, deb. int. £40 625, loan int. £9 431.

**MCCRAW ELECTRIC (U.S.).**—Net sales \$10 923 312 (\$9 503 386), net pft. \$888 894 (\$998 587). Earned surplus \$3 364 825 (\$3 314 570).

**LAURENCE SCOTT AND ELECTROMOTORS LTD.**—Fst. and fin. on "A" and "B" ord. 12½% (same). Net pft. 1944, after E.P.T. £110 032 (£109 504).

**SHROPSHIRE, WORCESTERSHIRE AND STAFFORDSHIRE ELECTRIC POWER.**—Net pft. 1944 £161 212 (£163 494). Brot. in £106 277. Div. on "A" ord. 8% (same), on "B" ord. 5½% (same).

**BRITISH XYLONITE Co. LTD.**—Gross income 1944 £77 415 (£72 816). To tax res. £27 544 (£18 868), dirs.' fees £1 000 (same), to pensions £15 512 (£15 718), leavg. net pft. £33 359 (£37 230).

**EVER READY TRUST.**—Gross rev. to Mar. 31 £33 332 (£33 814). To dirs.' fees £961 (£918), exes. £537 (£1 134), leavg. £31 834 (£31 762). Ord. stk. div. 10% £25 000 (same), defd. div. 10% £5 000 (same), fwd. £14 252 (£12 418).

**PHILADELPHIA ELECTRIC.**—Consd. net income (after taxes) for 1944, \$16 798 828 (\$15 751 521), to pref. divs. \$2 168 768 (same), com. divs. \$12 161 285 (\$11 345 252), surplus \$2 468 775 (\$2 237 501). Earned per com. sh. \$1.50 (\$1.37).

**BRUSH ELECTRICAL ENGINEERING Co. LTD.**—Trading pft. £242 576, £19 263 decrease. With divs., etc., £695 (£1 082), blec. is £243 271 (£262 921). To gen. res. £40 000 (£25 654) Prefce. div. takes £10 766, and the 4% int. on ord. £14 474 (nil). Carr. fwd. £11 560 (£11 532).

**BRITISH ELECTRIC RESISTANCE Co. LTD.**—Trdg. pft. to July 31 £50 349 (£24 087), inclgd. £9 965 (£5 064) from subsid. To manag. dirs.' comm. £3 732 (£859), dirs.' fees £313 (£500), tax £40 610 (£16 962),

leavg. net pft. £5 694 (£5 766). Div. 20% £5 000 (same), to gen. res. nil (£2 299), fwd. £4 402 (£3 708).

**WESTINGHOUSE ELECTRIC AND MANUFACTURING (U.S.).**—Net sales 1944 \$835 737 004 (\$709 342 717). Taxes \$76 271 080 (\$70 900 254). Net income \$26 019 096 (\$21 401 568). Prefd. div. \$319 896 (same). Com. \$12 502 669 (same), earned per sh. \$8.11 (\$6.67). Total surplus \$107 531 214 (\$93 766 411).

**DAVIS AND TIMMINS LTD.**—Tradg. pft. 1944 £81 867 (£72 167). To managmt. exes. £2 728 (£2 831), dirs. fees £3 291 (£3 043), tax £23 105 (£14 707), war dam. £541 (£853), leavg. net pft. £52 202 (£50 733). Pref. div. £6 500 (same), ord. div. 30% £28 500 (same), pensions £2 000 (same), war contings. £10 000 (same), fwd. £57 142 (£51 940).

**UCKFIELD GAS AND ELECTRICITY LTD.** (subsid. of Electric Supply Corpn.)—Gross gas rev. 1944, £8 176 (£7 148). To deprecn. and renewals £1 586 (£884), net rev. £66 (£67), plus int. £5 (£4). To deb. int. £71 (same), fwd. debit £1 196 (same). Gross elec. rev. £37 318 (£35 536), pft. £5 679 (£6 462). To deb. int. £440, div. on elec. stk. 5% (same), fwd. £2 545 (£2 156).

**COVENTRY MACHINE TOOL WORKS LTD.**—Tradg. pft. 1944 £24 032 (£23 744), int. £174 (£137), pft. sale of plant £1 202

(Continued on page 412)

## Metal Prices

	Monday.	April 30.
	Price.	Inc. Dec.
<b>Copper—</b>		
Best Selected (nom.) per ton	£60 10 0	—
Electro Wirebars ...	£62 0 0	—
H.C. Wires, basis ... per lb.	9½d.	—
Sheet ...	11½d.	½d.
<b>Phosphor Bronze—</b>		
Wire(Telephone)basis ..	1s. 0½d.	—
<b>Brass (60/40)—</b>		
Rod, basis ...	—	—
Sheet " ...	—	—
Wire " ...	11d.	½d.
<b>Iron and Steel—</b>		
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	—
<b>Lead Pig—</b>		
English ...	£26 10 0	—
Foreign or Colonial ..	£25 0 0	—
<b>Tin—</b>		
Ingot (minimum of 99.9% purity) ...	£303 10 0	—
Wire, basis... .. per lb.	3s. 10d.	—
<b>Aluminium Ingots ...</b> per ton	£85 0 0	—
<b>Spelter... ..</b> ..	£25 15 0	—
<b>Mercury (spot) Ware-house ...</b> .. 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.

(£881), mkg. £25 458 (£24 762). To dirs.' fees £850 (same), war dmge. £236 (£345), deprecn. £2 563 (£2 288), to cap. res. £1 202 (£881), leavg. £20 607 (£19 780). Tax £12 000 (£4 500), tax res. £2 000 (£9 700), div. 8% £4 000 (same), fwd. £11 163 (£8 556).

### Company Meeting

**LACRINOID PRODUCTS, LTD.**—The annual meeting was held in London on April 30, Mr. T. L. Horabin, the chairman, presiding. In the statement circulated with the

report and accounts, the chairman said that having regard to the conditions under which the work had been carried on, and in particular the increasingly difficult labour situation, the directors considered the year's results satisfactory. As was the case in the previous year practically the whole of the output of the company had been directed to supplying Government requirements. This would not, however, hamper their future development, and when peace came they would be in a position to maintain their output.

## 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.

**E. A. GARDNER AND SONS, LTD.**, Maidstone, engineers.—Apr. 7, £6 000 (not ex.) and £4 000 (not ex.) mortg., to Lloyds Bank Ltd.; respectively charged on 98a and 100, Week Street and 3 and 5 Brewer Street, Maidstone. \*£7 000. July 19, 1944.

**DE RENZI, HOLMES AND CO. LTD.**, Ellesmere Port, manufacturers of electrical switchgear. April 10, mort. and charge, to Midland Bank Ltd. securing all moneys due or to become due to the Bank; charged on land and factory at Fox's Lane, Wolverhampton, with machinery etc., and a general charge. \*£514. Mar. 29, 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.

**GOODYEAR**, Cyril, 85, The Drive, North Harrow, electrical engineer. £35 11s. 3d. Mar. 14.

**HILLER**, M. (male), 486, Kingsland Road, Dalston, radio engineer. £39 9s. Mar. 13.

**NEAL (ELECTRICAL) LTD.**, R/O, 44, Upper Tooting Road, S.W.17, electrical engineers. £21 1s. 7d. Mar. 6.

### Satisfactions

**MANGANESE BRONZE AND BRASS CO., LTD.**, London, W.C.—Sat'n. Mar. 30, of charge reg. July 25, 1941.

**SIMMS MOTOR UNITS, LTD.**, London, N.—Sat'n. Apr. 6, £100 000 reg. Oct. 23, 1939.

## Coming Events

### Friday, May 4 (To-day).

**I.E.E., MEASUREMENTS SECTION**—London, W.C.2. "Meter and Instrument Jewels and Pivots," G. F. Shotton. 5.30 p.m.

**BRITISH INSTITUTION OF RADIO ENGINEERS, N.W. SECTION**—Manchester. "Magnetic Dust Cores," E. R. Friedlaender. 6 p.m.

### Saturday, May 5.

**I.E.E., LONDON STUDENTS' SECTION**—Visit to the Brimsdown Power Station, Enfield. 2.45 p.m.

### Monday, May 7.

**I.E.E., S. MID. CENTRE**—Birmingham. Visit of the President of the I.E.E., Sir Harry Railing. Annual meeting and presidential address. 6 p.m.

### Tuesday, May 8.

**I.E.E., N.W. CENTRE**—Manchester. Annual general meeting. "The Place of Radiant, Dielectric and Eddy Current Heating in the Process Heating Field," L. J. C. Connell. O. W. Humphreys, and J. L. Rycroft. 6 p.m.

**CAMBRIDGE RADIO GROUP**—Technical School, Collier Road. "Carrier Protection on Overhead Transmission Lines," D. H. Towns. 6 p.m.

### Wednesday, May 9.

**I.E.E., TRANSMISSION SECTION**—London, W.C.2. "Localisation of Faults in Low-Voltage Cables, with Special Reference to Factory Technique," J. H. Savage. 5.30 p.m.

### Wednesday, May 9—Thursday, May 10.

**IRON AND STEEL INSTITUTE**—Institution of Civil Engineers, London, S.W.1. Annual general meeting. 10.30 a.m. and 2.30 p.m.; May 10, 9.15 a.m., and luncheon at Connaught Rooms, 1 for 1.15 p.m.

### Thursday, May 10.

**I.E.E.**—London, W.C.2. Annual general meeting. 5.30 p.m.

### Saturday, May 12.

**I.E.E., LONDON STUDENTS' SECTION**—Visit to the Sperry Gyroscope Co., Ltd., Brentford. 2.30 p.m.

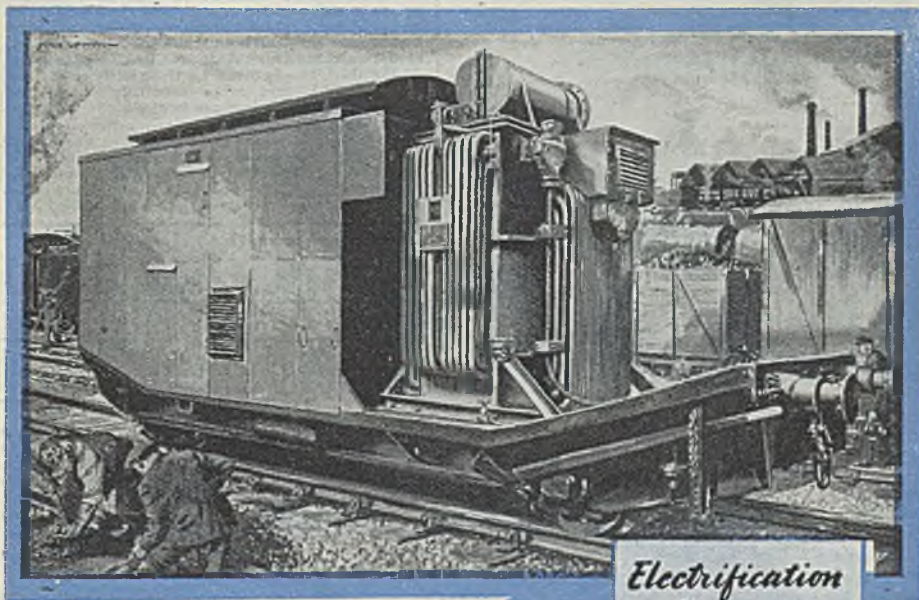
**INSTITUTE OF MUSICAL INSTRUMENT TECHNOLOGY**—Northern Polytechnic, Holloway, N.7. "A Homophonic or Single-Note Electronic Musical Instrument with a Photo Electric Cell as Playing Manual," demonstration and lecture, Dr. W. Saraga. 3 p.m.



# G.E.C.

*in war — as in peace —*

at the service of the Empire



### *Electrification Schemes*

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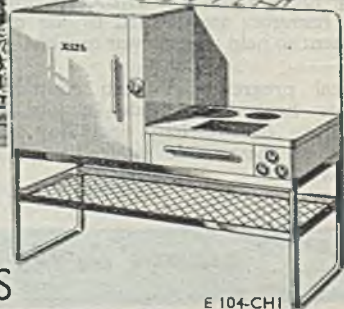
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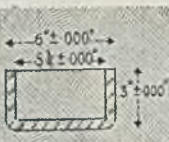
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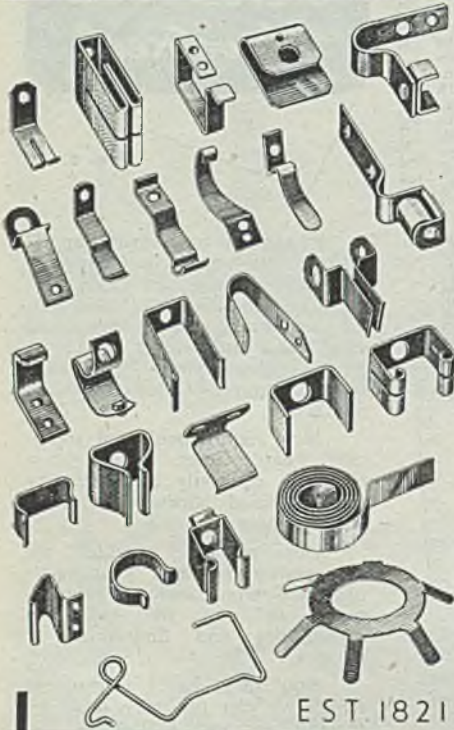
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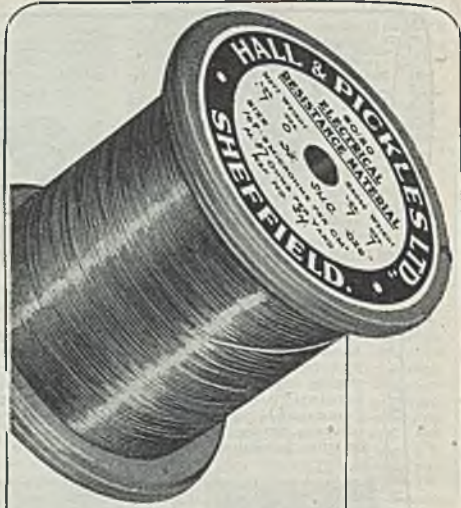
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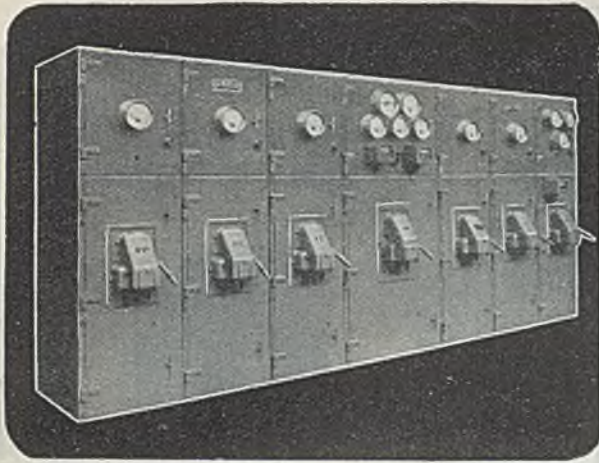
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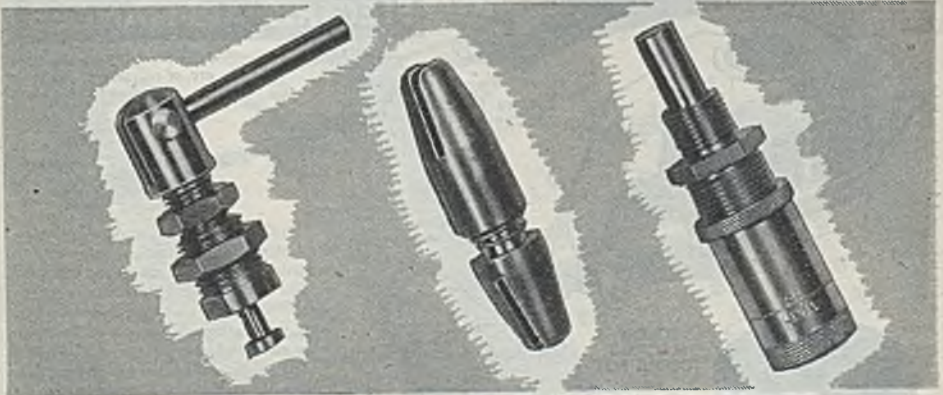
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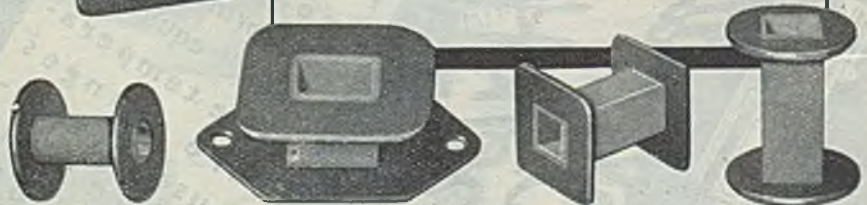
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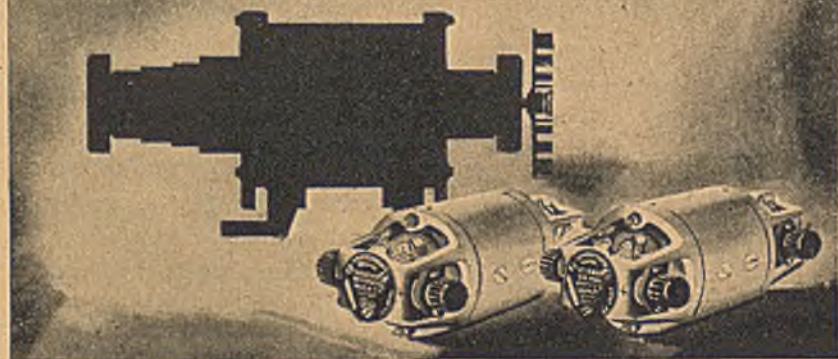
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