

ELECTRICAL REVIEW

VOL. CXXXIX.

NOVEMBER 8, 1946

NO. 3598



HOW IT IS DONE

'Laying-up' machines fitted with special devices to ensure that the pre-twisted cores of Aberdare Cable are correctly set into place to give uniformity of construction and finish. Just one of the many processes in which the application of really up-to-date methods ensures the consistently high quality and reasonable price of Aberdare Cables.

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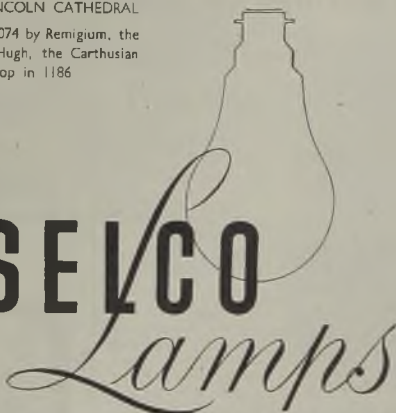


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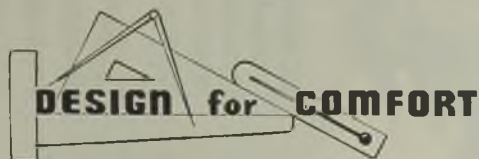
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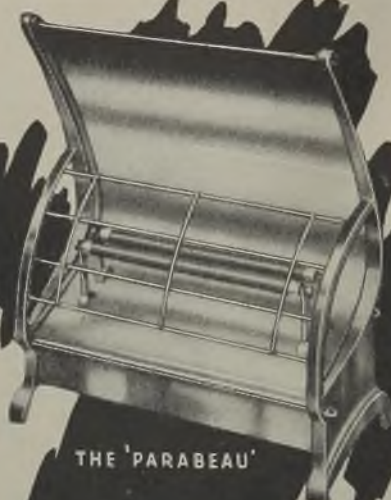
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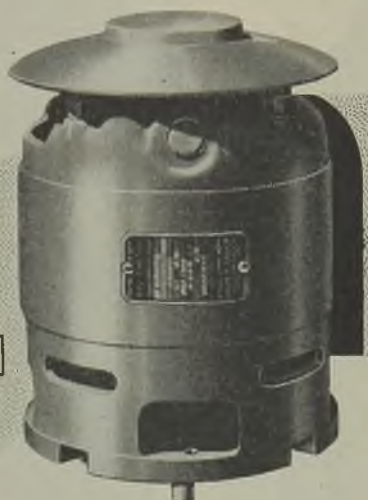
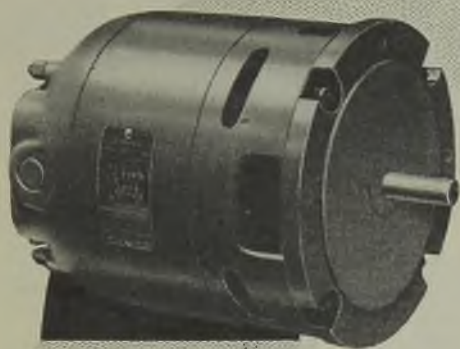
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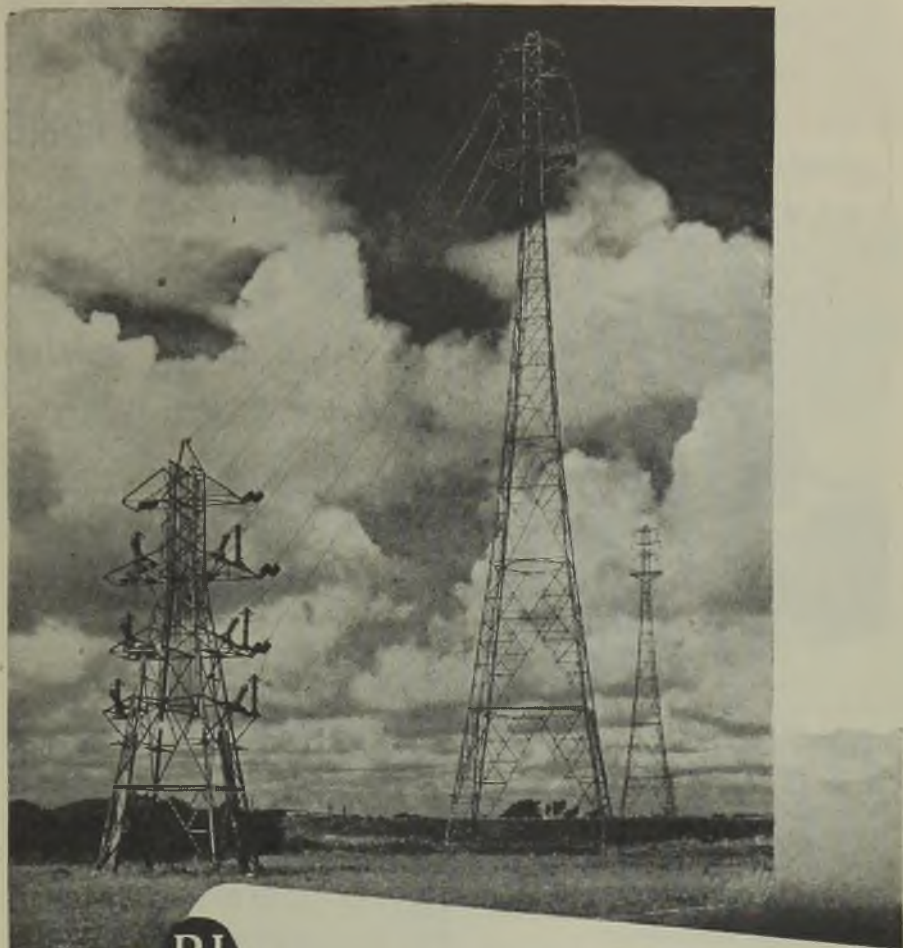
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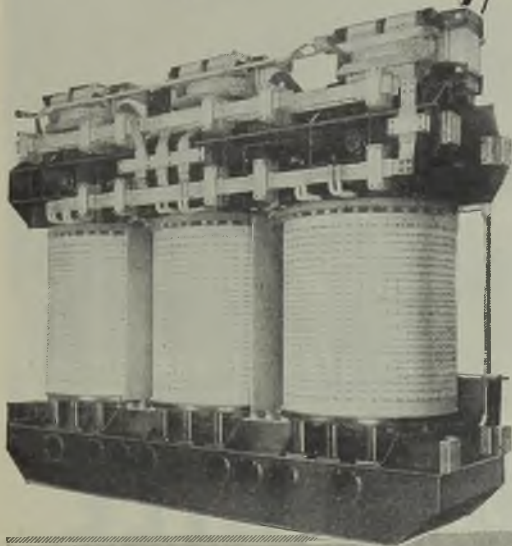
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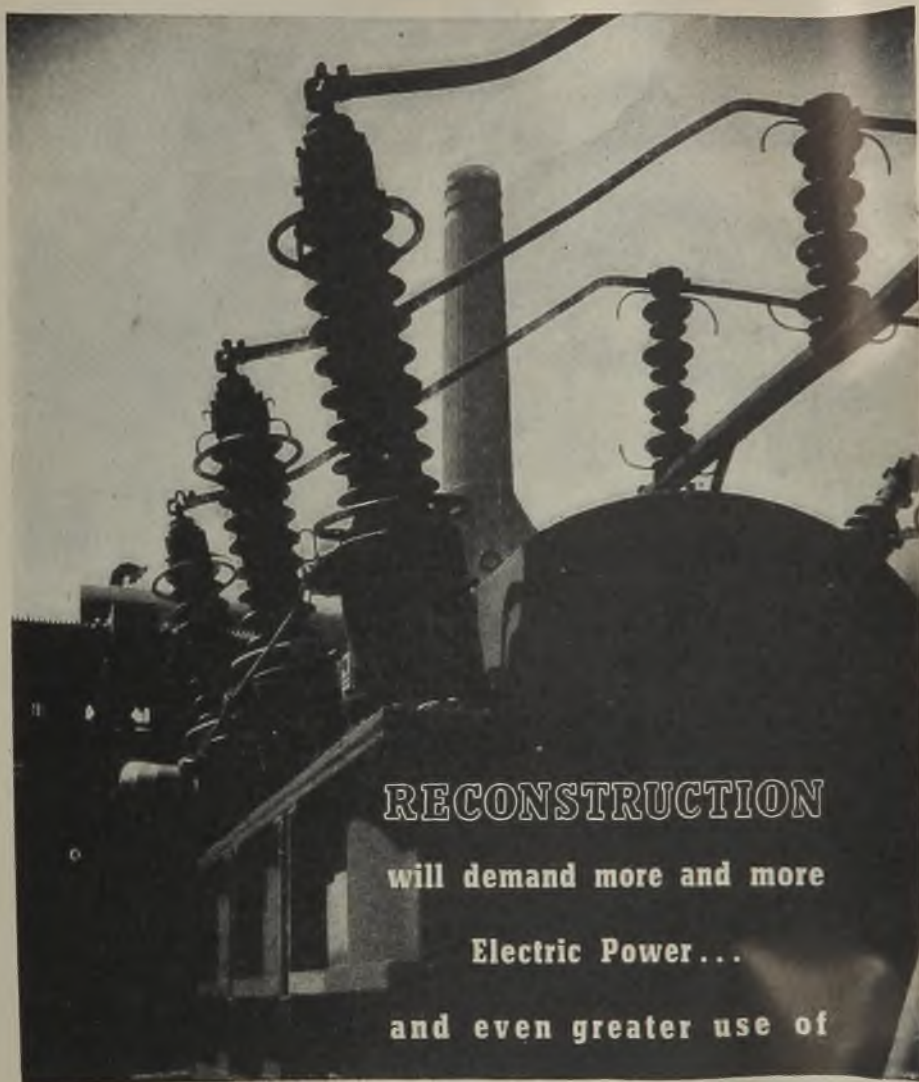


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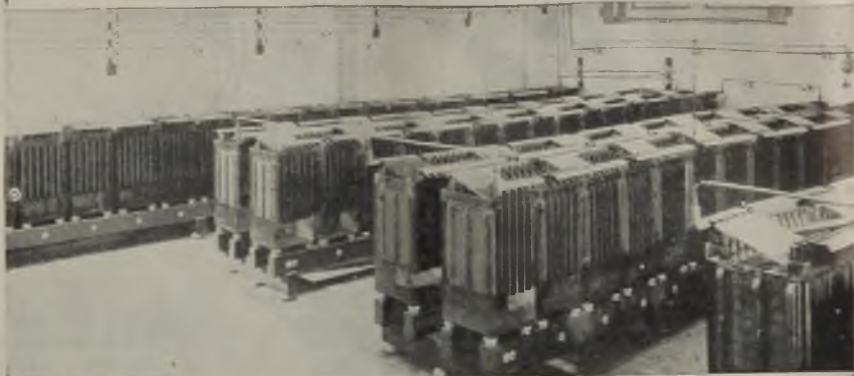
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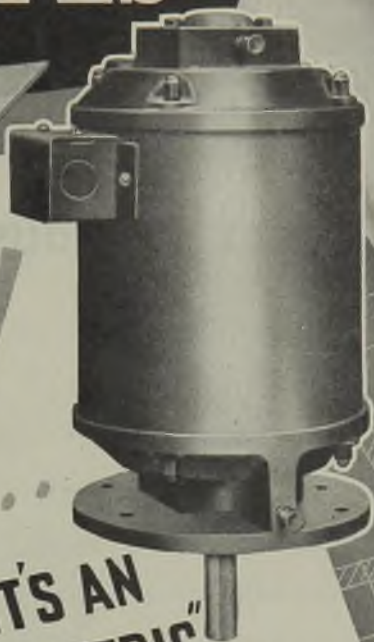
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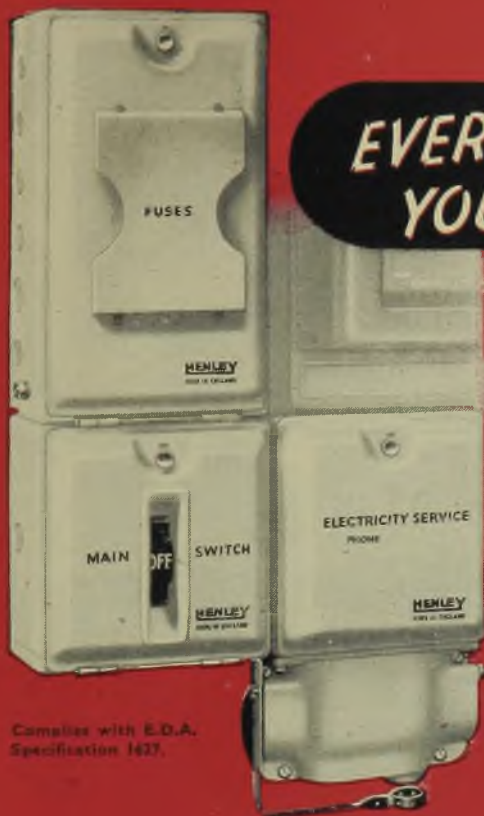


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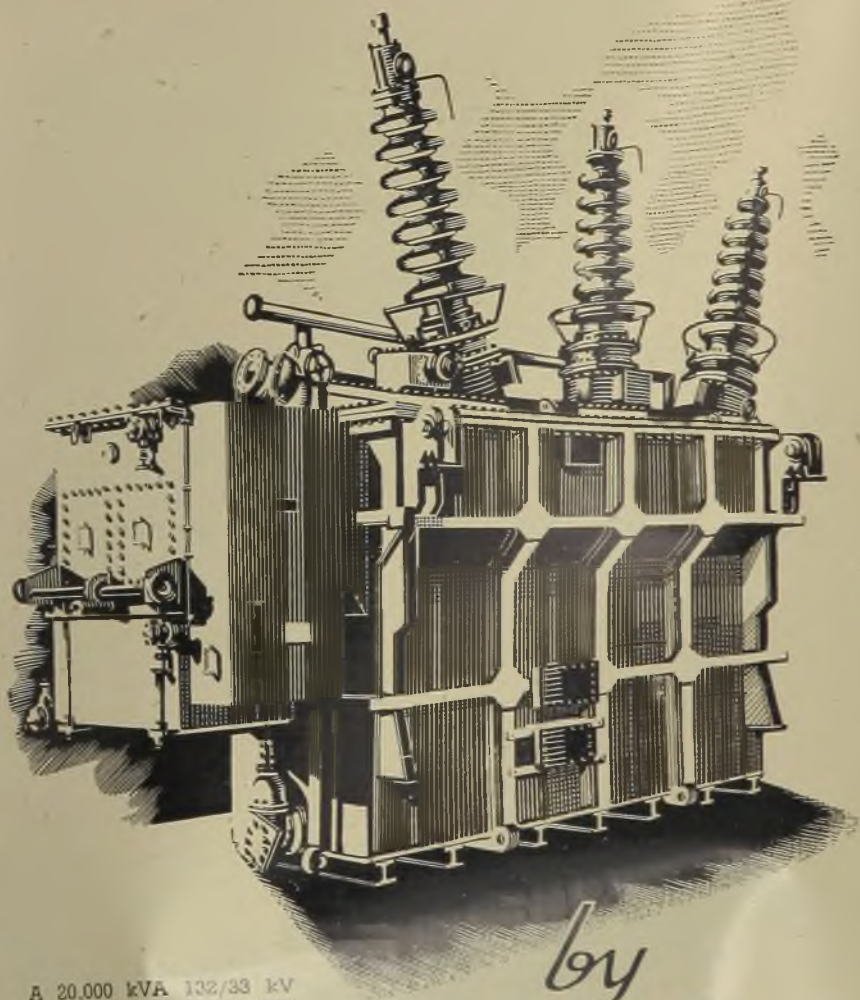
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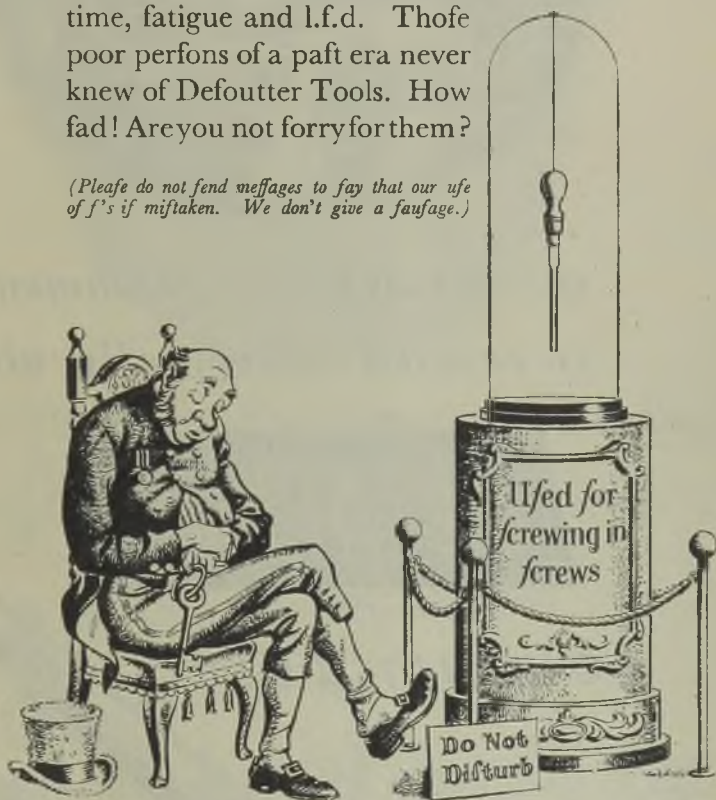
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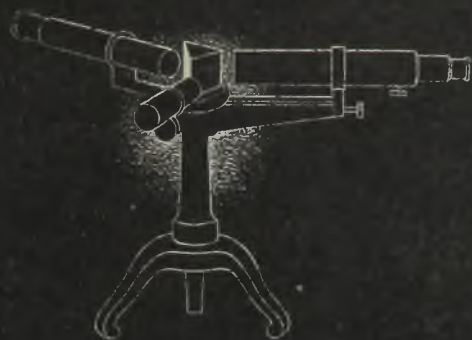
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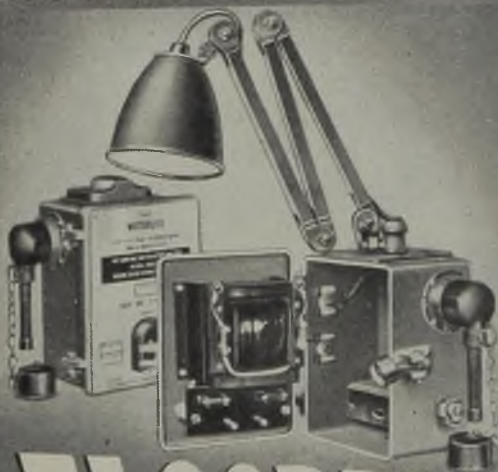
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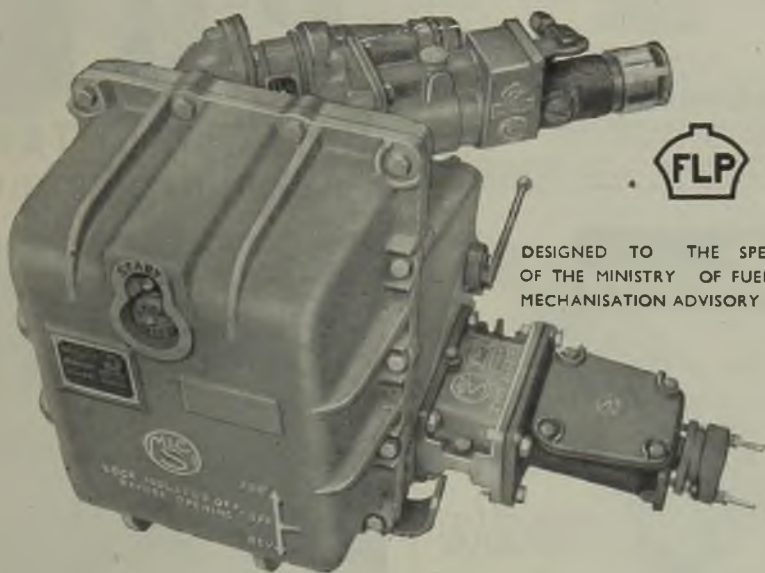
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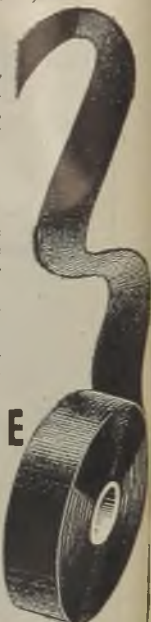
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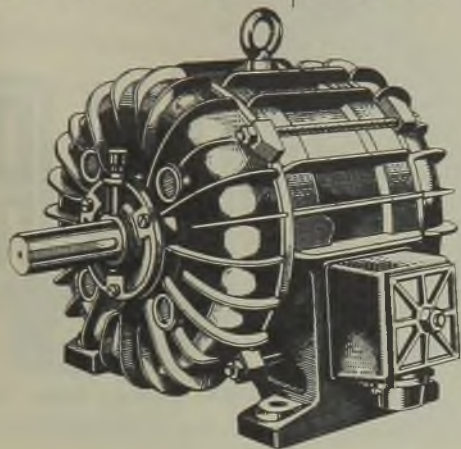


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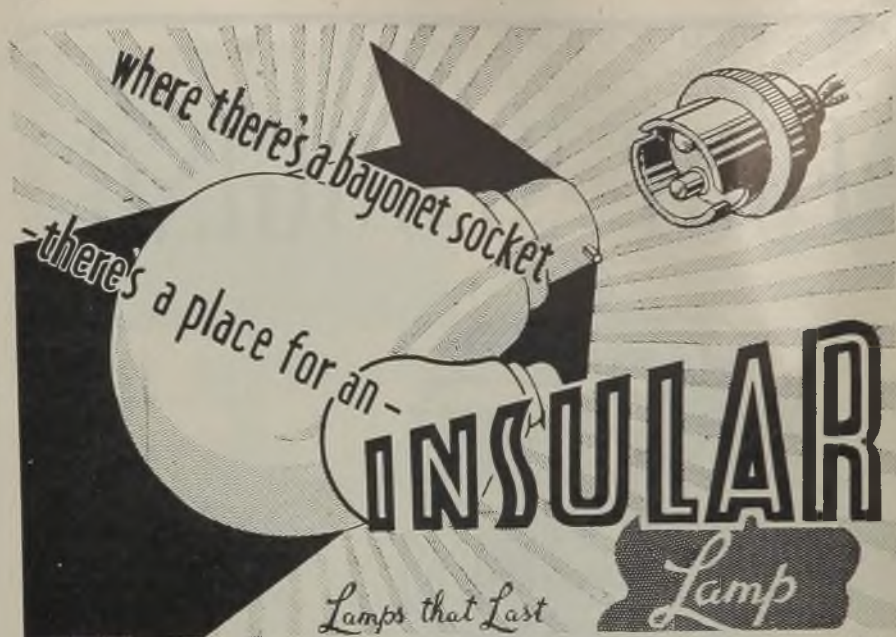
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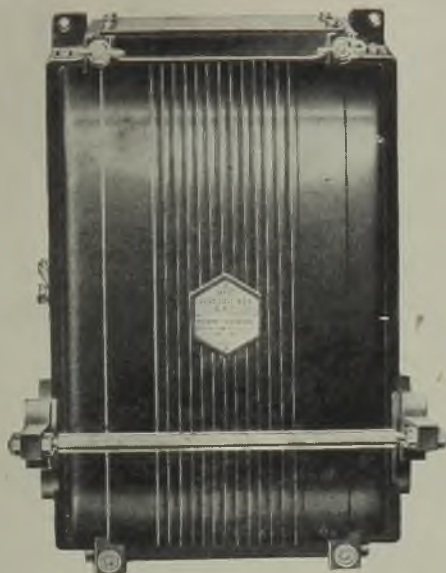
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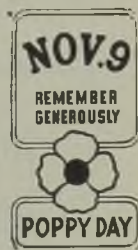
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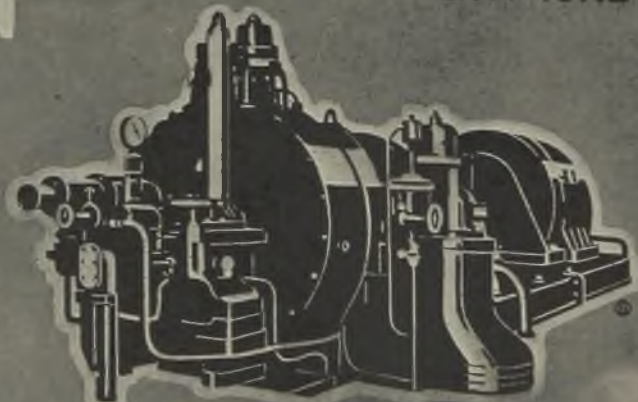
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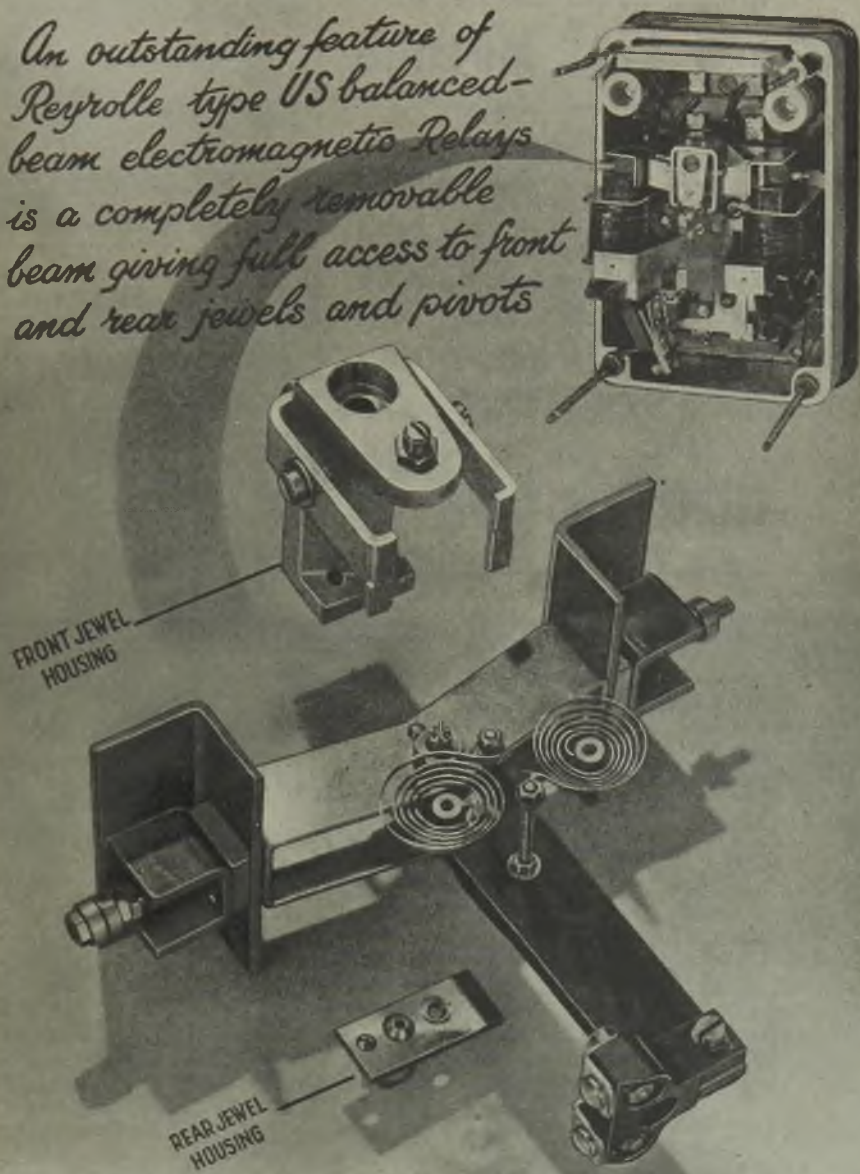
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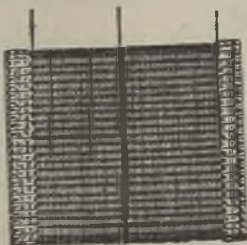
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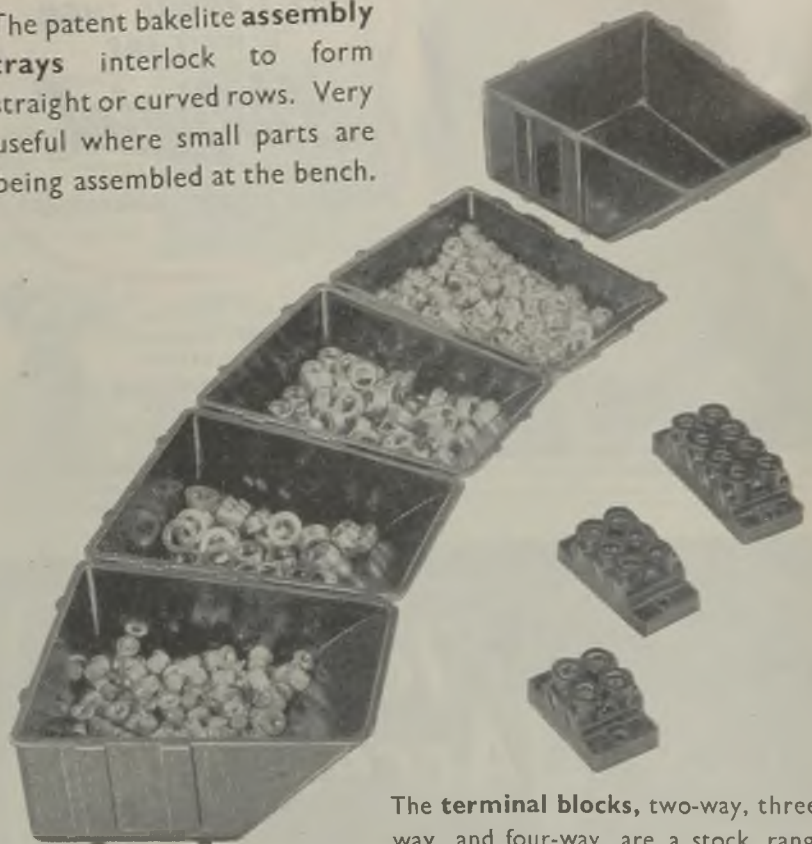


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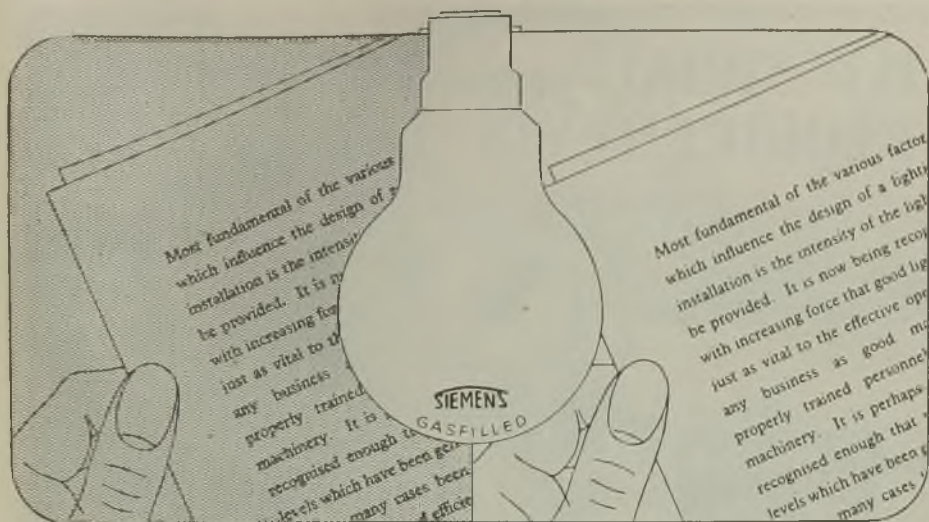


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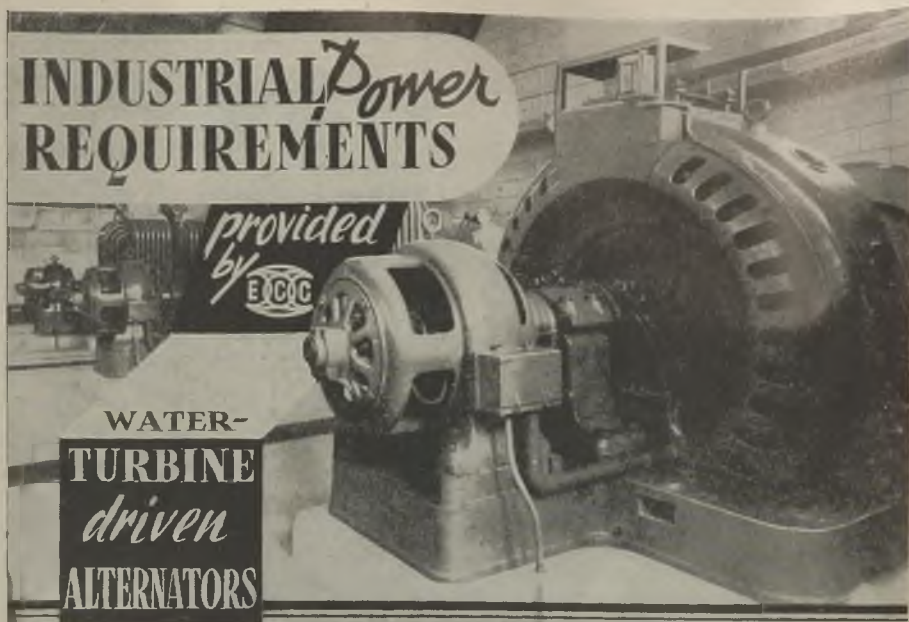
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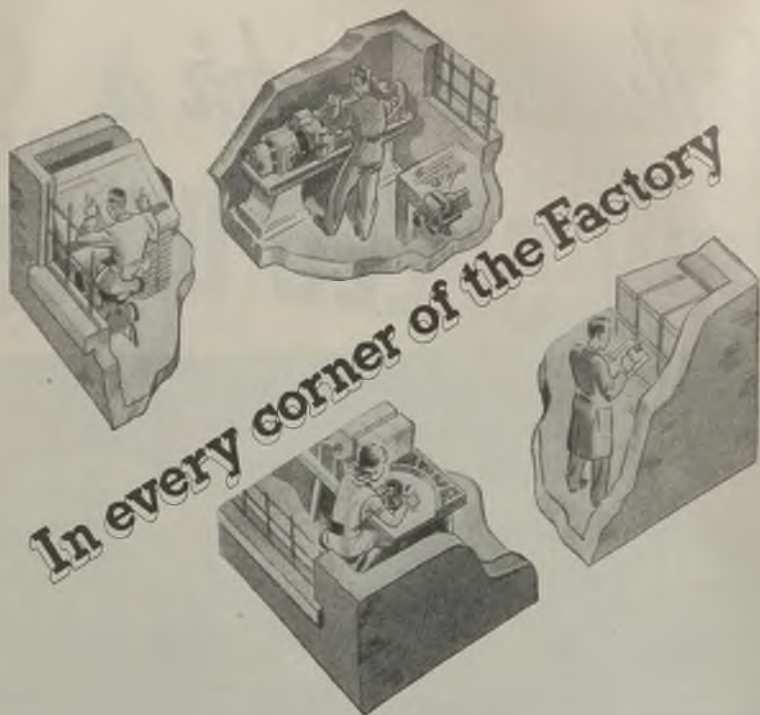
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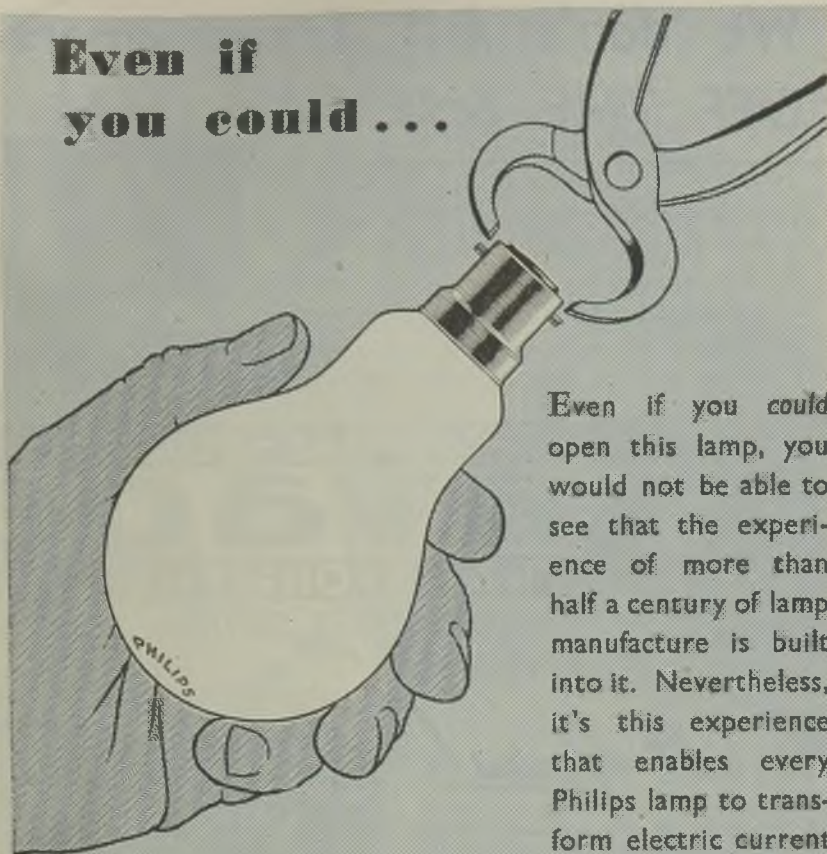
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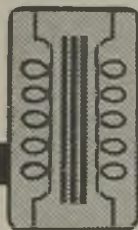
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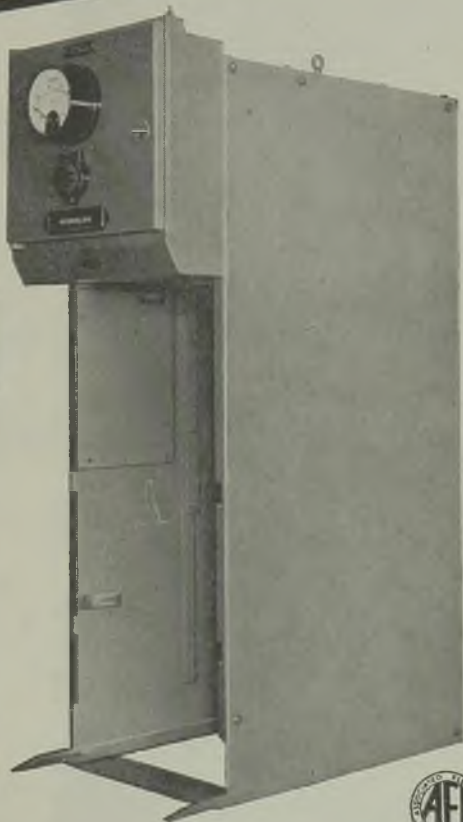
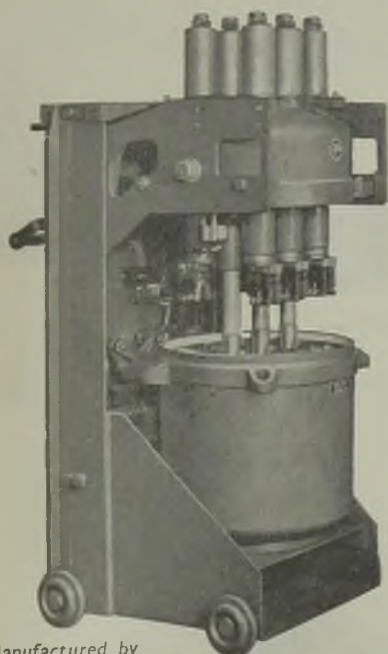
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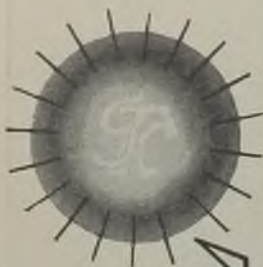
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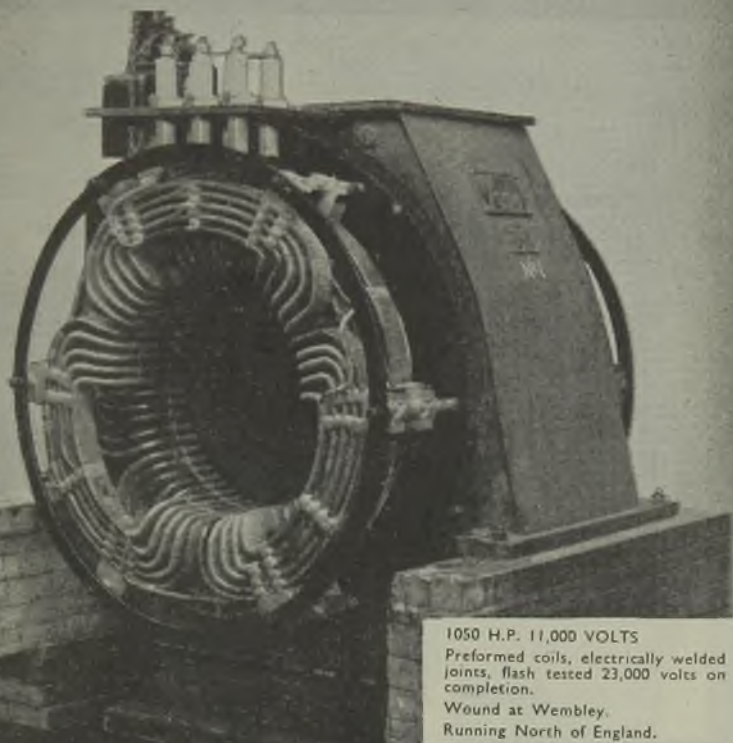
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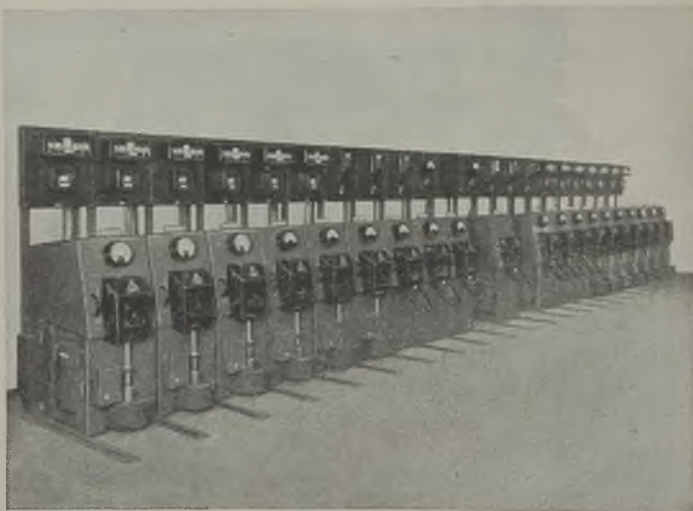
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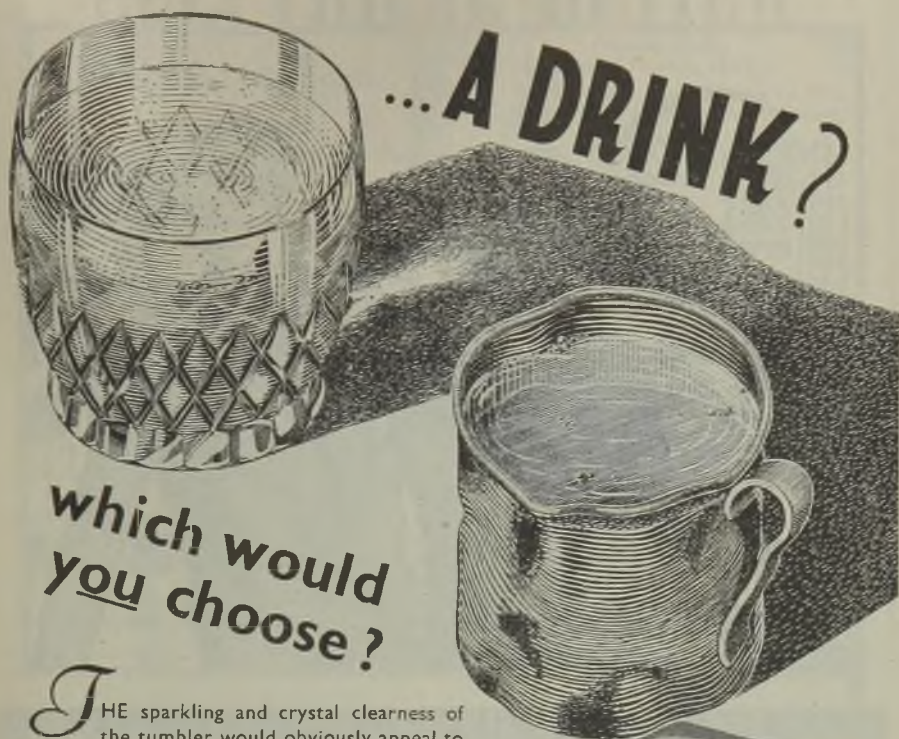
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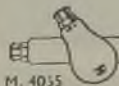
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ELECTRICAL REVIEW

November 8, 1946

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIX. No. 3598.

NOVEMBER 8, 1946

9d. WEEKLY

Let's Be Realists

Co-operation to Safeguard the Industry's Future



IT could hardly have been expected that our industry which has been so progressive and has enjoyed such freedom from overriding controls would ever take kindly to the idea of nationalization and the threat of bureaucratic management which this has implied.

But those who have opposed nationalization with every right to express their views should realize that the time has now come when violent opposition to the Government's plans, if continued, can only result in breaking up the present organizations within the industry and, as a consequence, compelling the Government to adopt an even greater measure of control than would otherwise have been considered necessary. There is an obligation to all in the industry to be realists in this matter.

Framing a Policy

The Minister, Mr. Shinwell, has told us that he did not choose the job he has been given, but, quite properly, having been given the job, he is going to carry out the policy of his Government to the best of his ability. It is perhaps rather beside the point that, in the view of many people, the present Government was actually caught without a policy for the electrical industry. But the fact that the policy of the Government is to be one which the Minister himself will frame gives to the industry an opportunity, which may never come again, to bring its experience and ideas to the aid of the Minister and endeavour to influence his views so that a scheme may be thrashed out which,

whilst accepting the policy on which the Government insists, may yet retain those principles in organization and control which the industry as a whole believes to be essential to continue good relations within the industry, and to safeguard incentive and freedom for progressive development.

Experienced Guidance Needed

It must not be forgotten that when Mr. Shinwell undertook his task he asked for the co-operation of the industry, although he made it clear that the policy of public ownership would be carried through with or without that co-operation. Having failed to get full assistance he has no alternative but to work out his own scheme without the hand of experience at his side to help to steer his course.

In this issue we publish a contribution from an individual widely known and respected in the supply industry. His views are addressed to the industry, but they constitute in fact an appeal to the Minister to safeguard those things which have made our industry virile and efficient and to frame his legislation with these things in mind.

So far the industry has made its protests against nationalization, but now the time has come when, if disaster is to be averted, the industry must be prepared to assist the Minister to navigate the ship. Mr. Shinwell would be ruthless in fighting opposition but we are confident that his object and that of our readers are the same, both desiring to do the best for our industry. Mr. Shinwell, however,

must at the same time follow the line laid down by the Government. Let neither party jeopardize the industry's future through obstinacy. It is in that spirit we write and in that spirit we hope we shall be read.

Meters WHILE common dimensions for securing interchangeability of quarterly meters for residential premises have been settled by discussions between manufacturers and supply undertakings, criteria of performance are far from being at so advanced a stage. Considerable changes are to be expected in the next edition of B.S. 37, but Mr. L. J. Matthews, in his chairman's address to the I.E.E. Measurements Section, mentioned a number of matters that still need clearing up before the temporary stability required for the issue of a British standard is even approached. It is to be hoped that, in the event of nationalization of electricity supply, no attempts will be made to impose conformity to detailed designs of meters, as Mr. Matthews believes may ultimately happen, so long as the present possibility of useful technical improvement remains.

H.V. Transmission A LONG-TERM value of a transmission - distribution system as compared with generating plant is that it does not become obsolete in the same way through load developments which require more efficient units of greater output. Higher-voltage systems can be superimposed on existing mains to reinforce them but the latter still serve their original purpose. An illustration of this was given by Mr. J. A. Lee, in his chairman's address to the I.E.E. Transmission Section, when he envisaged the construction of a 264-kV grid "backbone" to which the present 132-kV sections would be connected at various points. Mr. Lee is among those who hold that designers should be in close touch with men engaged on the job.

Southern Extensions CLOSE on our leading article last week drawing attention to the fuel-saving and other advantages of electrifying the railways comes the announcement from the Southern Railway of its proposal to convert a further 284 route miles to electricity and to use Diesel traction on all the remaining unelectrified routes east of Portsmouth. This is

expected to add another 300,000 tons to the 400,000 tons of coal saved each year by existing electrification schemes. With the largest electrified service in the world and with nearly one-third of its whole system already electrified, the directors of the railway have already satisfied themselves, the travelling public and the company's shareholders of the wisdom of their go-ahead policy. Apart from the coal-saving considerations the scheme will not only permit services to be speeded up and augmented, but will make an important contribution towards smoke reduction.

Intrinsic Safety THE scope for "intrinsically safe" electrical apparatus has been greatly extended since 1916, when the late Professor R. V. Wheeler and Professor W. M. Thornton (as a result of research carried out after the explosion at Senghenydd Colliery) showed that sparking risks could be eliminated by restricting the current and suppressing the voltage rise due to self-induction in signalling circuits. The term has certain limitations, however, and in view of the modern demand for such apparatus in industrial processes in which inflammable vapours are present, the technical information given in the new Testing Memorandum No. 10 (Stationery Office, 6d. net) of the Ministry of Fuel and Power, together with an account of the procedure to be adopted when submitting apparatus for prescribed tests, should be of interest to both manufacturers and users.

Cinema Wiring ONE class of building which should above all be very soundly and carefully wired is the cinema. An outbreak of fire in a "blacked-out" auditorium of this kind is too likely to raise a panic for anything to be left to chance. In most districts safety regulations are imposed (they are very strict in London) but apparently even in some of the larger cities they are not yet strict enough. At Liverpool a Committee of the Licensing Justices has found that electrical repairs were being carried out by inexperienced youths. Accordingly it has now been stipulated that all installation and repair work is in future to be carried out only by qualified electrical engineers and a certificate to this effect must be furnished to the Justices.

Distribution in Lancashire

Meeting the Needs of Rural Consumers

TO bring supplies to its rural consumers and to improve facilities in small townships (see "Serving Rural Consumers," May 31st issue, page 835) the Lancashire Electric Power Co. spent £750,000 on extending and consolidating its distribution network during the three years 1936-38. The war called a halt to further progress but now the company is ready to resume and complete the provision of electricity supplies throughout its area. It was with this end in view, and to provide for power station extensions, that the parent company, the Lancashire Electric Light & Power Co., Ltd., early this year obtained sanction to increase its authorized capital by £2,000,000 and issued 1,000,000 £1 cumulative preference shares.

Barton power station of the Manchester Corporation to a central point on the company's 11-kV network and the first control or distribution centre was established at Hill Top. (No. 1 on the map on page 720.)

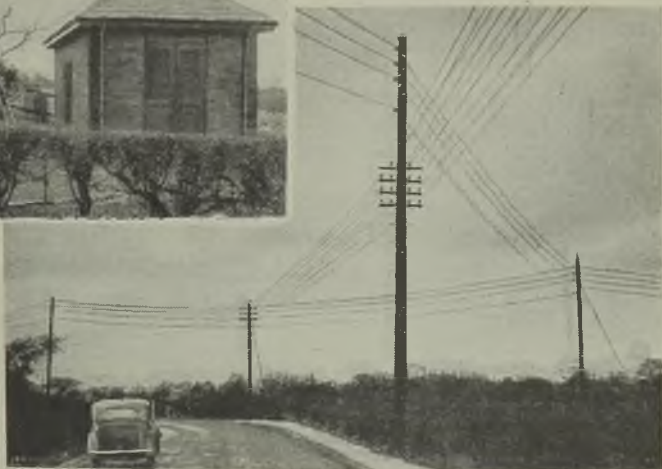
To provide a bulk supply to the Rochdale Corporation the laying of 33-kV underground cables between the Radcliffe power station and the Corporation's electricity works followed and these were later reinforced to meet the growing demand of the Corporation, now exceeding 35,000 kW. With the completion of the company's Padiham power station in 1927 a 33-kV feeder for interchange of load was provided between the Radcliffe and Padiham stations.

When the Kearsley power station was commissioned in 1929 it was decided that all transmission from that station should be at 33 kV and the main feeders then connected to the Radcliffe station were transferred to Kearsley and the direct supply routes to Radcliffe power station, Padiham power station, the Hill Top control, and the Rochdale Corporation were established and



Typical rural substation serving Mawdsley village and (right) Post Office telephone poles carrying l.v. overhead lines

The main transmission system was developed in 1905 by the provision from the company's Radcliffe power station of six 11-kV feeders, part underground and part overhead, additions to these being carried out until 1921. The first 33-kV development occurred in 1923 when two interconnectors were laid from the

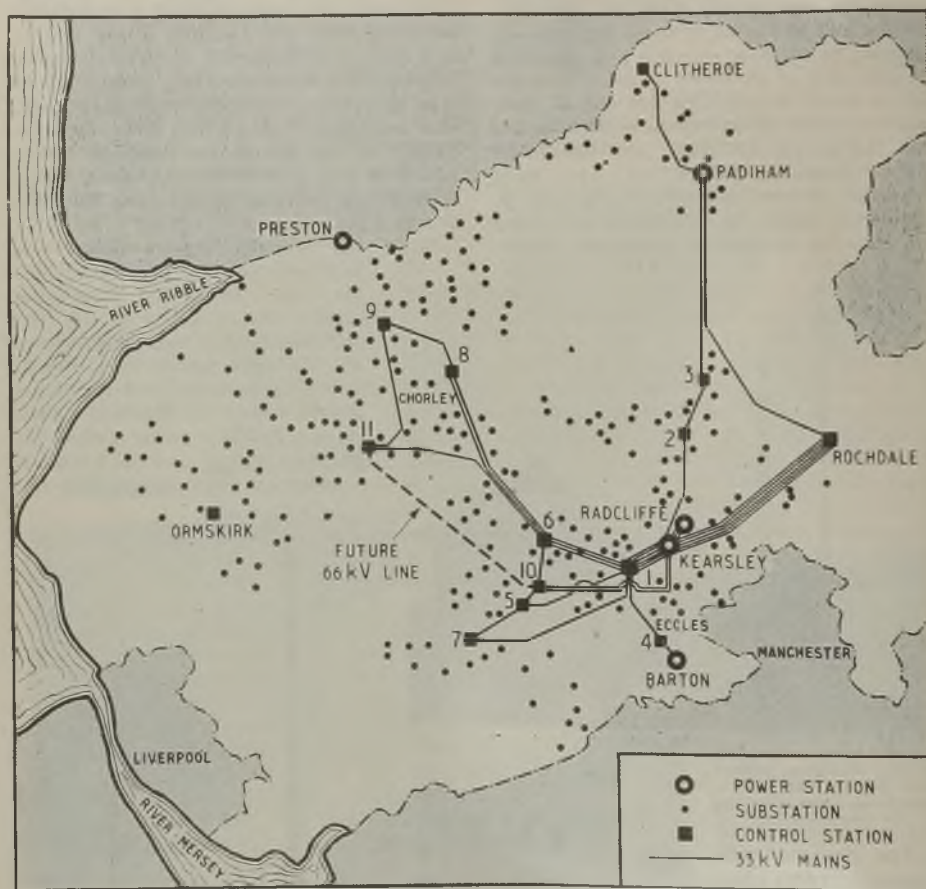


have since then been augmented as required. On the Rochdale route five 33-kV feeders now supply direct to the Corporation, and are not tapped for the company's distribution;

similarly three feeders interconnect the Kearsley and Radcliffe stations. The interconnector between the Kearsley and the Padiham stations has been utilized at two points for the purpose of the company's general distribution, and control stations have been established (Nos. 2 and 3), from which, through step-down transformers, twelve feeders carry supply at 11 kV to the adjacent power consumers and l.v. distribution networks. Similarly the 33-kV inter-

extensive 33-kV development has taken place and control stations have been erected at points 5, 6, 7, 8, 9, 10, from which, through on-load tap-changing step-down transformers, 11-kV feeders supply adjacent power consumers and l.v. distribution networks.

The provision of a number of attended controls, with engineers resident in adjoining houses, provides, by means of on-load tap-changing transformers, voltage regulation adjusted to the requirements of the area.



Map showing power stations, principal substations and 33-kV mains

connectors between the Barton power station of the Manchester Corporation and the Hill Top control of the company (No. 1) have been utilized by the provision of a control station (No. 4) for supply in bulk to the Eccles Corporation.

In the western half of the company's area

Contact points are also thus provided between the area consumers and the operating and engineering staff, and the arrangement moreover allows the 11-kV feeder system to be sectionalized and local transmission to be kept within reasonable mileage. Instead of the original six 11-kV feeders 105 now

provide for the requirements of the power consumers and distribution networks, and it is of interest to record that the original feeders, now forty years old, are still quite

operation the company's system is divided into eight mains districts. The following more detailed descriptions relating to the Chorley and Ormskirk districts are typical of the general organization and development of the whole of the company's system.



Botany Bay control station, Chorley

as trouble-free as cables of more modern specification with cut dielectric thicknesses laid at later dates.

Future development of the company's mains system may follow similar lines, but the existing 33-kV network readily allows for 66-kV feeders to be added to provide power, in bulk, from the Kearsley station to any of the control points and development along these lines is planned. These proposals provide for stepping up transmission voltage on the duplicate feeders from Kearsley power station to No. 10 control, and later for these duplicate 66-kV feeders to be extended from No. 10 control to No. 11 control to reinforce the more distant fringes of the present 33-kV development and to allow for future 33-kV extensions in a westerly and north-westerly direction. The 11-kV mains system provides the supplies required by the industrial power users and the distribution networks, and to meet these needs 452 substations have been erected as well as a considerable number of kiosks and pole transformers. In every case an effort has been made by the company to ensure that the substation harmonizes with its surroundings. For the purposes of mains and distribution

Supply to the 140-sq mile Chorley area is by means of duplicate 33-kV feeders to a main control station at Chorley and a single 33-kV feeder to a control at Wrightington. These controls are interconnected by 33-kV feeders with a similar control at Ley-

land. They are again interconnected by duplicate 10-kV feeders and the control at Leyland is linked by duplicate 10-kV feeders from the Ribble power station of the Preston Corporation Electricity Department, from which point again additional 10-kV cables are taken into the Lancashire Electric Power Co.'s area of supply.

From the above main controls duplicate 10-kV feeders are taken to substations and transformer kiosks to provide l.v. supplies, pole transformers serving isolated houses and farms. A number of 3-kV feeders is also used to supply certain rural areas. L.v. distribution is dealt with by underground cables and by four-wire overhead distribution.



Interior of Bow Lane substation, Leyland

During the past ten years about forty substations, kiosks and pole-mounted trans-

formers have been provided to deal with various forms of supply, while the length of 11-kV and 3-kV transmission lines has been increased from 122 to 169 miles, i.v. distributors now extending a distance of 386 miles, 138 miles more than in 1935. The number of consumers connected in this area during this period has increased by over 75 per cent, the total now being about 20,000.

The main distribution in the Ormskirk district is at 11 kV, supply to the main control at Ormskirk being provided by the Central Electricity Board on two 33-kV feeders in parallel through two 7,500-kVA 33/11-kV transformers and distributed to the western portion of the district at 11 kV. Supply to the eastern portion of the district is from the company's main distribution by three 11-kV feeders.

The whole of the system is interconnected so that it is possible to transfer load as required and also provide adequate alternative supplies. An example of this flexibility is illustrated by Hanging Bridge substation, where there are four feeders, each of which may provide an incoming supply for distribution on the three remaining circuits. The substation is equipped with a 11/11-kV, star/star 1,000-kVA transformer fitted with on-load tap changing, with a by-pass arrangement so that the transformer may be made "dead" for maintenance requirements without interrupting supply.

Control of the main distribution is provided by means of three 1/1 transformers

The above arrangements provide adequately for operating the system under all conditions. Duplicate feeders are provided in certain instances and a system of ring mains is established wherever this has been practicable. In parts of the district 3-kV distributor mains are installed where the anticipated loading conditions do not justify the establishment of a 11-kV main distribution. Large consumers are supplied from the 11-kV system at substations on the consumers' premises.

The networks are supplied at 400/230 V, 3-phase, and in most cases there are either five-core cables or five-wire overhead lines in order to provide for street lighting. Here again the main distributors are, wherever possible, interconnected between substations, and ring mains are established in order to provide alternative supplies.

To-day there are no villages of any size in the company's area without supply. The only small villages or hamlets yet to be connected are four groups of property each consisting of between forty and sixty premises within a radius of $\frac{1}{2}$ mile, and six groups of property each comprising over twenty-five but fewer than forty premises within a radius of $\frac{1}{4}$ mile. One of the above groups is now being dealt with, and most of the remainder will be connected as soon as material and labour are available, provided there is a wholehearted response to a canvass. Other property in rural areas not connected comprises isolated farms or very small groups of farms and property.

Few people realize that it costs four or five times as much to reach the average consumer in a rural area as it does in a town, even making due allowance for the fact that underground cable in the town costs more than the overhead construction used in outlying areas.

The costliness of the connection of farms is typified by the case of Ribble Bank Farm, Hesketh. The nearest habitable property to the farm was 1,700 yd away and the premises were 2,000 yd from the fringe of the company's i.v. distribution mains. To extend from the i.v. mains at ordinary distribution pressure over a length of 2,000 yd would not have provided an



Control station (33-kV) just completed at Wrightington

and four main control points. This ensures that if a fault occurs on the 11-kV system the fault conditions are limited to the Ormskirk district and are dealt with by the local staff without involving any other district in the company's area of supply. To provide for sectionalization, 11-kV line switches are installed at various key points on the feeders.

adequate or usable supply at the farm. So the company decided to extend its 11-kV mains 900 yd from the Hesketh Bank station (admittedly this would be required at some distant future date in the normal course of development), and provide a transformer kiosk at the termination of the above main (to utilize the supply both for l.v. distribution and h.v. supplies beyond, which might develop on the fringe of the area in question), a 2,240 yd h.v. cable service from the kiosk to the farm, and a house transformer at the farm. The total expenditure involved was £3,142 with a very small return. Furthermore, to transmit

this supply, 31 miles of e.h.v. or h.v. feeders have to be maintained between Kearsley power station and Ribble Bank Farm.



Cable laying plough in action

We have to thank the management and staff of the company for the assistance we have received in the preparation of this and the previous article.

Bradford Salary Decision

Tribunal Rejects E.P.E.A. Claim

REFERENCE has already been made in the *Electrical Review* to the adverse finding of the National Arbitration Tribunal in the claim brought by the Electrical Power Engineers' Association that Mr. E. H. Carr, city electrical engineer, Bradford, should be paid according to the scale of the National Joint Committee of Local Authorities and Chief Electrical Engineers.

Representatives of the parties were heard at a sitting of the Tribunal on October 15th. Statements were made regarding the constitution and operation of the National Joint Board of Employers and Members of Staff (Electricity Supply Industry) which covered the conditions and salaries of technical engineers up to and including the grade of deputy chief engineer and on which the Bradford Corporation was represented. Reasons were given for deciding to omit chief engineers from the scope of the National Joint Board and evidence was presented giving the history of the negotiations leading to the formation of National and District Joint Committees of Local Authorities and Chief Electrical Engineers and the adoption of a salaries agreement in 1941.

It was shown that no District Committee was formed for the No. 2 (Yorkshire) area until July, 1946. Mr. Carr was appointed deputy electrical engineer and manager at Bradford in September, 1941, and as electrical engineer and manager in April, 1943. The present salary applicable to his appointment was said to be £1,700 per annum on a scale of £1,500 rising by annual increments of £100 to £2,000 (plus cost-of-living bonus of £36 16s.

per annum). Salaries paid to other Corporation officials were mentioned and the Corporation submitted that Mr. Carr was aware on accepting the appointment that the terms and conditions did not comply with the 1941 agreement. Moreover it contended that the National Joint Committee was not empowered to make any agreement and that in any case the method of computing salaries under the agreement was inappropriate as it failed to take account of individual qualifications and responsibilities of chief electrical engineers.

The E.P.E.A. contended that there was no recognized or generally applied method of computing the salaries of chief electrical engineers other than that provided by the agreement. The Central Electricity Board recognized the applicability of the agreement or was paying salaries not less than the appropriate ones which the agreement laid down. Evidence was given of the extent to which the agreement had been adopted by local authorities.

On the other hand the Bradford Corporation showed that many of the larger local authority undertakings, both in Yorkshire and in other parts of the country, had not adopted the agreement. It was mentioned in the course of the proceedings that the maximum salary payable to Mr. Carr as provided by the agreement was £2,371 per annum.

In its award (No. 883, Stationery Office, 1d.) the Tribunal states that having given careful consideration to the statements and submissions on behalf of the parties it finds against the claim and awards accordingly.

Views on the News

Reflections on Current Topics

ONCE regarded as an astronomical curiosity, sunspot activity has become of serious practical significance owing to its effect on wireless communications. There seems to be no evidence that it influences the weather, as had been supposed by some, but fading of long-distance wireless transmission has been attributed to absorption, instead of reflection, of short radio waves by the ionosphere. Here the disturbing factor is ultra-violet light which, with the emission of wireless waves, accompanies an uprush of gas from the sun's interior to form on its surface (relatively) dark patches of electrified particles, usually in pairs of opposite polarity. That aurora and other magnetic manifestations are connected with periods of maximum activity of sunspots, which occur at intervals of about 11 years and 4 months, is well established by observation. So is the connection between these and recent irregularities in radio communications everywhere, of which, it has been suggested, the circumstances of the recent air-liner disaster in Newfoundland offer an example.

* * *

But for the commercial risk which the B.E.T. was willing to take (and municipalities were naturally precluded from taking) in providing electricity supplies and tramways in the smaller towns, the inhabitants would have been long deprived of two outstanding social benefits due to technical progress. The close association of small companies made the analogy of swings and roundabouts applicable to the exiguous or negative profits almost inevitable in those early days. Ultimate success probably owed much to the power of initiative devolved on local engineers in the management of their undertakings within the broad framework of a policy which they themselves had helped to devise.

* * *

Another pamphlet on the Tennessee Valley Authority's scheme has reached me. It is a well-illustrated production devoted to proving that the scheme is not only uneconomic but actually dangerous. As has been contended before, it is considered to be uneconomic because it pays no Federal taxes and only token interest—said to be about 0.1 per cent—and an insufficient

proportion of the cost is debited to power (as against flood control and irrigation). All this leaves room for differences of opinion between the "pro" and "anti" parties. Engineering considerations come into the other argument—that a dam designed for power generation is unsuitable for effective flood control. The Authority was forced to employ a compromise which, it is claimed, serves no useful purpose well. It is feared that such tactics might be adopted in this country but I doubt, as I have said before, whether there can be anything remotely resembling the T.V.A. here, in spite of vociferous advocacy.

I see from the *Chatham News* that while the ratings on the cruiser *Kenya* are "having their food cooked in the latest electrically equipped kitchens, the captain and his officers are having their three-course dinners sent up from a galley which still uses the old-fashioned oil-burning cookers." Other improvements installed for the benefit of the lower deck include an electric laundry. I am reminded of W. S. Gilbert's good ship *Mantelpiece* and her kindly commander, Captain Reece, R.N., who told his crew:

"By any reasonable plan I'll make you happy if I can,

My own convenience count as *nil*: it is my duty and I will."

* * *

Mr. W. E. Lawton, chairman of the Electrical Machinery Traders' Association, has shown me some pamphlets which he picked up during his visit to the recent Prague Fair. They were put out by the Skodawerke, the large Czech armaments concern, and illustrate (with full details in English) a wide range of motors of various types, from 0.25 to 230 H.P. These appear to be of good design and are made to accepted specifications—including British Standards. Mr. Lawton found that Bata's, the boot and shoe manufacturers, were also producing motors. Deliveries appear to be long-dated, however, and much of the production is for Russia whose influence in Czechoslovakia, Mr. Lawton says, is very marked in all directions.—REFLECTOR.

Future of Electricity Supply

Some Dangers Which Must be Avoided

THE purpose of this article is not to argue the merits or otherwise of any scheme for the nationalization of the electricity supply industry. That issue is mainly a political one and it will be settled by Parliament. Arguments are taking place in the Press, and later they will take place in Parliament, on the desirability for this drastic type of reorganization. At the moment it may be helpful if the following comments are made:—

(1) Anomalies have existed in the industry for many years past which the industry itself has unfortunately been unable to remove by voluntary methods.

(2) The industry has never been united on any of the main proposals for reorganization—the McGowan Report or the multi-coloured memoranda submitted by the various associations in 1943-44.

(3) The Labour Party has for some years past had in view, as part of its legislative programme, the nationalization of this industry; and it has always been open for the opponents of nationalization to raise their objections.

(4) Even in the days of the wartime Coalition Government it was reported to be the Government's intention to introduce a greater measure of public control into the industry; and ultimate public control has been the national policy since 1882.

(5) At the General Election in 1945 the Labour Party asked for a mandate, *inter alia*, to nationalize this industry, and, whilst they did not obtain a majority of the votes cast at the election, they obtained an overwhelming majority of seats in the House of Commons. It is useless to argue that the average elector knew little and cared less about the organization of electricity supply. Under our particular political system the Government now has the right to nationalize the industry if it so desires, provided it obtains the necessary support in Parliament.

In view of the above facts it is somewhat late in the day to argue that it is against the national interest to nationalize the industry or that before introducing its scheme the

By a Special Correspondent

Government should have a debate in Parliament on the whole policy of nationaliza-

tion. The Minister of Fuel and Power has made it abundantly clear that he intends to carry out his Party's programme, and in this democratic country he is fully entitled to do so whether the programme be good or bad.

Having agreed with the Minister thus far we feel that a few words of warning should be given to him. It is often said that Mr. Shinwell finds it difficult to suffer fools gladly. We would therefore ask him to accept our assurance that these words are written in no spirit of foolish bickering, or with any idea of making his position more difficult than it is already. Pin-pricking is not the purpose of this article, and in any case it is not a profitable occupation where Mr. Shinwell is concerned.

Since the decision was taken to nationalize the coal industry there has not been the improvement in output or in the mental attitude of the miners which many people had hoped to see. There may be good reasons for this

lack of improvement but we mention the point to show that the mere act of nationalizing an industry does not automatically bring an improvement in its efficiency or in the spirit of the people working therein. Indeed, it may never do so. What guarantee has Mr. Shinwell that by nationalizing the electricity supply industry he is going to remove the existing anomalies and increase the general efficiency? Although weaknesses undoubtedly exist in the industry there can be no doubt about the enormous progress which has been made during the past twenty-five years or the splendid way in which supply undertakings met the demands and faced the emergencies of war and enabled the nation to win its life and death struggle. The main cause of this success was not merely the reliability of the electrical plant or the excellence of organizations in different parts of the country. To those of us inside the industry it has long been apparent that the keenness of individuals and the spirit of adventure which have always existed in our

This article is addressed both to the electricity supply industry and to the Minister of Fuel and Power, counselling them to so arrange matters that under nationalization the public will be given the best possible service.

midst have been more responsible for our progress and success than any schemes of organization; and one of the greatest dangers which Mr. Shinwell faces is the destruction of the enthusiasm which has animated us in the past.

Nothing is easier than to make a blue print of an organization for an electricity supply undertaking. It can be done by people with no experience of electrical matters and it can be quite unworkable. Mr. Shinwell should ask himself whether his scheme, which may seem to be ideal on paper, is likely to damage in any way the goodwill and the enthusiasm which have for so long existed in the industry. In the course of his questioning he should ask himself and his colleagues what are the chief requirements to make certain that this industry shall continue to be progressive and efficient, and the people working therein still energetic and keen. Speaking from the inside we would suggest a few of these requirements and we would urge the Minister to pay some regard to our comments.

Dynamic Business Enterprise

Supplying electricity to millions of homes throughout the country, to farms and factories, and for innumerable uses, is a dynamic business enterprise requiring expert knowledge and a wide technical and business experience. As conditions vary in different parts of the country there should be a very large measure of regional control. Any attempt by the Minister to bring the industry under the control of Whitehall will lead to confusion, delay and dismay. There must, of course, be a central co-ordinating body of some kind, but each region of the country—we are assuming that Regional Boards will be created—should have a considerable degree of *real* autonomy. In Lancashire, for example, they have problems which differ from those in other parts of the country, and they speak with a bluntness and an accent which is peculiarly their own. To make the supply of electricity in Lancashire subject in all things to the control of Whitehall will not be a happy policy; and one cannot envy a gentleman with a correct Oxford accent being sent up North to tell them how to run their business.

An equally important freedom which the industry should have is freedom from Treasury control. Such control can be deadening and also irritating beyond words. It is notorious that at the Electricity Commission, for example, no expenditure can be

incurred without the consent of some outside body. A modest increase of 2s. 6d. per week in the salary of a junior typist cannot be paid without higher approval. This kind of thing may conform to the traditions of the Civil Service, but it will be disastrous in a business like that of supplying electricity.

Danger of Political Influence

The number of regions to be created by the Minister is not yet known, but it will probably be between fifteen and thirty. Assuming for the moment that each Regional Board will consist of six members, it will be seen that great patronage will be in the hands of whatever Minister is responsible for making the appointments to these Boards. Hence the danger is likely to arise that political influence will creep into the industry. Each successive Government will be tempted to remove from office people who may have incurred its displeasure in previous years in order to make room for others who have a more sympathetic political outlook. It is here that there is likely to be the greatest cause of dissatisfaction and disaffection amongst the responsible members of the industry.

The engineers and the commercial administrators will work cheerfully and energetically under Boards composed of able men who are chosen because of their knowledge and experience in dealing with problems which have to be confronted; but there will be a sullen resentment if seats on these Boards are given to men whose main qualifications are that they have not been too successful in other walks of life, or are thought to be deserving of some reward for past political services. Equally unfortunate will be the effect of appointing inexperienced people to represent workmen or customers or some group of town councils. By all means let there be machinery created for liaison between the Regional Boards and local authorities, employees and customers; but let the men upon whom the great burdens of the future will rest be chosen solely because of their ability to deal with the administrative, technical or financial branches of the industry.

Rewarding Ability

Again we emphasize that unless the Government's scheme makes this a certainty rather than a possibility, it will lead to inertia and perfunctory work on the part of those people who will have to carry on from day to day. Nothing can be more disturbing or depressing

to people in a technical and competitive business—we hope that a little competition will be left to us—than to live in an atmosphere of political uncertainty and intrigue. Another matter already causing grave concern is the question of the salaries which will be paid under the Government's scheme. Are these salaries to be fixed by some Government Department whose members possess neither professional qualifications nor a wide business experience, or are they to be fixed according to the scales generally adopted throughout British industry? In other words, are the people with the best brains to shun electricity supply, because of its restrictions and niggardliness, and go to other industries where the rewards are more generous and the scope for advancement and adventure more promising?

The Minister should know that the above misgivings are not merely those of the writer; they are widely held throughout the industry by thoughtful people amongst both municipalities and companies. If Mr. Shinwell

wishes, as we are confident that he does, to maintain and even increase the efficiency of the industry in any scheme of reorganization, he will do well to be sympathetic to the views herein expressed. The fears may be unfounded, but that is no reason why they should be ignored.

There is no large measure of ill-will in the industry towards the Minister, but rather the reverse. Whilst there are a few people who are so opposed to the whole of the Government's policy that they would prefer the electrical industry to go to pieces rather than see it progress under nationalization, most of us wish to see it serving the community with ever-increasing success. With his large Parliamentary majority Mr. Shinwell can force upon the country almost any scheme he chooses to father. Those of us who have spent our working lives in helping to build up the great electricity supply industry hope that the Minister's scheme will be a workable one and sufficiently sound to avoid the dangers mentioned in this article.

CORRESPONDENCE

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

Razors in Bathrooms

AS more goods become available, the electric razor will, no doubt, shortly be seen in large numbers. Unfortunately, many people will insist on using electric razors in their bathrooms, even though this is quite unnecessary and against all competent advice. Old habits die hard, and we must face the fact that large numbers of these appliances will be used in these circumstances in the future.

The dry shaver presents a pretty problem in earthing. Many of them are fitted with a thin waterproof two-core flexible, but let us hope that in the future they will not be sold without an earthing conductor.

Whether or not this hope is realized, what is the best and safest method of installation? Is one to install a 5- or 15-A B.S. three-pin switch socket with fused adaptor, thus inviting the use of other appliances in the bathroom? If the obsolete 5-A two-pin is installed solely for the use of the razor, it will not admit the plugs of other apparatus, but on the other hand, it is a contravention of I.E.E. Regulation 1001 (Eleventh Edition).

The cutting heads of some razors may be

exempted from earthing under 1001 (A) (IX), but the heads on most of the razors I have examined cannot be fairly described as separated by non-conducting material from current-carrying parts in such a way that in normal usage they cannot become alive.

What is "normal usage" and what happens if the razor is dropped, dislodging an internal part, or if the whole thing gets splashed with water?

A refusal to carry out the work only leads to the job being done by a possibly incompetent and certainly less conscientious person, or worst of all, the appliance is fitted with a b.c. adaptor and plugged into the bathroom lamp-holder.

I should be very interested to hear the opinions of other readers who have had experience of this problem, and who have solved it successfully.

Edgware.

JOHN BLAND.

Unsafe Installations

I WOULD like to see Rule 1108 of the I.E.E. Regulations brought into practice. This would naturally take some time, but if a move were made by the contractors and

the contractors' associations, then it would be up to the supply authorities to give them the necessary backing and co-operation which would make the scheme workable and effective.

The adoption of the rule involves a considerable amount of pioneer work, but those who have the interest of the electrical industry at heart will agree that it is time a halt was called to indifferent installation work and appliances. Persons deliberately not wiring to the I.E.E. Regulations should not be allowed to practise.

Spalding.

L. ADLINGTON.

School Lighting

WE have read with interest Mr. G. V. Downer's letter in your issue of October 25th and would like to add our protest against the danger to schoolchildren's eyes of excessive lighting and the additional cost to the ratepayers.

There is another factor of interest to housewives who dread the potential threat of less electricity when it is being wasted in excessive lighting as demanded by fluorescent lighting.

London, W.

B. M. YOUNG,

Secretary,

The Women's Guild of Empire.

[The illumination values prescribed are the lowest that leading authorities consider can be used without risk of eyestrain due to inadequacy of light when reading small print over extended periods. One advantage of fluorescent lamps is their low surface brightness, which is very considerably less than that for which shielding and other precautions are legally required in factories, for instance, in order to avoid harmful glare. Since fluorescent lamps consume less than half the amount of electricity taken by gasfilled lamps to give the same light, the question of waste does not arise. Even if the cost were more, the addition would surely be worth while in the circumstances.—Editors, *Electrical Review.*]

Standard Baking Tests

AS a designer of both electric and gas domestic cookers I find B.S.1315 (Pt. 1), Domestic Electric Ovens, very disappointing in comparison with B.S.948, Cooking Tests for Gas Ovens.

Cooking tests for scones, small cakes, sponge sandwich and rich fruit cake are almost identical in the two cases, except for the "Result of Test." Taking scones for example, definite minimum values are given for gas, but the electric Standard depends on the persons judging, and this at once introduces many variable factors. The "Full-

Load Test—Complete Dinner" is in line with the gas Standard, but again is not very precise. Although weights and sizes of meat are given there are no definite means of determining if it is cooked. In the gas Standard a definite minimum temperature rise is called for, this being measured in the centre of the meat.

For potatoes the maximum weight of each only is stated, so it would be possible to use small pieces, which would cook through more easily, whereas in the gas Standard both minimum and maximum weights are laid down.

In the electric Standard no time is mentioned for the test for Yorkshire pudding. In Appendix "B" under "Complete Dinner" it is stated that "the rice pudding is to be omitted if rice is unobtainable," and no mention is made of a substitute for it; surely these conditions make it hopeless to use as a Standard. The gas Standard states a minimum time for the whole and separate items.

As I see it, the electric Standard is worth very little as it can be interpreted differently by every cook or person competent to judge.

Finally, I would suggest that a Standard is required for "Cooking Tests for Domestic Ovens" which should include electric, gas, oil and solid fuel, for surely the housewife expects the same performance from all, although the manipulation may be different.

E.G.

Registration of Engineers

IT was interesting to read your editorial comment on "Registration of Engineers" in your issue of October 18th. The arguments in favour of establishing a definite status for the qualified engineer have already been stated many times, but I should like to raise the question of the method of achieving this result.

Cannot the main professional engineering institutions of this country set up a joint committee to consider the matter and prepare proposals in draft form for submission to the Government? While agreeing that the advocates of this idea may have, to use your own words, a "hard row to hoe" the main thing is to get some concrete proposals on paper. May I therefore suggest that all engineers interested in protecting their professional status should write to their institution pressing for this matter to be given attention and for steps to be taken on a united front to achieve success.

Hampstead, N.W.3.

G. E. B. WHITE.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Central Electricity Board has appointed **Mr. W. B. Noddings**, M.Eng., A.M.I.E.E., to be deputy commercial manager in place of the late **Mr. J. B. M. Gubbins**. **Mr. Noddings**, who



Mr. W. B. Noddings

has been assistant commercial manager for the past two years, joined the Board's staff in 1928, having previously held an appointment as assistant engineer with **Merz & McLellan**. He is a graduate of **Liverpool University**, where in 1923 he took the B.Eng.(Hons) degree with first class honours, and he received his early training with **Metro-politan-Vickers**.

The **Bingley Urban District Council** has confirmed the recommendation of the **Salaries and Wages Committee** to increase the salary of **Mr. O. G. Cook**, A.M.I.E.E., chief electrical engineer and manager, by an amount equivalent to the scale as recognized for chief electrical engineers. The Council has also adopted the scales of the **National Joint Council for Local Authorities**, Administrative, Professional, Technical and Clerical Services.

Mr. W. J. Collins, at present acting deputy electrical engineer with the **Bromley Corporation Electricity Department**, has been appointed deputy borough electrical engineer at **Tunbridge Wells**. **Mr. Collins** takes up his new post on December 1st.

The **Stockton-on-Tees Corporation** has increased the salary of **Mr. N. Hunter**, M.I.E.E., the general manager and engineer of the electricity undertaking, by £150 per annum.

Mr. C. H. Neale has resigned his appointment as director and has severed his connection with **Tanjon (Newcastle), Ltd.**

Cardiff Corporation Electricity Committee has appointed **Mr. G. J. Higgs**, of **Llantwit Major**, as assistant sales engineer at a salary of £521 per annum.

A large crowd of **G.E.C.** employees who have returned from the Forces, and members of the wartime **Well-Wishers' Club** who kept them supplied with parcels throughout their service, met at **Magnet House, London**, on **October 23rd** to see the presentation of a grand piano to the **G.E.C. Social and Athletic Club**. The piano had been bought with the balance remaining in the **Well-Wishers' Fund**, the amount being brought up to the required sum by subscriptions from **G.E.C. ex-servicemen**. The presentation

was made by **Mr. T. Dyke**, joint secretary of the company, who had served as chairman of the **Well-Wishers' Club** throughout both world wars, and the piano was received by **Mr. Leslie Gamage**, vice-chairman and joint managing director, in his capacity as chairman of the **Social and Athletic Club**. **Mr. Dyke** said that between 1939 and 1946 the **Well-Wishers' Club** had raised over £9,500 and had sent out more than 41,000 parcels. After the presentation the company was entertained by brief piano recitals by **Miss A. E. R. Jones**, **Mr. A. J. Burbidge** and **Mr. V. J. Sanders**.

Ten members of the **Barnsley Electricity Department** staff who have retired during the past twelve months between them total four hundred years of service. **Mr. E. A. Barker**, the borough electrical engineer, **Mr. J. A. Burton**, station superintendent, and **Mr. W. Sugden**, turbine driver, each had forty-six years' service to their credit, while **Mr. A. Atkinson**, a labourer, could claim no fewer than fifty.

As announced last week, **Mr. Basil R. Vickers**, of the **Manchester Corporation Electricity Department**, has been appointed by the **British Electrical Development Association** as its **Area Officer** in **Scotland** with headquarters in **Glasgow**.

Throughout the war **Mr. Vickers**, who is thirty-four, served as an electrical officer in the **R.N.V.R.**, and attained the rank of lieutenant-commander. After being engaged on mining and mine-sweeping duties, he was for two years a liaison officer with the **Russian Navy** to which he was technical adviser



Mr. B. R. Vickers

on mining, minesweeping and torpedo problems. **Mr. Vickers**, who was educated at the **Grammar School and Technical School, Stockport**, and the **Manchester College of Technology**, joined the **Manchester Corporation Electricity Department** in 1929 and latterly has specialized in space heating, industrial heating and large-scale cooking problems. Since his return from the Navy **Mr. Vickers** has been engaged on a proposed district heating scheme for a new housing estate.

Mr. T. H. Skelton, manager of **Edgar Allen & Co.'s Electric Melting and Tropenas Steel Converting and Foundry Heat Treatment Departments** has retired, for reasons of health. He joined the company in 1901 and when in 1909 the first **Heroult electric arc furnace** to be erected in this country was installed **Mr. Skelton**

took charge of it, becoming responsible, as the use of the electric furnace process developed, for all the steel produced in this way. At the beginning of 1919 he became permanently responsible for the production of all steel for the steel foundry. Mr. Skelton, who is sixty-one, will be succeeded by Mr. W. H. Everard, who has been with him for thirty-two years. Mr. Skelton will still be available as a consultant.

Commander T. D. Galbraith, R.N., M.P. has been appointed a director of the Clyde Valley Electrical Power Co., and of its three subsidiaries, the Lanarkshire Hydro-Electric Power Co., the Strathclyde Electricity Supply Co., Ltd., and the Clyde Valley Accessories, Ltd.

Mr. M. I. Lipman, M.B.E., general manager of the Special Products Division (Government contracts, Thermovent heating, car radio) of E. K. Cole, Ltd., relinquished his position with the company on October 31st.

Bury Electricity Committee has recommended the appointment of Mr. J. Mills, deputy electrical engineer and manager of the St. Helen's Corporation electricity undertaking, for the position of engineer and manager at Bury, at a salary of £1,208, rising to £1,422. For six months there has been controversy over the salary for this appointment.

Mr. C. W. Saddington, burgh electrical engineer, Oban, retires on November 15th on superannuation.

Miss Caroline Haslett and Miss Vera Norvick, director and assistant secretary respectively of the Electrical Association for Women, have been appointed members of a National Advisory Council which the Ministry of Labour and National Service has set up under the chairmanship of Miss Violet Markham to advise the National Institute of Houseworkers on any questions relating to the supply of, or the demand for, domestic labour that may be referred to the Council. Miss Norvick has just returned to England after three months in the United States and Canada.

Twenty-five years ago there were only seventy-five employees at the Luton Electricity Works, but of those twenty-one are still with the undertaking and there are eight others on the retired list with twenty-five years' or more service. Therefore, nearly 40 per cent of the employees in 1921 have spent twenty-five years with the undertaking and this fact was recognized recently at the opening of the Sports and Social Club's new premises, when members were welcomed to the Long-Service Association. The longest service was that of Mr. Dorrington, the present power station superintendent, who has been with the undertaking forty-four years, the next being Mr. Gregory, chief clerk, and Mr. Chandler, meter superintendent, both with thirty-eight years' service. Mr. W. H. Cooke, formerly chief engineer, who was with the undertaking from 1901 to 1939, replied on behalf of the members of the Long-Service

Association to the welcome extended by the chairman, Councillor Sinfield. An indication of the development of the undertaking is given by a comparison of the number of personnel twenty-five years ago and the number now employed—462.

Mr. S. M. Harris, O.B.E., sales manager of T.M.C.-Harwell (Sales), Ltd., has been appointed to the board as sales director.

Mr. A. J. Robinson, manager of Christy Bros & Co., Ltd., and the Aldeburgh Electric Supply Co., has retired and he has been presented with an armchair by Mr. Frank Christy, chairman, on behalf of the directors and staff of the Aldeburgh and Chelmsford Companies. Mr. Robinson has been with Christy Bros. since 1899, and has been manager at Aldeburgh since 1912. Mr. W. E. Wisbey is succeeding him as manager at Aldeburgh.

The Midland branch of the Association of Mining Electrical and Mechanical Engineers held its annual dinner in Nottingham on October 26th. Mr. R. E. S. Mills, branch president, presided, and the chief guest was Mr. C. Charles Bleach, national president. Mr. A. W. Williams, past national president, said that in 1922 the Midland branch had fewer than 100 members, but to-day there were 700, and they were the second largest branch in the country.

Mr. W. Heald informs us that he has terminated his contract with the Sun Electrical Co., Ltd. Mr. Heald has been with the company for eighteen years, apart from war service in the R.A.F., and latterly has represented the company in the counties of Hampshire, Bedfordshire and Oxfordshire.

Mr. A. Everett, who has been employed by Claud Hamilton, Ltd., for fifty years, has been presented with a cheque by Mr. A. J. Ferguson, chairman of the company. The staff has presented him with a wallet and an electric clock.

Obituary

Mr. Richard G. Botting, manager and director of the Aberdeen Electrical Engineering Co., Ltd., Belmont Street, Aberdeen, died on October 27th. Among contracts carried out by him were the electrical installations at the Waldorf Hotel, London, and at Goodwood, home of the Duke of Richmond and Gordon.

Mr. James Ford, chief clerk of the Electricity Department of the Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board since January, 1934, died at his home, Danesmoor, Old Hall, Mottram, near Manchester, on October 24th, at the age of fifty-nine. A native of Bury, Lancs, he joined the Bury Corporation staff as a youth and passed through the various departments, finally becoming chief clerk in the Electricity Department. He joined the staff of the Stalybridge Board in January, 1934. He was a member of the Committee of the North West Centre of Electricity Supply Administrative

Association and all his life had been a member of N.A.L.G.O. The funeral service was held at Mottram Parish Church on October 28th, and the interment took place at Bury.

Mr. W. H. F. Colebrook.—The funeral took place at Andover recently of Mr. William Henry Frederick Colebrook, of Over Wallop, who assisted Marconi in his early experiments at Bournemouth. Mr. Colebrook, who was born in 1873 and educated at Andover Grammar School, became station superintendent and chief assistant engineer to the Bournemouth & District Electric Supply Co., Ltd. (now the Bournemouth & Poole Electricity Supply Co., Ltd.) and in 1899 was appointed consulting and resident engineer to the Watford electricity undertaking. He retired in 1931 but during the war joined the staff of the Wessex Electricity Co. Shortly before he died Mr. Colebrook presented his scientific and electrical apparatus to Andover Grammar School.

Mr. F. Twitchett.—The death has occurred at Benfieldside (Co. Durham) of Mr. Frederick Twitchett, Northern area manager at Newcastle-on-Tyne for the Splendor Lamp Co., Ltd.

Mr. Herbert Taylor, rolling stock superintendent to Darlington Corporation, has died at the age of fifty-nine. He had been at Darlington about thirty years and before then was with Bradford Corporation.

Wills.—**Mr. Thomas Richard Martin**, of Rodcombe, Aston-sub-Edge, Chipping Campden, Gloucs., late a director of British National Electrics, Ltd., and Archibald Low Electrics, Ltd., and for many years associated with J. H. Tucker & Co., Ltd., who died on February 13th last, intestate, aged sixty-six years, left £5,394 gross, with net personality £5,078.

Mr. F. C. Curtis, founder and principal of the Curtis Manufacturing Co., Ltd., left £79,796 (net personality £74,172).

B.E.T. Jubilee

IN celebration of its jubilee, the British Electric Traction Co., Ltd., held a dinner at the Savoy Hotel, W.C., on October 26th, at which Mr. R. J. HOWLEY, chairman of the company from 1929 until June last, presided in the absence abroad of Mr. H. C. Drayton, the present chairman.

SIR ROBERT RENWICK, proposing "The B.E.T." expressed himself on principle as against any compromise in regard to nationalization, the tendency in favour of which he considered a result of war strain. In the case of the B.E.T. it might take away 97 per cent of what had been built up during the past fifty years. He regretted that the Conservative Party had not put forward a policy of "denationalizing" when returned to power.

In his reply the chairman summarized the past history of the undertaking from its foundation by Emile Garcke in 1896, when it was chiefly identified with tramways and electricity supply

in smaller towns, apart from its pioneer work in launching the County of Durham, S.W. and S. and Northmet companies, which were later transferred to other interests. Particulars given in "Five Decades of the B.E.T." showed that in 1945 there were 88 companies in the group with a total subscribed capital of £30 million. Of these only Gateshead still operated tramways (18 route miles). Electricity, 306 million kWh, was supplied to approximately 107,000 consumers. Mr. Howley considered that there was cause for disappointment in the Government's proposals, in view of the fine record of the B.E.T., which furthermore was, in regard to its staffing, a "happy house."

Replying to the toast of "Our Guests," proposed by Mr. J. S. WILLS (managing director), SIR FREDERICK HANDLEY PAGE deplored the present influence of ideology without experience. Under socialism, he said, only a few men could come from the bottom to the top—the reverse of what happened under private enterprise. The health of the chairman was proposed by SIR JOSEPH NALL, who referred to Mr. Howley's forty-seven years' service with the company.

Electricity Supply History

AT the South Wales Institute of Engineers on October 22nd, Mr. C. G. Morley New (Electricity Commissioner) delivered the William Menelaus Memorial Lecture. Mr. D. Ifor Evans, president of the Institute, was in the chair. Mr. Morley New first presented a masterly survey of the electricity supply legislation of this country, dealing in passing with the reports of the various committees upon which legislation had been based. He described in some detail the functions of the Electricity Commissioners and the operations of the Central Electricity Board and the Scottish Hydro-Electric Board. The next section of the lecture traced the rapid development of the industry, due credit being given to the supply authorities themselves, the Electrical Development Association and the Electrical Association for Women. Technical developments were similarly dealt with and Mr. Morley New mentioned the advantages which the industry had gained from its support of the E.R.A.

British Institution of Radio Engineers

AVERY representative gathering of scientists, members of Government departments, the Services and the radio industry met at dinner at the Savoy on October 31st to celebrate the 21st anniversary of the British Institution of Radio Engineers. The speech of the President, Admiral The Viscount Mountbatten, has already been widely reported in the daily Press. The toast of the Institution was proposed by Sir Robert Robinson, President of the Royal Society, and that of the guests was responded to by Professor Sir William Bragg.

Meter Design

Advances in House-Service Types

THE trend in watt-hour meter design with some reference to the development of indicating instruments was the subject chosen by Mr. L. J. MATTHEWS (Electrical Apparatus Co., Ltd.) for his inaugural address as chairman of the Measurements Section of the Institution of Electrical Engineers.

It was pointed out that during the past fifteen years the design and performance of house-service meters had advanced considerably, especially in respect of prepayment meters. Wartime production was reduced to 5 per cent of the normal, but some research continued with considerable thought and discussion from which it was evident that meter practice was entering upon a period of important change.

The more enlightened treatment of meters in service was new and commendable, but Mr. Matthews regretted that some consumers' "unit" panels had been designed from too narrow an outlook and, furthermore, an excellent opportunity of standardization had been missed.

Improvements in Components

Turning to functional components, British magnets were described as at least as good as those produced in any other country. But there was room for considerable improvement in casting to shape and finishing by grinding. Also methods of magnetizing and ageing should be chosen to suit the different alloys. The E.R.A.-Shotter research into meter bearings constituted the greatest advance in meter practice during recent years.

Most development work had been directed to the improvement of stability. Was there any other piece of commercial electrical equipment for which a comparable performance was specified? Whether compensation for ambient temperature, not yet general, was strictly necessary in commercial grade meters was perhaps open to question.

Prepayment meters had developed noticeably, mostly in mechanical respects. A recent design of single-bearing synchronous motor for actuating this class of meter was illustrated. There had not been any notable development in respect of polyphase meters, but was it outside the bounds of possibility that domestic loads might increase to the extent of justifying three-phase services?

After indicating that administrative aspects of the Electricity Supply (Meters) Act, 1936, were open to criticism, Mr. Matthews referred at greater length to certain consequences of standardization which needed to be considered. For instance, information about actual short-circuit conditions, based on proper tests, would be most valuable in relation to the proposed new method of rating meters. It was questionable whether the proposed extension of the loading range was really necessary for domestic services. Therefore it might be economically unsound to strive for greater accuracy throughout the extended range and Mr. Matthews suggested that when revising B.S.37 there should be more consideration of practical service requirements instead of squeezing performance to the limit.

Fewer Sizes

The proposed reduction of the number of different sizes to three c.m.r. of 10, 40 and 80A had received much support. But the chairman's graphical representation of the proportions called for showed that 45 per cent of the demand was for the 25/50A size and 40 per cent for a 10/20A rating.

The address concluded with a reference to the contribution made by instrument engineers in general to the war effort, pointing out that whereas much had been said of the employment of radar, it was not so fully appreciated that instrumentation had made the use of radar possible.

Edinburgh Electrical Society

AT a meeting of the Edinburgh Electrical Society held recently, MR. H. E. PARTRIDGE read a paper on "Heat Transmission in Steam Boilers." He referred to the improvements in boiler design which had reduced the weight of a plant to one ton for each ton of steam per hour produced. Exposure of as much as possible of the boiler surface to the radiant heat from the furnace and the maintenance of as high a furnace temperature as possible were essential features. Pulverized firing was not considered to have any advantages whatever for high-efficiency boilers. Finally the use of oxygen instead of air for promoting combustion was suggested and it was claimed that such a scheme would result in an enormous increase in steaming capacity for a given size of plant.

Southern Electrification

Further 284 Route Miles to be Converted

A £15,000,000 scheme announced by the Southern Railway last week will involve the conversion to electric traction of a further 284 route miles (610 miles of single line track, including sidings) and the adoption of Diesel traction for subsidiary services. Steam locomotives will thereby be completely eliminated on all routes east of Portsmouth, that is, on the lines of the former London Brighton and South Coast and South-Eastern and Chatham Railways. With 714 miles of its 2,156 miles of track electrified and 55 per cent of the total train mileage worked electrically the company already possesses, even before embarking on this new scheme, the largest electric suburban service in the world.

The new routes to be electrified in the order in which they are to be carried out are :—

(1) Sevenoaks via Tonbridge and Ashford to Folkestone, Dover, Deal, Sandwich and Ramsgate with the secondary lines from Maidstone to Ashford, Maidstone to Paddock Wood, and Ashford via Canterbury to Ramsgate.

(2) Gillingham to Margate and Ramsgate with the secondary line from

Faversham via Canterbury to Dover.

(3) Tonbridge via Tunbridge Wells to Bexhill and Hastings.

(4) The secondary line to Haywards Heath and Brighton from South Croydon via Oxted, East Grinstead and Horsted Keynes.

(5) The secondary line from Horsham via Steyning to Shoreham.

To-day the Southern Railway owns over 1,800 steam locomotives. When the proposed conversion is completed the number will be reduced to under 800. Approximately 70 per cent of the trains will be composed of multiple electric units with an average of 225 H.P. per coach, the remaining 30 per cent being operated by Diesel and electric locomotives. About 200 Diesel units of 400-600 H.P. will be required and 150 electric locomotives. The latter will probably be of generally similar construction to the two 1,500-H.P. experimental units which have been giving satisfactory service for hauling freight trains for several years. Some higher powered units of about 2,000 H.P. will be required to give speeds up to 90 m.p.h. on the cross-Channel ferry services.

Electrification schemes already undertaken



All the Southern Railway's routes shown above are already, or will be, electrified. (New routes shown by dotted lines.) Diesel traction will be used on the remainder

save about 400,000 tons of coal a year and the latest extensions, together with the adoption of Diesel traction, will result in a further saving of 300,000 tons a year. Sir Eustace Missenden, general manager of the Southern Railway, hopes that it will be

meter and all the necessary instruments, with electrical braking and steam heating equipment.

Energy is collected from the conductor rail by eight shoes mounted on each side of the locomotive and there is a pantograph mounted on the roof for collecting electricity from overhead wires in certain sidings. The controller has twenty-six positions for controlling the voltage applied to the traction motors. Each function is a "running" position which can be used for any length of



One of the electric locomotives which the Southern Railway has had in regular service since 1942

possible to start work on the scheme in six months' time and that, provided that materials and labour are available, the work will be completed in five years. Additional light signalling will be required to cope with the speedier and more frequent services provided. Sixty new substations will have to be provided with the main one probably at Canterbury.

The present scheme is only the first stage in comprehensive plans for modernizing the company's system and the use of more powerful Diesel locomotives of about 1,600 H.P., perhaps in pairs, is already being contemplated for the West Country routes.

The two electric locomotives already in service were constructed at the company's works at Ashford and incorporate English Electric equipment. Each machine is capable of dealing with freight trains of 1,000 tons in weight and can also haul passenger trains at speeds of up to 75 m.p.h. The locomotive consists of a box type cab carried on two six-wheel bogie trucks. Each of the six axles is driven by an electric motor through single-reduction spur gearing.

The box cab contains an electric boiler for supplying steam for heating passenger trains, as well as electrically driven compressors and exhausters for operating brakes. It also contains the electrical apparatus for controlling the traction motors. At each end there is a motorman's driving cab containing his controller for brake operating levers, together with speedo-

time, thus giving very smooth acceleration and a large number of "running" speeds. A novel feature embodied in the design of the electrical equipment enables the locomotive to continue to exert a drawbar pull when passing over the unavoidable "gaps" in the conductor rail which occur at junctions and crossings.

Senior Demonstrators' Course

ON October 30th Mr. L. Silkin, Minister of Town and Country Planning, opened a three-day course for senior demonstrators and saleswomen in the electrical industry at the Connaught Rooms, London, W.1, organized by the British Electrical Development Association and the Electrical Association for Women. Mr. Silkin said that the trend for population to drift from the country to the town was disastrous to the welfare of the people and it had to be arrested. One way was to provide amenities in the countryside which would attract the housewife and keep her there. To-day there was a great temptation to lower standards in order to put up houses quickly. He was being urged to agree to the building of houses in most unsuitable places, and the electrical industry was being urged to reduce standards. He hoped that it would resist the temptation. Miss C. Haslett, director of the E.A.W., said that the trend of the future would be for more and more married women to work outside the home. A few households might have one or two servants, but the majority of people would employ a trained domestic worker for two or three hours a day.

E.D.A. Conference

Equipping New Houses. Cotton Mill Electrification.

SPEAKING at a conference of the E.D.A. North-West Area at Preston last week on the subject of "Electricity in New Houses," Mr. J. I. BERNARD, chief technical officer of the Association, said that the introduction of the dual-heat principle, by which a small quantity of water was kept hot continuously and larger quantities were made available at the touch of a switch, had brought about the lowest possible consumption of electricity for water-heating. Self-contained water-heaters of the dual-heat type, of 20-gal capacity, were designed for fixing under a kitchen draining board, and a considerable number of installations of this type already in use were producing very satisfactory results. Properly designed electric water-heating installations required a negligible amount of maintenance and gave an automatic constant hot-water service in which the consumption of electricity was practically in direct proportion to the amount of hot water used.

Mr. Bernard drew attention to the wide variety of electric fires, both portable and for wall-mounting, now available. For any part of the house where additional background heating was required an electric convector heater could be provided—if fitted with a self-contained thermostat advantage was taken of the savings so easily made with automatic control electric heating. Suitable equipment for the all-electric heating of a small dwelling consisted of fires in the principal rooms, together with one or two thermostatically controlled convectors providing background warmth throughout the ground floor; the hot air finding its way upstairs would air the bedrooms.

Automatic Laundering

Need for a wringer was avoided in the latest idea in home laundry equipment. The tub was run at high speed to remove most of the water by centrifugal force. An automatic washing machine had been produced in which the whole sequence of operations—soaking, washing, rinsing and partial drying—was carried out with no more trouble to the housewife than the setting of a control dial.

Post-war electric cookers had been improved by incorporating quicker oven-heating (thermostatically controlled), facilities for simmering, and increased grilling and warming space. Elimination of corners and ridges had made cleaning easier, while standard sizes had assisted the architect to utilize kitchen space to the full.

Referring to the wiring of new houses, Mr. Bernard said that the problem of providing cheaply an adequate number of plug points to ensure the convenient and safe use of electricity had been largely solved by the introduction of an all-purpose fused plug. Mr. Bernard

detailed the different types of permanent prefabricated houses which have been approved, and urged that local housing authorities should insist on adequate electric wiring and equipment in all new houses.

Conversion of Cotton Mills

At the morning session Mr. R. H. Harral, M.I.E.E., electrical engineer and manager, Blackburn, spoke of the work done to bring about the electrification of cotton mills and factories by the E.D.A. Textile Sub-Committee, of which he is chairman. Complete electrification of the cotton industry, he said, would save 750,000 tons of high grade coal to the value of £1,875,000. The N.W. Area Textile Committee in a recent survey of 1,391 mills, found fewer than 350 factories were completely equipped with electricity and 670 partly equipped.

Photography in Engineering

SOME representative instances of the value of photography in engineering were discussed by Mr. P. PHILIP (Dundee electricity undertaking) in his inaugural address as chairman of the Scottish Centre of the Institution of Electrical Engineers. The address was delivered at Glasgow, Edinburgh, Aberdeen and Dundee and it represented work done partly as a hobby, but mainly with serious intent, to make records for systematic study, which had been of the utmost value relative to plant maintenance, and for conveying accurate impressions to others who were concerned with development work.

The technique of photographic processes was not of great moment to engineers, but the scope and limitations of this means of obtaining permanent records were worthy of more than passing interest. Not only did it give the observer a comprehensive idea of the subject recorded, but also deepened his knowledge of it by enabling him to observe details which had not been evident in the limited time at his disposal for ordinary examination.

"Photostat" copying of drawings and documents saved time, money and errors; while cinematography was no less important as a medium of education, research and salesmanship than of entertainment. High-speed cinematography of events of short duration, stroboscopy and panchromatic photographic thermometry were mentioned. Cathode-ray oscillography was explained in general terms and the similarity in principle of optical and electron microscopes for microphotography was commented on, the address terminating with references to X-ray examination.

Reconstruction in Burma

Hydro-Electric Possibilities

WAR brought devastation to practically all the towns of Burma, with the destruction of the electricity supply systems. The Government of Burma realizes that the restoration of electricity supply is one of the country's first needs and it has appointed Mr. E. A. Logan, M.Sc., M.Inst.C.E., M.I.E.E., M.I.Mech.E., as chief electrical engineer and manager to carry out this work and put into effect a contemplated nationalization scheme.

Mr. P. Nimmo (Electricity Commissioner) presided at a farewell dinner to Mr. Logan at the Waldorf Hotel, on October 29th and in proposing the toast of "Burma," spoke from his twenty years' experience in that country of the problems and opportunities facing Mr. Logan. He said that Burma was as big as France but had a population of only 15 millions. The earliest and largest supply schemes were those in Rangoon and Mandalay but altogether there were about a hundred licensed undertakings most of which supplied power mainly for fans and lighting. Mr. Logan would have the supervision also of electricity supplies to mines, oilfields and other industrial undertakings which had secured very good service from plant supplied by British manufacturers.

Mr. Nimmo introduced Mr. Saw Tha Din, a member of the Karan mission to this country. The Karans, hill folk, had maintained their independence through many political changes.

Mr. Saw Tha Din said that Burma had very little fuel, a situation which could only be overcome by the harnessing of the country's water power. In this matter they pinned their hopes on Mr. Logan. The Burmese realized that many British had given the best part of their lives in Burma's service. They hoped one day to be able to do something in return but as yet they still had to ask for Britain's help.

Mr. V. W. Dale (E.D.A.), proposing the toast of the Institution of Electrical Engineers,

mentioned that it was the largest body of its kind in the world; the membership had now reached the 30,000 mark. Mr. V. Z. de Ferranti, President of the I.E.E., responded to the toast.

In giving the toast of "Electrical Exports," Mr. H. E. Midgley (Brush Electrical Engineering Co.) gave credit to Mr. V. Watlington, who has just retired from the position of director of the British Electrical and Allied Manufacturers' Association, for the way in which he had presented the electrical manufacturers' export case to the Government. They had got more or less what they wanted—in fact rather more. The speaker referred to the electrical manufacturers' training schemes which had produced some excellent engineers. It was men of this type who would help Mr. Logan in his work.

Replying to the toast, Mr. Watlington said that electrical manufacturers found it difficult to meet the demands made upon them. He hoped that there eventually would be a greater exchange of goods between this country and Burma.

The health of the guest of the evening was proposed by Mr. E. E. Hoadley (borough electrical engineer, Maidstone) who said that Mr. Logan had drive and initiative and the Government of Burma had chosen wisely. He was another spearhead of Britain's export trade.

Mr. Logan in the course of his reply said that he hoped to be able to develop Burma's water power as a means of restoring prosperity to the country.

Mr. L. Weight, Financial Adviser to the Government of Burma, mentioned the country's straightened economical position and said that value had to be obtained from all public expenditure.

The party of about thirty was representative of the electrical supply and manufacturing industries and of concerns with interests in Burma.

Rural Electrification in Russia

UNDER the new five-year plan for Uzbekistan, U.S.S.R., a thousand 60-kW hydro-electric stations are to be built on small rivers and irrigation canals for supplying electricity to collective farms. Last year, 45 were built and this year 300 more are under construction. As a result it is expected that in 1950 the daily consumption of oil in the villages of this Republic will be reduced by about 1,000 tons. A number of rural areas are also being linked up with the transmission lines of industrial power stations, such as the Farkhad hydro-electric station now being completed and the Central Asian Syr-Darya River.

Factories in Uzbekistan have started production of turbines, transformers, insulation,

wiring, fittings and electrical instruments. Manufacture of generators will start in the near future. Electricity is supplied to a great many remote villages and in some districts such processes as threshing, hulling and the preparation of fodder have been electrified. Experiments are being made in regard to agricultural processes to which electricity has hitherto not been widely applied, such as ploughing; models of electric tractors have already been completed.

Collective farms are providing money (in addition to that provided by the Soviet Government) and labour for building the power stations and engineers of urban industrial enterprises are rendering technical aid.—

A. VASILNITSKY.

Railway Points

Long-Distance Electrical Operation

OPERATION of railway switches or points by power originated nearly half a century ago, but the application of electrical engineering to railway signalling did not show a very great advance until the last two decades. Nowadays electricity is used in nearly every branch of signal engineering—only a small section of which is covered in the present article, i.e., the operation of points by power instead of manually.

The term "points" covers the two switches used to change the direction of vehicles from one line to another, one "closed" and the other "open." Both switches are rigidly coupled together so that only one can be up against the stock rail at a time.

In the early days of railways, the switches were coupled by a rough form of rod and operated by some kind of hand lever adjacent to the points. In some cases a clamp was provided to fix the closed switch against the stock rail. In 1860 new regulations required

By **H. C. Towers, M.I.E.E.** the switches and the other for the facing point lock and bar. The locking bar is made of angle or tee iron fixed on rockers clipped to the rail and is capable of a certain amount of radial movement from one side to the other; in the middle of the operation the rockers are vertical and the bar is above rail level. Consequently the bar would be held down by



Diamond crossing with moving frogs

the wheel flanges of a vehicle standing on it. The bars are longer than the longest wheel base in use. The facing-point lock consists of a substantial plunger working in a casting parallel with the rails. At right angles to

the plunger is a stretcher joined to both switches and having notches cut to receive the plunger so that the points can be locked one way or the other, according to the lie of the switches. The plunger is connected to the locking bar so that it cannot be completely withdrawn from the stretcher to unlock the switches until the bar has thrown.



Electric shunt signal

all facing points to be provided with locks and locking bars. Usually two levers are installed in the signal cabin, one for operating

operated from the signal cabin is limited by legislation. Considerable load is imposed on the lever in the signal cabin by the weight

of point rodding, the resistance of switches and the frictional losses of all the attendant connections. In a busy cabin, therefore, point movements are slow and the signalman's fatigue is proportional to the number of movements performed during his term of duty.

These considerations and a desire to work points over an unlimited distance led to several experiments with operation by means of low-pressure and high-pressure air and hydraulic and gas power. To-day the power operation is mainly electro-pneumatic or all-electric. The photographs reproduced are all of the latter type.

With electro-pneumatic layouts, the facing-point lock is incorporated in an escapement, which is usually fixed outside the track but which may be fixed between the rails. The mechanism has a backward and forward movement, accomplishing the locking of the switches driven through the escapement. The air motor driving the escapement is coupled direct and consists of a compressed air cylinder and piston.

The auxiliary motor consists of two small pistons operating a slide valve, which controls the admission of air to the point motor. The auxiliary is provided with two electro-magnets, one for normal and one for reverse, and these control the auxiliary pistons working the slide valve. The magnets are connected to the point lever in the signal cabin.

On the points being thrown from normal to reverse, the sequence is as follows. The point lever is reversed (at this stage indication is not considered) and this de-energizes the normal magnet and energizes the reverse. The reverse auxiliary cylinder becomes charged with air at the same time as air supply is cut off from the normal side. The reverse piston pushes the slide valve over, at the same time pushing the normal piston back. The slide valve has now connected the air leading to the reverse side of the point motor, while the normal

atmosphere. The piston is forced from normal to reverse, driving the point-operating gear, while the air from the normal side is forced back through the normal pipe to atmosphere, the escape port being opened by the passage of the slide valve from normal to reverse.

This type of point valve has been in use now for several years and has proved very reliable. A more recent type employs three magnets, the third operating a valve which cuts off the air-main connection after the points have been operated, but a special circuit immediately reconnects the air supply should anything occur at the points to open the closed point switch. With this type of valve air leakage due to worn piston leathers is minimized.

This type is now more or less standard for electro-pneumatic point operation. Air is supplied at 60 lb per sq in. If there is one cabin only the air supply is obtained from a compressor and storage tank, but for a number of stations a signal air main can advantageously be run between two substations containing air compressors. Two advantages are claimed for electro-pneumatic point operation: First, the apparatus is simple and can be maintained by the ordinary signal fitter; secondly, the points can be thrown rapidly.

When power operation was first introduced



Point-machine layout seen from above

the practice was to operate the locking bar also by the point motor so that the points could not be changed while a train was passing over them. During the last two

decades track circuiting has made such progress that with power-operated points, as with mechanical points, the locking bar has been done away with, the track circuit through the points locking the point lever when the track is occupied.

An electrical point detection circuit indicates to the signalman that the points have responded to his lever movement, and are correctly set and locked. A special circuit-controller box fitted to the points makes contact normal or reverse according to the position of the points. The contacts can be made only if the switches are properly set and the point lock fully home. This circuit controller acts as a pole changer and operates an interlocked d.c. relay or a.c. vane relay in the signal cabin. The relay is provided with normal, reverse and de-energized contacts. By the normal and reverse contacts small dials reading "N" and "R" at the back of the point lever are illuminated. For colour-light or other electrically operated signal, the control circuit is taken over the point relay, so that no signal can exhibit a "proceed" indication unless all the points over which it reads are correctly set and locked. For a mechanically operated signal, an electric lock is used on the signal lever. The de-energized contacts on the detection relay are used for various warning circuits and for reconnecting the point valve of the cut-off type to the air main should the point-detection circuit fail through the opening of a switch.

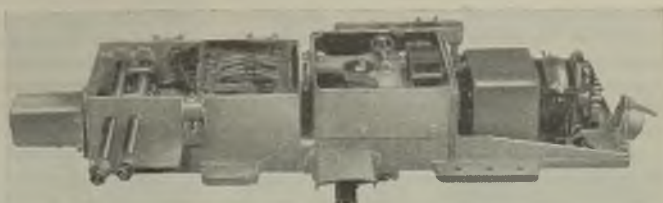
All-Electric Operation

Point operation by all-electric machines is very much in favour to-day because no compressed air is necessary. The system is therefore most suitable for the operation of a few outlying points which could not ordinarily be controlled from an existing mechanical cabin. Many of the largest railway yards in Great Britain and other parts of the world employ all-electric operation.

The point machine consists of an electric motor which drives the switches and operates the point lock through a train of gears. The whole of this mechanism, including the terminal panel, is enclosed in a cast-iron case,

which also incorporates the electrical switch and lock-detector and special contacts for cutting out the motor when the points are correctly set and locked.

These machines can be operated at low



Point machine with cover removed

voltage from local batteries connected by polarized control or by 110-V d.c. motors supplied directly from the mains or from a cabin battery on float. A.c. point machines are also in general use with series motors. The current taken by these machines is high and in order to obviate undue voltage drop the motor circuit is supplied from a local transformer situated close to the points. The polarity of the circuit is controlled through a polarized point controller which is reversed according to the position of the lever in the signal cabin.

Hand-Generator System

Where a power supply is not available, points can be operated by d.c. machines on the hand-generator principle. This system is used in Northumberland on the Ashington Colliery line, where facing points are operated 1,500 ft from the signal cabin, and, in Ireland, at 5,550 ft from the cabin.

The points are operated by all-electric machines which work switch and lock movements. Signals, of the semaphore type, are operated by low-voltage machines. All signals and points are controlled by full-sized levers mounted in a regular signal frame and provided with the usual mechanical interlocking. The levers work electrical contacts connecting the various circuits controlling signals and point machines. Adjacent to the lever frame is a hand generator. Indication is usually provided in the form of an electric lock preventing the final movement of a lever.

This may be understood by considering a complete point movement. To reverse a pair of points the lever controlling them is pulled over but cannot be fully reversed owing to its being held in the indication position by an electric lock. When the

points are correctly reversed the electric lock on the point lever is released. The lever may then be fully reversed and the signal lever or levers pulled.

If several point levers are provided it may be difficult to operate the generator and still be within reach of the levers. Indication slides are therefore provided close to the generator and within easy reach of the operator. These, when fully pulled or pushed back, release the locking in the frame. The locking may be made to release the signal levers direct, dispensing with the point lever. With this system all points and signals can be power-controlled from a central position, the signals being held "off" by battery power.

The question of point indication has occasioned some controversy. As explained previously, the position of points is electrically detected, the circuit operating some form of polarized relay. The relay operates normal and reverse visuals behind the point lever and also controls signals which read over the points concerned.

Indication Locks

On some railways, normal and reverse indication locks prevent the final or indicating movement of the lever until the points correctly respond and the "indication" is received. For example, take the operation of a point lever with indication locks. The lever is moved from normal to the reverse indication position, where the final movement is prevented by an indication lock. When the points are correctly reversed and locked, the point-indication relay reverses and the indication lock is released, permitting the lever to be fully reversed. This releases the mechanical locking in the lever frame and enables the signal lever to be reversed. If the reverse indication had not been correctly received the point lever would have held mid-way and the signal lever would have been locked in the normal position.

Without indication locks, the point lever can be fully reversed, followed by the signal lever. If the points do not set correctly the visual light behind the point lever does not show "R" and the signal does not "clear." (This refers to operation from a power frame with colour-light signals.) The signal aspects are also repeated behind the lever and in this case, due to the points not reversing, the red visual would continue to be illuminated with the signal-lever reverse.

It has been claimed that the disadvantage of check locks on point levers is that lever

movements take longer and slow up the frame. Without the locks several points can be thrown at once; in all electric operations this may impose an overload and blow the main fuse. In a busy cabin, in the event of a point failing, the signalman may not notice that the signal has remained at danger though the lever has been reversed and this leads to delay in bringing the train in. There are many arguments for and against both methods; the choice between them has to be settled by circumstances and the policy of the administration concerned.

Acknowledgments are due to the Westinghouse Brake & Signal Co., Ltd., for permission to reproduce the photographs in this article.

French Electricity Supply

From Our Paris Correspondent

THE recent cutting off of electricity in Paris, without warning, has given rise to gloomy prognostications for the future in spite of official pronouncements which deny that restrictions are likely to be so severe this winter. But there are so many qualifications that the reassurance is nullified.

Four reasons have been given why cuts are likely to be introduced:—The cessation of imports of power from the British Zone of Germany, amounting to at least 50,000 kW; several thermal plants are out of use undergoing repairs; lack of rain has reduced storages to 69 per cent of the normal level; and individual consumption has risen from an average of 450 kWh in 1938 to 650 kWh. It has been estimated that there has been a 30 per cent increase in consumption this year over last year.

Production, however, has increased by 10 million kWh, which will enable a larger allocation to be made. It is expected that France will be divided into three sectors, the consumption in each of which will be reduced one week in three. Paris is likely to be divided into two zones, with each suffering cuts of 45 minutes at given times.

It is mainly domestic consumers who are responsible for the increased demand. Although there is little coal available for domestic purposes, most people thought that the days of electricity cuts were over, and have been buying electric heaters.

On November 1st, thermal plants which have undergone repairs were expected to be in operation again. To solve the problem permanently, however, it will be necessary for the hydro-electric plan to be achieved. This is expected to make available a supplement of 900 million kWh in 1947 and 8,000 million by 1950. Total production will then be about 40,000 million kWh. L'Electricité de France asserts that by 1948 there will be no further cuts

Telecommunication Networks

Pulse-Testing Methods

THE pulse-testing of wide-band telecommunication networks is the subject of a paper prepared by MESSRS. D. C. ESLEY, E. C. CHERRY and M. M. LEVY (G.E.C. Research Laboratory) for the Radio Section of the Institution of Electrical Engineers. The authors describe equipment that has been designed for rapidly and directly assessing the characteristics of networks to assist the study of line-cable and feeder matching, testing delay lines and band-pass filters; as well as the mismatching of radio aerials and feeders and the study of feed back amplifiers. The complete equipment is mounted in five panel units contained in a cabinet on wheels and it provides information that can usually be obtained only by laborious attenuation and phase measurements.

Henley Students

STUDENTS taking the courses under the education scheme of W. T. Henley's Telegraph Works Co., Ltd., held their fourth conversazione at the Gravesend Technical Institute on Saturday last. The proceedings began with orchestral music under the direction of Mr. W. Hill and the function was then opened by Mr. E. Judge, manager of the Gravesend works. Sir Montague Hughman, Henley's chairman, presented awards to the students and there followed an address by Mr. E. W. Woodhead, Kent county education officer, who was thanked by Dr. P. Dunsheath, consulting engineer and director of the company. Mr. P. E. Bacon spoke on behalf of the students and the proceedings closed with a speech by Mr. V. B. Twiss, education officer.

After tea there was an inspection of an exhibition of students' handicrafts and demonstrations of scientific and technical apparatus

arranged by Mr. H. C. Hoban (research laboratory) and Mr. J. H. Savage (Woolwich works). These covered a wide range; some were related to the company's work and products, others were outstanding examples of arts and crafts not directly concerned with these.

Heaters in Hard Water

A DESIGN of base-plate that would permit the use of a more widely spread heating element for immersion water heaters having handholes in the storage tank or cylinder was suggested in the paper presented before the Institution of Electrical Engineers by Messrs. Ronald Grierson and Forbes Jackson last March. Since then a 2-kW element has been tested by the Northmet Power Co., in a 24 in. by 24 in.



Spread immersion heater in hard-water

by 15 in. galvanized mild-steel tank with a 27 gal. capacity

The water used had a temporary hardness that was one of the highest in the country, viz., 24 deg (Clark), giving 3.43 lb of scale-forming matter per 1,000 gal. Corresponding figures for permanent hardness were 4 deg and 0.57 lb. A storage temperature of approximately 140 deg F was maintained and 60 gal of water were drawn per working day. By the

time the accompanying photograph was taken, 6,500 gal had passed through the tank and the energy consumption had reached 2,227 kWh. This is equivalent to a run of thirty-two weeks in the average low-cost house.

The weight of the scale and sludge on the floor was 2½ oz. Further tests are to be taken after a further run of the same quantity of water and will be continued until the accumulation of scale is found to interfere materially with the free circulation of water or until the element fails.



Mr. E. W. Woodhead addressing Henley students. The platform group includes Sir Montague Hughman, Sir Edward Crowe and Dr. P. Dunsheath

PARLIAMENTARY NEWS

By Our Special Reporter

LAST week in the House of Commons, Mr. N. Smith asked the President of the Board of Trade whether he would consider an amendment of company law to prevent statutory monopoly concerns from circularizing political propaganda to their customers.

Sir Stafford Cripps said he did not think that such an amendment would be appropriate for inclusion in the Companies Bill.

Asked by Mr. Smith whether he was aware that only last week every customer of the West Kent Electricity Company received a leaflet saying that under nationalization the price of coal would go up and if he thought it was desirable to mix business with mendacity and malice, Sir Stafford Cripps said that that seemed to be a matter for the shareholders.

There was no reply when Mr. Chamberlain asked Sir Stafford Cripps if he was aware that the South London Electric Supply Corporation had been distributing this "lurid pamphlet" which ended by saying that nationalization would mean higher prices and bad service, and if that was not entirely unwarrantable, misleading and untrue.

New Power Stations

On October 29th Mr. Shinwell, Minister of Fuel and Power, said that the Central Electricity Board had arranged for forty-five new stations or extensions of existing stations with a total generating capacity of 3,209,000 kW. Fifteen with a capacity of 521,000 kW were nearing completion. He was not aware of any case in which completion was being delayed owing to shortage of materials.

The maximum capacity of generating plant operated under the control of the C.E.B. was 10,689,000 kW but deductions must be made for plant being unavailable owing to breakdowns, overhaul, etc. It was estimated therefore that not more than 8,738,000 kW could be relied on for this winter. In severe weather it was estimated that the maximum simultaneous demand would be about 10,000,000 kW. When occasionally load had to be shed, it was due to the absence of adequate plant. Priority was taken into account, with the supply of generating plant to the C.E.B., but of course there were other priorities to be considered.

Overhead Line Poles

Replying to Mr. Spence as to the percentage of the electric transmission line poles imported from Germany that was allocated to Scotland, Mr. Shinwell said that the wooden poles which were beginning to arrive would require seasoning for six months at least before they could be used. No allocation so far had been made to the electricity supply industry. Schemes for rural

electrification in Scotland had been held up by the lack of poles.

Answering a number of questions by Mr. Glossop, Mr. Belcher, for the President of the Board of Trade, said that the first imports of poles after the end of the war arrived last February, and were only just becoming ripe for preservative treatment. They, therefore, had not yet been allocated. About 17,000 timber poles were imported into this country during September for all essential requirements, including the electricity supply industry.

Cutting Off Electricity

Mr. Shinwell said that all possible steps were taken by the C.E.B. to issue warnings through the B.B.C. and the press and to individual electricity undertakings when there was a likelihood that generating capacity would not be able to meet the demand. Also electricity undertakings were instructed to avoid as far as possible cutting off supplies without telephone warning to hospitals, factories engaged in continuous process work, and other establishments where sudden interruption would be dangerous. It was not, of course, practicable to give individual notice except to a small proportion of consumers. The choice lay between having a pre-arranged interruption of supply which might have been avoided or a sudden interruption which occurred only when it became inevitable. The best solution would be for everyone to reduce consumption as far as possible during the peak hours of 8 to 10 in the morning and 4 to 6 in the afternoon.

Asked by Mr. Churchill if it was not possible to give a momentary flick two or three times by way of a five-minutes' warning that there was going to be a stoppage, Mr. Shinwell said he was not certain whether the proposal would be practicable, but they would give it consideration.

Electrical Fittings

In reply to questions by Mr. J. J. Robertson, Mr. Tomlinson, Minister of Works, said that the production of electrical fittings was in general adequate for the demands of priority building, which included all new housing and other essential work. It could, however, meet only a proportion of the remaining requirements. No licence was required to export these goods, so that detailed figures of exports were not available, but it was estimated that 17 per cent of production of electric lighting appliances, accessories and fittings and 11 per cent of production of electric cooking and heating apparatus were at present being exported. These percentages mainly resulted from substantial exports of particular items which were not in short supply.

COMMERCE and INDUSTRY

Notification of Accidents. Factory Construction Schemes.

THE Minister of Labour and National Service has given notice that he proposes to make under Section 65 of the 1937 Factories Act, regulations entitled the Dangerous Occurrence (Notification) Regulations, 1946.

The Dangerous Occurrences (Notification) Order, 1935, which these Regulations would revoke, extended the provisions with regard to notice of accidents, to the same classes of occurrences as are specified in the Schedule to the new Regulations. It was, however, limited to factories or workshops within the meaning of the Factory and Workshop Act, 1901, and places which for the purpose of the provisions of that Act with respect to accidents, were a factory or workshop or part of such premises.

The proposed Regulations require notification of the same classes of occurrences in factories as defined in the Factories Act, 1937, or in premises or places to which Part V of that Act (which relates to the notification and investigation of accidents and industrial diseases) is applied by Sections 103 to 108. Copies may be obtained from the Stationery Office, price 1d.

Progress in Factory Building

The Board of Trade announces that up to September 30th, 2,236 building projects for new factories and extensions had been approved. These should eventually provide additional employment for about 190,000 men and 150,000 women. Out of the total number of projects approved, 901 are in the development areas and should eventually provide additional employment for about 100,000 men and 101,000 women; 313 are for the North Eastern area, 213 for South Wales, 312 for Scotland, 38 for West Cumberland, 20 for South Lancashire, and five for the Wrexham area. Building has begun on 380 of the development area projects, of which 40 projects had been completed by September 30th.

Refrigerator Hire Recommences

First news of resumption of refrigerator hire trading by supply undertakings comes from St. Pancras, where the Electricity and Public Lighting Department is offering a refrigerator

for hire at 16s. 3d. per quarter or 1s. 3d. per week. Now available to any householder in the borough, subject to the premises being suitable for installation, the hire plan is primarily intended for operation in conjunction with Council and other housing and conversion schemes. During the first week of the scheme fifty hire agreements were completed, and it is



St. Pancras Electricity Department's showroom display arranged in conjunction with its refrigerator hire scheme

expected that a high rate of application will continue. The refrigerator offered is the Electrolux 1·6 cu ft built-in model which is at present being supplied for Government temporary housing schemes. Safeguarding of health, low costs, and labour-saving are points stressed in a special showroom display arranged by the undertaking in connection with the hire scheme.

House-Building Industries' Committee

A conference is being arranged by the House-Building Industries' Standing Committee (82, Cavendish Street, W.1) at the Seymour Hall, Marylebone, on November 28th. At this a report upon the Committee's work during the last eighteen months will be presented and problems now facing the house-building industry will be discussed.

New Accrington Station

The proposed appointment of an adviser to the Corporation on the design, construction and commissioning of the new £5,000,000 power station at Huncoat referred to in our issue of November 1st (page 693) came before Accrington Town Council at its last meeting. The town clerk (Mr. P. D. Wadsworth) reported that the matter was now before the Central Electricity Board which indicated that it would

be giving a wrong lead if they agreed to the appointment as adviser of Mr. Hubert Clarke (director of a concern which might possibly be a contractor for the new station). The chairman, general manager and chief engineer of the Board, however, confirmed that the Board had every confidence in Mr. Clarke as an engineer of high standing. The question of Mr. Clarke's ability and integrity was outside the point under consideration. It was emphasized he was well able to carry out the work as an engineer. A recommendation that the matter should be referred back for further consideration in the light of the new information now available was accepted.

Batti-Wallahs' Society

The way architecture influences our lives and reflects the spirit of the times was the subject of an address given by Mr. T. Graham Crump, F.R.I.B.A., at a lunch held last week by the Batti-Wallahs' Society.

Lighting in the "Queen Elizabeth"

The General Electric Co.'s main contribution to the internal lighting of the *Queen Elizabeth* included the manufacture of fittings for the first class salon, lounge and wing staircases, the cabin class cocktail bar, the tourist class lounge, dining saloon and smoke room. In the first class salon illustrated, the central lighting feature is a large silver-bronze fitting 27 ft 6 in. long by 12 ft wide which employs architectural and standard lamps. The outer margin ceiling lights are of special pressed glass and contain standard

fluorescent tubes of the cold cathode type are employed, while throughout the tourist class lounge and dining saloon the main lighting is by laylights of flushed opal glass and ceiling fittings in silver-bronze employing standard lamps in Superlux glass bowls. All these fittings were manufactured by the G.E.C. to the designs and specifications of Mr. Grey Wornum, the architect responsible for the interior decoration of the liner, and Mr. Waldo Maitland, the lighting consultant of the Cunard-White Star Line.

Delivering a Large Transformer

Recently a 45,000-kVA, 3-phase, 132/33-kV transformer for the Central Electricity Board was taken from the English Electric Co.'s Stafford works by road to Nottingham. The complete transformer weighed 125 tons and as carried on the transport vehicle 92 tons. On its journey this load had to descend the 500-yd-long Weston Bank, near Stafford, with an average gradient of 1 in 9 and a maximum of 1 in 7. This was negotiated with one tractor at the front end of the vehicle and a second tractor coupled to the rear.

Lift Calculations

Preliminary information usually needed by architects for the planning of passenger, goods, hospital, motor-car and service lifts is provided from the calculating rule devised by Marryat & Scott, Ltd. The rule makes such data as the following readily accessible:—Size to which floors should be trimmed for a lift to carry various numbers of persons; load on lift-shaft walls; passengers dealt with per hour at different lift speeds; dimensions of car for conveying beds and stretchers in a hospital; and limiting dimensions of shaft for general goods. Post-war "reprints" are now available, but can be supplied under present conditions only to practising architects, quantity surveyors and consulting engineers.

Bolton Engineer's Salary

A representative of the Electrical Power Engineers' Association, is to address Bolton Council Labour Group on Sunday to explain the demand for a starting salary of £1,916 15s. rising to £2,255 for the borough electrical engineer. The Association has advised a boycott of the appointment at the advertised salary of £1,600 a year. The Electricity Committee has decided to protest against the boycott to Mr. Shinwell. Mr. John Lewis, M.P. for Bolton, has now written saying he was asked to intervene by the E.P.E.A.



Attractive lighting in the first class salon of the "Queen Elizabeth"

lamps as do the wall fittings and those at the back of the dais, whilst the outboard "soffit" lighting is by architectural lamps. Engraved "glamour" glass with a rich sandblast finish is used throughout.

In the cabin class cocktail bar, "Osram"

Having considered the resolution from Bolton Corporation protesting against the action of the Standing Joint Committee of the A.M.E.E. and the E.P.E.A. requesting engineers not to apply for the post of electrical engineer and manager at the salary offered, the Brighton Corporation Electricity Committee have resolved: "That nationally negotiated agreements are desirable and that the resolutions of the Bolton Council be not supported."

Metrovick Export Drive in Portugal

As an indication of the special efforts it is making in the national export drive, the Metropolitan-Vickers Electrical Co., Ltd., has sent us a composite picture of showcards displayed in the windows of its agents in Lisbon. The showcards are all 6 ft high and in two colour schemes, red and black and yellow and blue; they call attention to various schemes carried out by the company in different parts of the world. The exhibition is in a popular square and forms part of the drive for business in Portugal.

Iron and Steel Control

The Minister of Supply has made the Control of Iron and Steel (No. 54) Order (S.R. & O. No. 1728 1946, Stationery Office, price 1d.) which came into force on October 30th. The Order amends the maximum prices of certain steel products, the principal alterations including increases in certain goods and a reduction in the price of alloy steels containing molybdenum and vanadium.

Electric Vehicle Demonstration

To supplement the course of lectures on electric vehicles now being given at the L.C.C. Smithfield Institute, E.C., by Crompton Parkinson specialists, a practical demonstration was given in Smithfield Market on October 29th. Assembled for the occasion were two 1-ton "Morrison-Electricar" vans and a 1-ton chassis. After demonstration and inspection, those taking the course were given the opportunity of driving either an electric van or the chassis.

Composition of "Stalloy"

In the article entitled "Electrical Sheet Steel," describing the new research laboratories of Joseph Sankey & Sons, Ltd., which appeared in the *Electrical Review* of October 25th, "Stalloy" was referred to as 4 per cent nickel steel. This should of course, have read 4 per cent silicon steel.

"Abril" Waxes

In March, 1946, at a former Royal Ordnance factory at Bridgend, Glamorgan, manufacture was begun of a range of waxes as alternatives to natural waxes. This group of substances, known as "Abril," has as its basis the by-products of the margarine, soap and other fat-splitting industries of this country. It is claimed

that types can be created of the qualities desired in any particular industry. One of them has a melting point as high as 280 deg C, whereas the highest known melting point of natural wax is 88 deg C, and it is said that cables protected with "Abril" are proof against termites, while machines coated with it or wrapped in treated paper are impervious to humidity and heat.

Lamp Publicity

The lamp publicity of the Metropolitan-Vickers Electrical Co., Ltd., this winter is based on the slogan "When daylight fades, switch to Metrovick 'Cosmos' lamps." Attractive press advertising designs

are supported by large window displays opening to 9 ft and small displays measuring 3 ft 6 in. The small display has been designed especially for small



Cosmos aluminium counter stand

windows and for those windows where the contractor wishes to include products other than lamps in his display.

In preparation is a new comprehensive lamp catalogue with a distinctive orange cover, and a pin-up folder for the contractor. This folder will contain not only list prices but also prices with purchase tax. Much of the Metrovick literature is still confined to descriptive leaflets, each leaflet covering a separate fitting either industrial or street lighting, but as the manufacturing position becomes stabilized catalogues and brochures will be produced to show the whole range of the company's lighting equipment. Literature is being prepared covering the whole subject of infra-red electric lamp heating. This literature will take the form of a series of coloured folders, and the first one (No. 4108/3-1) is now available. This folder has an attractive cover showing the Gloster Meteor on its record breaking run at Herne Bay in 1946.

Utilization of Waste Gas

About 5,000 tons of coal will be saved annually as a result of a "mutual aid" scheme between the Renishaw Iron Co. in North Derbyshire and the Derbyshire and Nottinghamshire Electric Power Co. Just over a year ago a blast furnace, which had been rebuilt and modernized during the later war years, was put into operation at the ironworks, and some of the waste gases have been used to generate electricity required within the works. On October 23rd a second furnace, which has been overhauled and modernized,

was "blown in," and the two will have an output of some 2,300 tons of pig iron a week. To avoid wasting the furnace gases representatives of the ironworks and the power company have devised a scheme whereby a 1,000-kW turbo-generator is to be installed and about 7,500,000 kWh a year will be fed into the power company's mains.

Boilers for New Glasgow Station

Glasgow Corporation has accepted a revised offer of £2,614,000 by Babcock & Wilcox, Ltd., for the construction and erection of six boiler units at the new generating station at Braehead. Babcock & Wilcox were originally to have installed four boiler units, but following agreement between the Central Electricity Board and the Corporation to extend the station, they were asked to supply two more.

Belfast Plant Contract

The Belfast Corporation Electricity Committee has placed a contract with the Stirling Boiler Co., Ltd., for the supply and installation of steam boiler plant with auxiliaries, pipework, feed pumps and coal-handling plant at the Harbour power station. The value of the contract is £752,721.

Flour-Mill Electricians' Wages

Electricians in the flour milling industry in a specified category are to receive an increase in their base rate of wages from £3 9s. 6d. to £3 13s. under a National Arbitration Tribunal award, following a claim by the Electrical Trades Union. The tribunal has decided against the claim that the base rates of the electricians concerned should be related to the base rates applicable to the electrical contracting industry.

Fluorescent Lighting in Silk Mills

The value of fluorescent lighting in the many fine processes in the silk and rayon industry is well illustrated by the number of installations which have been made during the past year or two. Prominent amongst them is the hosiery mill of Kayser-Bondor, Ltd., at Dowlais, Glam., which has a floor area of 25,830 sq ft and has been relighted by means of Revo "Truflite" reflectors and 80-watt 5-ft tubular fluorescent lamps. In the hosiery manufacturing shop 230 Revo "Truflites" are mounted 7 ft 3 in. high to lamp centre.

Electrical Contracting at Stoke

At a recent meeting of the Stoke-on-Trent City Council the Electricity Committee reported that it had considered a proposal that the Electricity Department should carry out installation, repair and maintenance work and it recommended that the proposal should be adopted and the general manager should report on the extension of the installations division of the Department to enable it to undertake the work.

An amendment was moved that the recommendation should be merely to instruct the general manager to submit a full report on the matter at the next meeting of the Electricity Committee. In favour of this course, it was contended that the proposal would lead to the Department's competing with men who had spent some years in the country's service. There was already available adequate service in this respect. The amendment was rejected and the original recommendation adopted.

Kearsley Extensions

In a few copies of the *Electrical Review* of October 25th, the boiler diagram in connection with the description of the Kearsley power station extensions (p. 642) was unfortunately shown inverted. The caption to the same illustration was also somewhat misleading, although it is quite clear from the text that the boilers in question are by Babcock & Wilcox, Ltd., fired by Babcock-Detroit "Rotograte" stokers.

Illumination Design Course

Applications for seats for the next Illumination Design Course (an evening one) arranged by E.L.M.A. Lighting Service Bureau, which was to commence yesterday (Thursday) exceeded the seating capacity. It will not be possible to repeat the course this year, owing to the very full programme, but the Lighting Service Bureau hopes to hold a similar course in the early part of next year.

Rubber Market Freed

The Secretary of the Export Promotion Department of the Board of Trade (Mr. Marquand) announced on Monday last that from November 18th the rubber market would be free to resume its normal activities. This would enable the importation of rubber on private account as from January 1st by which date the Board of Trade would have ceased to purchase rubber. This had been made possible by the rapid improvement in the supply of natural rubber.

Pattern Makers' Strike Notice

At a delegates' meeting of the United Pattern Makers' Association last week-end it was decided to hand in strike notices to the employers to take effect on November 23rd. It was also agreed that no overtime should be worked after this week. These decisions arise from the employers' refusal to meet a claim for an increase in wages from 2s. 5½d. to 3s. an hour.

Reports on German Industry

Among the latest reports upon German industry prepared by British and Allied investigating teams are the following:—B.I.O.S. 725, "German Research on Rectifiers and Semi-Conductors" (4s. 6d.); F.I.A.T. 288, "Rural Telephone Service, Dial Switching for

Teletypewriter Systems and Miscellaneous Items" (1s. 6d.); F.I.A.T. 669, "Survey of German Low Voltage Motor Control Equipment" (3s. 6d.); J.I.O.A. 56, "Selenium Rectifier Development in Germany" (4s.). F.I.A.T. 115, "Survey of the Carbon Brush Industry for Electrical Equipment of Germany" (2s.); J.I.O.A. 59, "Synchronized Broadcasting Systems in Upper Austria: Principle of Operation" (1s.).

Trade Publications

Philips Lamps, Ltd., Electronic Heating Depot, Aboyne Road, London, S.W.17.—Quarto brochure of 20 pages entitled "The ABC of High-frequency Heating of Metals," which is intended briefly to explain the elementary principles and some applications of induction heating. Fine drawings illustrate the range of work made possible thereby, as well as types of coupling coils, automatic feeding devices and quenching methods.

Dalyte Electrical Co., Ltd., West Row, North Kensington, London, W.10.—Illustrated brochure describing "Deco" cable reeling drums for a variety of industrial purposes.

Delco-Remy & Hyatt, Ltd., 111, Grosvenor Road, London, S.W.1.—Illustrated and priced leaflet (EF.46.1) on exhaust fans.

Tucker & Edgar, Berkeley Road, London, N.W.1.—Illustrated catalogue with price list of modern "Teeanee" lighting pendants, wall brackets, lanterns and table lamps.

Midland Electric Manufacturing Co., Ltd., Reddings Lane, Birmingham, 11.—Illustrated and priced folder on "Glasgow-Rex" switches, redesigned for cartridge fuses with larger capacities.

E.C.D., Ltd., Tonbridge, Kent.—Priced leaflet on "Ozono" air conditioning cabinet.

Changes of Name

Beaconetric, Ltd., wholesale electrical distributors, trading as the Beacon Electrical Co., 42, Richmond Road, Kingston-on-Thames, Surrey, have changed the title of the company to the Beacon Electrical Co., Ltd., with branches at Guildford and Reading. Mr. W. Runnalls has been appointed to the board.

Southampton Electrix, Ltd., of 126a, Macnaghten Road, Bitterne Park, Southampton, has changed its name to Southern Electrical Accessories, Ltd. The nominal share capital of the company was increased on October 14th from £7,500 to £15,000.

Trade Announcements

The Mercantile Credit Co., Ltd. (hire-purchase finance), has removed from its temporary war-time offices at 208A, Regent Street, London, W.1. to new and permanent offices at Argyll House, 246-250, Regent Street, London, W.1.

Mr. John Peirson, electrical contractor, has opened new offices and a showroom at 31, Charles Street, Bradford (Tel. Bradford 6265),

and asks for manufacturers' catalogues of fittings, cooking and heating apparatus, motors, meters, switchgear, wires and cables, etc.

Brooks & Bohm, Ltd., have opened a new branch at Ulster Bank Chambers, 4-6, Ann Street, Belfast (telephone: Belfast 24447).

The Purchasing Department of **British Mechanical Productions, Ltd.**, is now operating from the company's works at 23-39, Bendon Valley, Wandsworth, S.W.18 (telephone: Battersea 8630).

Britannia Batteries, Ltd., has moved to new offices at Trafalgar House, 9, Great Newport Street, London, W.C.2 (telephone: Temple Bar 2354/5).

Antiference, Ltd., has moved to 67, Bryanston Street, London, W.1.

Five-Day Week

Allen West & Co., Ltd., have adopted the five-day week and their Brighton works and offices are closed from Friday night until Monday morning.

The **Dalyte Electrical Co., Ltd.**, has adopted a five-day week and therefore its premises will be closed on Saturday mornings.

TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from October 30th:—

RUNTACT. No. 642,941, Class 7. Machine tools.—**Donovan Electrical Co., Ltd.**, Safuse Works, Northcote Road, Stechford, Birmingham, 9.

INTERVOX. No. 642,633, Class 9. Electrical apparatus and instruments included in Class 9; scientific, cinematographic and teaching apparatus and instruments, coin or counter freed apparatus and talking machines.—**Trix Electrical Co., Ltd.**, 1-5, Maple Place, Maple Street, London, W.1.

INFORMATION DEPARTMENT

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

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

Makers of screwed socket portion of Edison lampholders, also of slotted tubes for bayonet cap lampholders, not makers of complete lampholders.

International Standardization

AT a conference of representatives of the national standards bodies of twenty-five nations held in London from October 14th to 26th, a draft constitution and by-laws for a new international organization was unanimously agreed upon. The object of the "International Organization for Standardization" or ISO, as the organization will be known in its abbreviated title, is to facilitate the co-ordination and unification of the industrial standards of the different countries.

The seat of the secretariat of the new body is to be in Geneva. The first president is to be Mr. Howard Coonley, chairman of the Executive Committee of the American Standards Association, with Mr. Gustave L. Gérard, president of the Belgian Standards Institution, as vice-president. For the next five years, the five major countries, namely, China, France, United Kingdom, U.S.A. and U.S.S.R. will each have a seat on the Council. The other countries which were voted for and now have seats on the Council are Australia, Norway (for four years); Belgium, India (for three years); and Brazil and Switzerland (for two years).

Although the establishment of ISO is subject to ratification by national standards bodies within six months, it was unanimously agreed by those present at the London Conference that the International Standards Association should be considered as having been dissolved as from April, 1942. Subjects of major importance suggested for immediate consideration, include iron and steel (including cast iron and cast steel), rubber and coal and coal products.

Grants for Training

FOR many years it has been the practice in the electrical engineering industry for candidates for positions to follow a course of practical training appropriate to their educational standards; the normal course for university graduates lasts for two years and is known as a "college apprentice" course. Provision has now been made under the Further Education and Training Scheme of the Ministry of Labour and National Service for grants to enable those who have obtained university degrees in electrical engineering, or who have qualified in some other way as graduates of the Institution of Electrical Engineers, and who have been prevented by their national service from completing their practical training to undertake a specially designed course of practical training conforming to By-law 12a of the I.E.E.

Employers of these men will be expected to pay the usual national scale applicable to engineering graduates and the awards under the scheme will take these salaries into account in the normal manner. The majority of those who have served in certain technical branches of the Services should be able to complete their practical training in a twelve months' course,

but those who have not had any previous training in industry and only limited technical experience in the Services will require a full two years' apprenticeship and should follow an approved graduate apprentice scheme.

The arrangements will be administered by the Appointments Officers of the Ministry of Labour and National Service whose officers will be in contact with local representatives of the Institution's Advisory Service. Intending applicants for grants should notify the secretary of the I.E.E. when they apply to the Ministry.

"Britain Can Make It"

THE Council of Industrial Design announces that the "Britain Can Make It" Exhibition will remain open until December 31st next. The Council has considered many suggestions which have been received for sending the Exhibition on tour, but owing to the difficulties involved has decided not to do so. It has also been decided that the technical difficulties and the cost involved and the inevitable lapse of time, will be too great to justify the Government in sending the Exhibition overseas.

The Council announces from November 12th the Exhibition will be closed to the public every Tuesday and Friday morning from 10 a.m. to 1 p.m. On Tuesday mornings the Exhibition will be reserved for school parties and on Friday mornings, beginning at 9.15 a.m., directors, managers and buyers of industrial and commercial establishments and foreign visitors can obtain admission on presentation of their signed business cards. Children cannot be admitted under this arrangement. The present arrangements whereby all these categories of visitors can obtain entry on weekdays from 9.15 a.m. and after 10 a.m. (except Sundays) without queueing, still holds good.

Neasden to Burn Oil

ABOUT 70,000 tons of coal a year or 64 per cent of the present coal consumption will be saved by the partial conversion, just begun, of the London Passenger Transport Board's Neasden generating station from coal to oil burning. This is believed to be the largest single coal to oil conversion job in the country. Neasden station, together with Lots Road, supplies power for London's Underground and Metropolitan Railways and it has a capacity of 80,000 HP. The first of its six pulverized fuel boilers will be converted to oil firing during the December quarter of 1946. The other five will follow, and will take at least eighteen months to complete. When all these boilers are converted they will consume about 45,000 tons of oil a year. The main contractors are British Combustion Equipment, Ltd., and the sub-contractors are Hamworthy Engineering Co., (oil transfer pumps) and Babcock & Wilcox ("Simplex" oil firing units).

ELECTRICITY SUPPLY

Leicester Lighting Scheme.

Yorkshire Tariff Concession.

Barrow-in-Furness.—**SUPPLY EXTENSIONS.**—The Electricity Committee is to extend the supply to Outgate, Marton, Newlands and Tower Wood at a cost of £11,130.

Battersea.—**CABLE REPLACEMENT.**—The remaining obsolete vulcanized bitumen distributors are to be replaced by 4-core paper-insulated lead sheathed and armoured cable at a cost of £11,330.

EXTENSIONS.—A supply is to be provided at a cost of £17,724 to the Hibbert Street area which is being developed by the L.C.C.

Bexhill.—**CHANGE-OVER.**—Estimates are being prepared for changing over the system of supply in the St. Leonards Road area.

Birkenhead.—**LIGHTING CONVERSION.**—The borough electrical engineer has been asked to submit an estimate of the cost of converting 2,922 gas lamps to electricity, including the provision of ripple control.

DISTRIBUTION WORKS.—Obsolete switchgear is to be replaced at three substations at a cost of £8,438, six substations are to be built to meet rapid growth of load (£34,835) and supplies afforded to new housing estates at Little Neston and Brackenwood (£21,638).

Cannock.—**INCREASE IN CHARGES.**—In our October 25th issue the increase in charges to ordinary consumers was given incorrectly as 3 per cent instead of 5 per cent.

Cardiff.—**EXTENSIONS.**—The Electricity Committee has approved a number of supply extensions, including those to the Renold & Coventry Chain Co., Currans Yard (£1,649), and 206 houses on the Ton-yr-Ywen estate (£2,561). An additional transformer at Roath power station will cost £19,761.

Clitheroe.—**SUPPLY EXTENSION.**—The Electricity Committee is affording a supply of electricity to Holden Clough.

Cupar.—**STREET LIGHTING COMPLETED.**—Completion of Cupar's electric street lighting was marked by a dinner on October 24th, when the Metropolitan-Vickers Electrical Co., Ltd., which has carried out the installation in record time, entertained town councillors and county officials.

Darlington.—**HOUSING SUPPLY.**—The Town Council has received sanction to borrow £1,416 for the supply of electricity to a temporary housing site in Lansdowne Road.

Ealing.—**LOANS.**—Sanction has been obtained by the Electricity Committee to borrow £9,800 for mains, £27,300 for substation equipment and £3,000 for transformer modifications.

Falkirk.—**ASH-HANDLING PLANT.**—Tenders are to be obtained for the installation of a new ash-handling plant at the electricity works at an estimated cost of £4,562.

Hastings.—**SUPPLY SCHEMES.**—The Electricity Committee has approved schemes for extensions and developments costing £70,913.

Leicester.—**STREET LIGHTING CONVERSION.**—The City Council has approved a recommendation of the Public Lighting Sub-Committee that the street lighting over an area within half a mile of the city centre shall be converted from gas to electricity. The chairman of the sub-committee stated that the estimated cost was £16,450 and an annual saving of £700 would be effected. The Council also approved a scheme costing £1,565 for electric lighting in Glenfield Road.

LIGHTING OF PUBLIC CLOCKS.—A special sub-committee has been set up to consider the lighting and synchronizing of the city's public clocks.

London.—**J.E.A. EXTENSIONS.**—Mains extensions and services, estimated to cost £69,433, are being carried out by the London and Home Counties J.E.A.

LOANS SANCTIONED.—Loans sanctioned recently include £15,000 for cookers, £10,000 for consumers' electrical apparatus, £50,000 for mains and services, £30,000 for substations and equipment and £10,000 for meters.

Mansfield.—**COLLIERY SUPPLY.**—The Corporation Electricity Committee has obtained sanction to borrow £20,400 for supplying the Mansfield colliery.

Rotherham.—**NEW FEEDER.**—At a cost of £14,000 the Electricity Committee is to provide an additional feeder to Wincobank.

Scarborough.—**LOANS SANCTIONED.**—Sanction has been received to borrow £11,448 for mains and services, £2,000 for meters and £4,765 for substations and equipment.

Southwark.—**DEFICIT.**—The Electricity Committee reports a net deficit of £14,378 for the year.

Stoke Newington.—**PURCHASE OF COOKERS.**—Having considered particulars of the latest models of cookers the Electricity Committee has placed an order for 300 offered by the General Electric Co., Ltd., at £19 6s. 4d. each. This type is equipped with automatic control, two hot-plates and a grill.

LOSS ON YEAR'S WORKING.—A net loss of £3,881 for the year ended March 31st last is reported by the Electricity Committee.

Swindon.—**ALLOCATION OF SURPLUS.**—There was a surplus of £26,615 on the past year's working of the electricity undertaking and the accumulated surplus now amounts to £36,760. The Town Council has decided to transfer £1,000 to the reserve fund, £13,150 to the general rate fund, and carry the remainder forward.

Wallasey.—**RIPPLE CONTROL.**—The Electricity Committee has obtained sanction to borrow £12,225 for ripple control equipment.

Walsall.—**YEAR'S SURPLUS.**—The Electricity Committee reports a net profit for the year of £15,553, of which £4,534 has been contributed to rate relief.

Winchester.—**LOWER CHARGES.**—Recommended reductions in the lighting and heating flat rates and the "all in" domestic and business tariffs will in effect restore the charges to those operating before the increases made in April, 1940.

Yorkshire.—**REDUCED CHARGES.**—The Yorkshire Electric Power Co. has announced its decision to reduce charges for electricity supplied under agreements including a coal clause. The reduction will be effective from January 1st this year and consumers affected will be notified by the company, as soon as possible, of all necessary details.

Overseas

China.—**CONDITION OF POWER STATIONS.**—The Compagnie Française de Tramways et d'Éclairage Électriques de Shanghai reports that, although its plant and installations suffered no damage during the war, the Japanese carried off a large quantity of material from the power station. It has, however, been found possible to continue operations, although this is proving very difficult owing to the depreciation of the value of Chinese money and the confused political situation ruling in Shanghai. The Compagnie de Tramways et d'Éclairage de Tientsin reports that its plant and installations were seized during the war by the Japanese, who dismissed the whole of the European staff. The property was handed back to the Chinese authorities in November of last year but so far the owning company, owing to the unacceptable conditions laid down by the Chinese, has not been able to regain possession of its property nor to issue any accounts since the end of 1939.

Cyprus.—**TEN-YEAR PLAN.**—The Cyprus Government has published a ten-year £6,000,000 development plan, including an island-wide electrification scheme which may cost £3,350,000.

—*Reuter.*

Eire.—**COMPLETION OF POLLAPHUCA STATION.**—It is expected that the Liffey hydro-electric station at Pollaphuca will be in full commission at Christmas, the second 15,000-kW generator being now at the test stage. With both generators in operation, together with the station at Golden Falls, there will be from 40 to 45 million kWh annually at the disposal of the Electricity Supply Board. Work continues on the erection of the 4,000-kW plant at Leixlip, but this will not be ready for operation before 1948.

Italy.—**HYDRO-ELECTRIC SCHEMES.**—Plans for the construction of a hydro-electric plant using the waters of the higher reaches of the Rienta

River have been drawn up on instructions from the Italian state-owned railways. The plant would provide energy for the electrification of the Turin-Venice and Bologna-Padua railway lines. Plans have also been prepared for another hydro-electric plant in the valley of the Limenta river in the Bolognese Apennines to provide energy both for the railways and for agriculture.—*Reuter.*

Norway.—**LARGE NEW POWER STATION.**—The Nore II power station, the building of which started before the war is starting normal production after trial operations. The plant has a capacity of 225,000 kW and is therefore one of the biggest in Europe.—*Reuter.*

TRANSPORT

Brighton.—**ADDITIONAL TROLLEY-BUS SERVICES.**—The Corporation Transport Committee is seeking powers for the provision of more trolley-bus services.

Bury.—**BUSES TO REPLACE TRAMS.**—At a meeting of the Town Council it was stated that if trolley-buses replaced the trams on the Walmersley-Tottington route, a re-alignment of the overhead equipment would be involved. To renew the overhead equipment would cost something like £41,000 and the trolley-buses required would cost approximately £80,000. The Transport Committee has decided to replace the trams with oil-engine buses which, it was stated, could be operated at 0.67d. a mile cheaper than trolley-buses.

Cardiff.—**TROLLEY-BUSES.**—The Corporation has obtained powers to provide trolley-bus services along a route commencing in Queen Street.

Glasgow.—**NEW GENERATING PLANT.**—The Corporation Transport Committee has decided to renew its application to the Electricity Commissioners for sanction to the installation at Pinkston power station of a new 25,000-kW turbo-alternator.

North-East Coast.—**RAILWAY ELECTRIFICATION PLANS.**—The L.N.E.R. Co. has given an undertaking to Sunderland Corporation to electrify the Sunderland-Newcastle and the Sunderland-South Shields lines as soon as circumstances permit.

RADIO and TELEPHONY

London.—**OVERHEAD WIRES.**—The General Purposes Committee of the Poplar Borough Council reports on the increasing number of overhead wires which are being erected in the borough in connection with the operation of radio relay services, the practice reaching proportions not envisaged at the time of the passing of the Overground Wires Act, 1933. It expresses the view that legislation is needed to enable local authorities to exercise a greater measure of control in connection with such installations. The matter has been referred to the Metropolitan Boroughs Standing Committee.

Local Exhibitions

Recent Electrical Displays

AN exhibition was held recently in Spennborough at which a wide range of domestic electrical apparatus was shown to the public. The E.L.M.A. stand demonstrating the main features of good lighting occupied a prominent place, as did the mechanical unit lent by Dorman & Smith which demonstrated the making and breaking of the switch controlling

Covering all aspects of municipal activity an exhibition was held at Aberdeen recently, under the auspices of the National Association of Local

Section of the Spennborough electrical exhibition

the new universal socket outlet. In support of the exhibition a film show was given, the programme including the E.D.A. film, "Their Invisible Inheritance." At a pre-view of the exhibition (which was attended by architects, electrical and building contractors, and members and officials of the Spennborough Council, Councillor G. T. Ellison, chairman of the Electricity Committee, spoke on the work of the Department. He was



Government Officers, and attracted considerable interest, being visited by over 32,000 people. The Aberdeen Corporation Electricity Department occupied stands which depicted the generation, distribution and utilization of electricity. The generation and distribution stand, shown in the accompanying picture, had models of steam-raising equipment and a turbo-alternator, together with distribution equipment including



Part of the electrical display at the Aberdeen exhibition

supported by the chairman of the Council, Councillor L. Mallard, J.P. The exhibition was organized by Mr. N. Ashton, engineer and manager, and members of his staff.

a 6-kV ring main isolator and a feeder pillar. The utilization stand, besides exhibiting the latest domestic appliances, had additional attractions in a variable speed, belt-coupled motor-generator, with a drum-type controller operated by younger members of the public. A photographic record of the history of the Aberdeen undertaking was also shown. Mr. L. B.

Perkins, consumers' engineer, was responsible for the arrangement of the stands, under the direction of the city electrical engineer, Mr. A. Gardner.

To publicize the personal aspect of the Luton Corporation Electricity Department's service as

Before the carnival a competition for all housewives in the area was organized in which they were invited to send in their favourite recipes. These were judged by the members of a "Brains Trust" and the winners received their prizes from the Mayoress after the Cookery

"Brains Trust." The first prize was an electric iron presented by the Electricity Department and other prizes were presented by the E.A.W. A selection of recipes was printed and sold



The Mayor and Mayoress with the chairman of the Electricity Committee, at the "Electricity in the Home" exhibition at Luton

a means of assisting the tenants of temporary and permanent houses to get the best value from expenditure on electricity, an "Electricity in the Home" exhibition has just been held. The charts shown in the accompanying illustration indicate the past ten years' growth in the use of motor cars and electric cookers, both of which are produced at Luton.

Devon Farming Exhibition

There was a large attendance at a four-day exhibition, "Electricity on the Farm," which concluded at the Drill Hall, Bideford, North Devon, on October 19th. It had been organized by the Bideford and District Electricity Supply Co., and drew visitors from all over North Devon's agricultural area, as well as from the market towns of Barnstaple, South Molton and Torrington. Interest was aroused by an electric corn mill and the latest types of sterilizing apparatus, and an official of the company told a press representative during the exhibition that farmers were showing particularly keen interest in the application of electric motors to farm tools. Cookery demonstrations were held and agricultural films shown. A short account of the exhibition was broadcast in the Western programme on October 15th by Mr. A. Porter, of the Devon County branch of the National Farmers' Union.

Tunbridge Wells Cookery Carnival

A cookery carnival organized by the Tunbridge Wells Branch of the Electrical Association for Women was held in the Corporation electricity showroom on October 29th and 30th.

during the carnival. The electricity showroom was thronged during all the demonstrations and the Council Chamber was packed with an appreciative audience of women during the

Cookery "Brains Trust." The demonstrations were given by Miss Weedon, of the Jackson Electric Stove Co., Miss Leader of the G.E.C. and Mrs. Clare and Miss Scripps of Alfred Bird & Sons.

Southampton Jubilee Staff Celebration Dinner

IN connection with the jubilee of the Southampton Corporation electricity undertaking (reference to which was made in our issue of May 3rd last) a celebration dinner was held at the Guildhall, Southampton, on October 28th at which the staff and employees together with their wives and retired employees attended. Mr. W. G. Turner, borough electrical engineer, presided.

In proposing the toast of the staff and employees, Councillor R. J. Stranger, the Mayor, said that sales were now 140 million kWh per annum; there were nearly 60,000 consumers in an area of 44 sq. miles. He paid a tribute to Mr. Turner for his efficient management of the undertaking, and to the technical staff, especially for their service during the bad periods of the war.

Mr. Turner, responding, said that the staff had carried out their duties with ability. Without their loyal co-operation the development, operation and efficiency of the undertaking could not have been achieved. Mr. W. Deacon (vice-chairman, Works Whitley Committee) proposed the toast of the Electricity Committee and guests and Ald. G. B. Bascomb (chairman of the Electricity Committee) responded.

Concrete Poles

Demonstration Tests at Makers' Works in Lincolnshire

THE world shortage of timber which is expected to persist for some years, and the scarcity of wood poles in Britain and Eire have combined to revive interest in the employment of ferro-concrete posts for supporting overhead power lines.

Reinforced-concrete poles have been in use for that purpose in this country for some sixteen years. Lighter types of dependable consistency may become practicable by reason of the line-constructional experience of Dowsett Engineering Construction, Ltd., in association with modern manufacturing facilities now provided at the Tallington factory of Dow-Mac (Products), Ltd., near Stamford in Lincolnshire, where demonstration pole tests were witnessed last week by representatives of the Electricity Commissioners, the Electricity Supply Boards of Northern Ireland and Eire, consulting engineers, power companies, cable makers and the G.P.O.

The factory, which reached full production in 1943-44 and has this year been almost

doubled in area, is manufacturing a variety of concrete products on the conveyor-line system by mould-casting as well as pre-stressing methods with the aid of machinery that mixes the aggregate in a manner which

minimizes the water-to-cement ratio while the casting moulds themselves are electrically vibrated to ensure intimate bonding of the concrete with its steel reinforcing members. Both gravel and cement are obtainable in bulk locally.

The overhead-line poles are formed to the design of Mr. G. I. Faulkner Nuttall (consultant) as formerly made by Ferro Concrete and Electrical Construction, Ltd.

They are rectangular in shape and completely cored through the upper section, thus presenting an appearance similar to lattice steel poles, the slanting members being particularly valuable during transit. The cored sections reduce weight and permit the insertion of crowbars for turning the poles over when moving them; they also serve as steps for climbing during line erection. Core holes are provided for bolting fittings to the pole-top and, if desired, a stranded copper earthing conductor is cast longitudinally into the pole, so obviating the risk of breakage to which an exposed wire is subject.

The specimen poles tested last week, seventeen days after casting, were constructed to comply with B.S. 607/1946 requirements. They were 28 ft long, mounted horizontally, and secured 5 ft from the butt; designed for a minimum ultimate transverse load of 1,250 lb, representing a working load factor of two (625 lb) 2 ft from the top of the pole.

Some specimens were tested on their major axes and others on the minor, the stress being applied transversely, as illustrated, in stepped increases up to 100 per cent working load, then maintained for two minutes before being further increased to the proof stress, representing 120 per cent of the working load,



Deflection of pole top under transverse test stress



Paint marks indicating even spacing of hair cracks

which caused hardly measurable permanent set. The second illustration indicates the regularity of hair-crack spacing in the lower section of the pole. Subsequent stressing beyond 200 per cent of the ultimate designed working load finally caused failure at 1,610 lb, a 3.5-in. permanent set resulting from the 20-in. deflection of the top of the pole.

Forthcoming Events

Monday, November 11th.—CARDIFF.—At the South Wales Institute of Engineers, Park Place, 5 p.m. I.E.E. Western Centre. "Power Supplies to Generating Station Auxiliary Services," by S. Szwander.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Engineering Principles Applied to the Design of Domestic Water-Heating Installations of the Solid-Fuel/Electric Type," by R. Grierson and Forbes Jackson.

BRADFORD.—Technical College, 7.15 p.m. Bradford Engineering Society. Charnock Night. "Engineering in Physics," by H. G. Howell.

MANCHESTER.—At 16, St. Mary's Parsonage, 7 p.m. Junior Institution of Engineers, North-Western Section. "Modern Factory Lighting," by J. W. Howell.

Tuesday, November 12th.—MANCHESTER.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Centre Measurements Group. "A Precision A.C./D.C. Comparator for Power and Voltage Measurements," by G. F. Shotton and H. D. Hawkes.

LEEDS.—Corporation Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre. "Electrical Control of Dangerous Machinery and Processes," by W. Fordham Cooper.

GLASGOW.—Royal Technical College, 6.15 p.m. I.E.E. Scottish Centre. Paper by R. Grierson and Forbes Jackson (see above.)

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. "Economic Telephone Exchange Area Planning," by H. T. A. Sharpe.

Wednesday, November 13th.—LONDON.—Institution of Electrical Engineers, 5.30 p.m. Transmission Section. "The Development of the Gas-Cushion Cable System for the Highest Voltages," by T. R. P. Harrison.

WOLVERHAMPTON.—Victoria Hotel, 7 p.m. Electrical Power Engineers' Association. Midland Technical Group. "Maximum Demand Control," by A. H. Gray.

BIRMINGHAM.—James Watt Memorial Institute. 6.45 p.m. I.E.E. South Midlands Students' Section. "Lightning Protection of High-Voltage Systems," by J. Mitchell.

Thursday, November 14th.—LONDON.—Institution of Electrical Engineers, 5.30 p.m.

Installations Section. "Electrical Control of Dangerous Machinery and Processes," by W. Fordham Cooper.

SWANSEA.—I.E.E. West Wales (Swansea) Sub-Centre. Address by R. W. Biles, chairman of Western Centre.

SOUTHAMPTON.—Polygon Hotel, 6.30 p.m. Institution of Rubber Industry, Southern Section. Discussion on Electrical Test Methods of B.S. 903.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. Women's Engineering Society, Manchester Branch. "Textile Engineering," by J. S. Taylor.

BIRMINGHAM.—Imperial Hotel, 6.30 p.m. Institution of Heating and Ventilating Engineers, Birmingham and District Branch. "Industrial Ventilation Research," by R. Poole.

Friday, November 15th.—LONDON.—Junior Institution of Engineers, 6.30 p.m. Annual general meeting.

Caxton Hall, Westminster, S.W.1, Diesel Engine Users' Association. Informal discussion on "Operating Problems."

St. Stephen's Tavern, Bridge Street, Westminster, S.W.1, 6.30 p.m. E.P.E.A. Meter Engineers' Group (Southern Division). "Some Notes on Meter Errors," by G. F. Tagg.

NEWCASTLE-ON-TYNE.—King's College, 6.30 p.m. I.E.E. North-Eastern Students' Section. "High-Frequency Carrier Telephony," by Mr. Moon.

Saturday, November 16th.—I.E.E. Tees-side Sub-Centre, 3 p.m. Visit to Darlington power station.

LONDON.—I.E.E. London Students' Section, 3 p.m. Visit to Willesden power station of the Northmet Power Co.

Monday, November 18th.—LONDON.—Institution of Electrical Engineers, London Students' Section, 7 p.m. The Students' Lecture. "The Trend of Modern Telecommunication," by A. H. Mumford.

BIRMINGHAM.—Grand Hotel. Birmingham Electric Club. "The German Electric Supply System, 1933-1946," by G. R. Peterson.

Tuesday, November 19th.—LONDON.—Magnet House, Kingsway, W.C.2, 6.15 p.m. Association of Supervising Electrical Engineers. "Notes on Present-day Cable Practice," by J. R. Harding. (Joint meeting with the Institution of Engineers-in-Charge.)

Nautical Instrument Makers

THE twenty-eighth annual general meeting of the British Nautical Instrument Trade Association was held at York on October 31st. A presentation was made to Mr. Albert Cater, who had completed three-and-a-half years' service as president.

The president and vice-president for 1946-47 are Mr. Francis Hughes (Marine Instruments, Ltd.) and Mr. Leslie Harris (Lilley & Reynolds, Ltd.).

Circuit-Breaker Operation

Air-blast and Resistance Switching

TWO papers were submitted at this week's meeting in London of the Institution of Electrical Engineers. The first of them was concerned with arc extinction in air-blast circuit-breakers, which has been the subject of research by A. Reyrolle & Co., Ltd., for the past eighteen years. The authors, MESSRS. A. ALLAN and D. F. AMER, have shown that nitrogen is equivalent in properties to compressed air. Some investigators consider carbon dioxide to be slightly better than air, but it is extremely difficult to control owing to freezing at valves and in restricted passages.

Other investigators have indicated that hydrogen will increase the breaking capacity, but its cost and that of the ancillary apparatus are a serious objection. Breaking capacity should also be increased by the use of "Freon" because of its great electric strength, but it is expensive and is decomposed by the arc into acid-forming elements.

Air Turbulator

The greater part of the research which this paper represents concerns the aerodynamic design of circuit breakers; its authors describe the development of an "air turbulator" and its application to 66- and 132-kV breakers. This device, which includes means of controlling the arc length, comprises three basic components: a metal arcing chamber with a nozzle and an arcing electrode, constituting the upper terminal; a fixed arcing electrode near the orifice of the nozzle, constituting the lower terminal; and a laterally movable bridging contact.

All are supported by an insulating tube through which the blast of air passes. The bridging contact is attached to a piston, which moves to the open position on admission of compressed air to the arcing chamber and thus draws an arc between the central (fixed) electrode and the moving contact piece. Initiation of the lateral arc in the "turbulator" causes a pressure disturbance in the flow of compressed air, thus transferring the hot gas (arc) in 1/400 second to a central position along the axis of the nozzles, so that it offers the maximum drag to the air flow.

The performance, which is definitely predictable, is greatly affected by the aero-

dynamic conditions at the nozzle and the minimum insulation level of the contacts must be carefully determined.

The authors do not consider that resistance switching necessarily renders the breaker independent of circuit severity. Multi-breaks greatly enhance performance; the best number to use is determined for any given duty by practical and economic considerations. It is possible to substantially ensure equal pressure distribution on multi-breaks, which justifies part testing.

Resistance Switching

In parallel with the development of small-oil-volume and air-blast types, continuous progress has been made in England and the United States with the dead-tank oil circuit breaker. The authors of the second paper, MESSRS. H. E. COX and T. W. WILCOX (B.T.H. Co.), claim that improvement of arc control pots has so reduced the fire hazard that it is now no greater than the risk to which wooden houses or warehouses full of textiles are liable. Both arc duration and total break time have also been reduced and compressed air mechanism for switch actuation is declared to have now made the oil breaker a match for the air-blast type in respect of speed of operation and instantaneous automatic reclosing cycles.

Cost considerations are claimed overwhelmingly to favour the dead-tank oil breaker when assessed, not alone, but complete with all its associated equipment. This claim is based on the fact that primary insulation for both the current transformers and capacitance voltage dividers already exists in the oil-breaker terminal bushings, whereas it has to be provided separately for the small-oil-volume and air-blast types.

Side-vented Explosion Pots

The paper reviews the improvement of performance of side-vented explosion pots when they are shunted by resistors and subsequently explains how the latter can also be utilized to even the voltage distribution over several pots in series. A description is included of the incorporation of such resistors in a 132-kV switch rated at 2,500 MVA.

The effect of the resistors when breaking small currents in inductive and capacitive

circuits is discussed in detail. This is followed by a commentary on the validity of testing separately one pole of a three-phase separate-tank breaker, having two breaks per pole, by applying the full three-phase output of the test plant. The third terminal is obtained by bringing out through the tank wall a connection from the moving crossbar. Actual performances are illustrated with test results (Switchgear Testing Co.) from one pole of a three-phase, 132-kV, 2,500-MVA breaker, thus rendering it possible greatly to extend the proving capacity of testing plant.

The conclusions are that resistance switching improves the operation of the explosion pot at critical current values, when arc length and duration are greatest and therefore constitute a design limit. It is claimed to enable complete control to be exercised over the distribution of the restriking transient voltage on individual pots of a series. It reduces switching over-voltages, whether caused by rupturing capacitive or small inductive currents and also reduces switching surges on transformers and other inductive apparatus.

Fluorescent Tram Lighting

Experiments at Sheffield

WHAT is claimed to be the first use in this country of fluorescent lighting on a tram-car was made during the Sheffield Corporation Transport Jubilee. These tests in service are intended to assess the relative merits of the lamps on a.c. and d.c. circuits. The former are supplied at 110-V and 500 cycles per sec from a motor-driven inductor alternator, while the d.c. lamps are fed from the 600-V traction system.

The motor generator is mounted on rubber supports and suspended from the car underframe. On the a.c. circuit eleven fluorescent lamps are fed in parallel and, for starting, individual straight resonance is employed. Nine of these lamps illuminate the major part of the upper deck and the remaining two lamps the destination indicator at one end of the car. A rotary switch on the platform bulkhead controls the d.c. motor driving the generator. The motor-man's dashlight at each end of the car is an incandescent lamp supplied from the a.c. circuit.

The d.c. lighting is in three separate circuits of six, five and four fluorescent lamps, which are stabilized by two, three and two incandescent lamps, respectively, with a resistance in the last case. The lamps are started by chokes and thermal switches. Eight lamps illuminate the saloon, two the destination indicator at the other end of the car, two the platform, and three complete the lighting of the upper deck. In order to avoid the "dark-end" effect which is liable to occur on continuous running with the current in one direction, a rotary switch on the platform reverses the polarity of the supply every time the lights are switched on. The seven stabilizing lamps (of the series-burning type) are applied to the signal lights and air brake gauges.

The lamp fittings for the upper deck and platform are of the surface-mounting type and accommodate the control auxiliaries; in the saloon they are fully recessed. One fitting in the saloon on each side of the car is fitted with a white opal "Perspex" reflector to illuminate the side destination indicators. The fluorescent tube lamps throughout the installation are the Metrovick experimental 20-W warm-white, bi-pin



Sheffield tramcar with fluorescent lighting

pattern, 2 ft. in length by $1\frac{1}{2}$ in. in diameter.

Comments of the travelling public have been most favourable. The level of illumination is approximately 10 lumens per sq ft, with a high degree of uniformity and freedom from glare. Acknowledgments are due to Mr. R. C. Moore (general manager, Sheffield Corporation Transport Department) for permission to reproduce the accompanying photograph, and to Mr. S. W. A. Sturman, A.M.I.E.E., the rolling-stock engineer. The equipment was supplied by the Metropolitan-Vickers Electrical Co., which worked out the scheme in collaboration with the Corporation engineers.

Commercial Vehicle Hire

Responsibility for Repairs

By F. E. Sugden, A.C.I.S., Barrister-at-Law

OWING to the high cost of vehicles and their uncertainty of performance many electrical contractors prefer to hire or hire-purchase vehicles from large motor concerns. Many vehicles now actually have the hirer's name prominently displayed, the owner's name being very inconspicuous. This practice has given rise to many knotty points, particularly where the van comes to grief, not through a collision on the road but owing to some mechanical defect which in many instances could not be foreseen. Defects have to be remedied in due course and the work has to be paid for.

Recent Court Case

Recently an important case arose bearing on the situation; briefly the facts are these: In accordance with a hire-purchase agreement dated August 1st, 1945, the respondent in the case let on hire a motor vehicle to a trader on the terms, *inter alia*, that the trader was to keep the vehicle in good order, repair and condition at his own expense. Incidentally it was understood that the trader was not to have any authority to pledge the credit of owner of the vehicle for repair purposes or to create a lien, that is a legal claim, in respect of such repairs.

On December 12th, 1945, the trader being at that time in arrears in his payments to the owner of the vehicle, the owner decided to terminate the agreement by letter dated December 19th, 1945, and issued a writ against the trader for the arrears, at the same time claiming the return of the vehicle. On December 27th, 1945, the trader, who had disregarded the notice, met with an accident and left the car at the appellants' garage for repair. That is to say, at a third party's garage.

Third Party Action

On January 30th, 1946, judgment was obtained against the trader by the respondent, who obtained leave to obtain recovery, and on March 1st, the sheriff levied execution at the appellants' garage in respect of that judgment, to recover the hired vehicle. The appellants, the people who had executed the repairs, claimed an artificer's lien for the amount of the repairs and the sheriff commenced a third party procedure action and

issued what is termed an "interpleader." The Master of the Court decided eventually that the lien could not be enforced.

The Court of Appeal further held that the authority to the trader had been duly determined under the terms of the agreement, and at the time when the trader took the car to the appellants' garage to be repaired, he had no more right to the car than a thief would have. Therefore the appellants who had executed the work, could not establish a lien on the car against the owners, who were no parties to placing it with them for repairs.

The Lord Chief Justice, Lord Goddard, stated in his judgment that an arrangement between the owner and the hirer, that is the trader, that the hirer should not be entitled to create a lien did not affect the repairer. A repairer had a lien although the owner had purported to limit the hirer's authority to create a lien in that way. Once an artificer exercised his art upon goods the law gave him a lien upon those goods which he could exercise against the owner of the goods, if the latter was the person who had placed the goods with him or had authorized another person to place the goods with the artificer.

Effect of Judgment

Briefly this case lays down that the Common Law lien arising on execution of repairs to a car is only enforceable against the owner if the hirer has authority to send the car for repair, and that such authority is normally implied while the hirer is in lawful possession of the car. When the hire-purchase agreement has terminated, however, the possession is against the will of the owner and it is held that a repairer cannot exercise a lien for repairs which the hirer has no longer any authority to have executed.

In my opinion this judgment cuts across the present system of hire-purchase governed by the Hire Purchase Act, 1938, which lays down that the legal ownership of the property does not pass from the vendor to the purchaser or hirer until the final instalment has been paid. Incidentally, the hirer must not part with possession of these goods during the time that the hire-purchase agreement is in operation.

Spain's Electrical Imports

Large Proportion from Switzerland

THE Spanish Government has recently published the returns of the country's foreign trade for 1945. The accompanying statement gives the values of the principal electrical imports, with supplying countries, for that year and the increase or decrease compared with 1944. It will be seen that decreases in the imports of power plant of the smaller sizes were offset by increases in those of the larger sizes.

France, Holland and the United Kingdom showed more activity. The values of imports are given in gold pesetas (45 pesetas equal £1).

According to the British Board of Trade returns, exports of electrical goods and apparatus to Spain (not including machinery, separate figures for which are not given) during the first nine months of the current year have

| Class of Goods and Supplying Countries | 1945 Pesetas (000) | Inc. or dec. on 1944 Pesetas (000) | Class of Goods and Supplying Countries | 1945 Pesetas (000) | Inc. or dec. on 1944 Pesetas (000) | | |
|--|--------------------|------------------------------------|---|--|------------------------------------|-----|-------|
| <i>Dynamos, motors, fans, alternators, transformers, starters, rheostats and parts up to 5 kg—</i> | | | <i>Electrical meters, voltmeters, ammeters and electro-medical apparatus—</i> | 2,301 | + | 279 | |
| From Germany | 349 | — | 318 | From Germany | 21 | — | 518 |
| From Switzerland | 62 | — | 299 | From Switzerland | 1,476 | + | 863 |
| From Great Britain | 123 | — | 28 | From Sweden | 515 | — | 291 |
| From United States | 99 | + | 86 | <i>Switchboards—</i> | 644 | + | 248 |
| Ditto, from 5 to 25 kg— | 24 | + | 24 | From Switzerland | 542 | — | 270 |
| From Germany | 569 | — | 409 | From United States | 62 | + | 61 |
| From Switzerland | 45 | — | 188 | <i>Heaters, cookers, hot-plates, etc.—</i> | 63 | — | 72 |
| From Sweden | 333 | + | 14 | From Switzerland | 14 | — | 38 |
| From United States | 90 | — | 27 | From France | 49 | — | 49 |
| Ditto, from 25 to 100 kg— | 34 | + | 2 | <i>Lamps, complete—</i> | 113 | — | 185 |
| From Germany | 861 | — | 356 | From United States | 69 | + | 42 |
| From Switzerland | 60 | — | 428 | From Great Britain | 5 | — | 1 |
| From Great Britain | 542 | — | 66 | From Holland | 31 | + | 28 |
| From United States | 34 | + | 22 | <i>Mercury-vapour lamps—</i> | 84 | — | 119 |
| From Sweden | 11 | — | 9 | From Germany | 6 | — | 94 |
| Ditto, from 100 to 500 kg— | 74 | + | 47 | From United States | 50 | + | 47 |
| From Germany | 1,567 | — | 159 | From Holland | 10 | + | 10 |
| From Switzerland | 107 | — | 453 | <i>Cables over 1 cm diam.—</i> | 127 | — | 159 |
| From Great Britain | 1,207 | + | 95 | From Germany | 1 | — | 125 |
| From United States | 15 | — | 70 | From Great Britain | 102 | — | 56 |
| From Sweden | 79 | + | 26 | <i>Cables not exceeding 1 cm diam.—</i> | 216 | + | 185 |
| Ditto, from 500 to 1,000 kg— | 825 | + | 168 | From France | 210 | + | 210 |
| From Switzerland | 671 | + | 373 | <i>Insulated wire less than 0.5 mm—</i> | 52 | + | 11 |
| From Sweden | 93 | + | 26 | From Great Britain | 20 | + | 20 |
| Ditto, from 1,000 to 3,000 kg— | 1,206 | + | 446 | From United States | 20 | + | 12 |
| From Switzerland | 1,101 | + | 509 | From Sweden | 3 | — | 3 |
| From Sweden | 62 | + | 12 | <i>Telegraph and telephone apparatus</i> | 2,832 | + | 255 |
| From United States | 41 | + | 41 | From Germany | 113 | — | 1,808 |
| Ditto, from 3,000 to 5,000 kg— | 668 | — | 299 | From United States | 40 | — | 16 |
| From Great Britain | 147 | — | 147 | From Great Britain | 1,226 | + | 1,223 |
| From Switzerland | 434 | — | 491 | From Sweden | 93 | — | 112 |
| From United States | 74 | + | 74 | From Switzerland | 492 | + | 370 |
| Ditto over 5,000 kg— | 8,042 | + | 4,428 | <i>Radio valves—</i> | 566 | — | 473 |
| From Switzerland | 7,663 | + | 6,348 | From Germany | 248 | — | 406 |
| From Sweden | 247 | — | 548 | From United States | 44 | + | 22 |
| <i>Generating sets and rotary converters up to 1,000 kg—</i> | 204 | — | 520 | From Great Britain | 186 | + | 185 |
| From Germany | 8 | — | 379 | <i>Switches, circuit-breakers, lamp-holders, etc., up to 1 kg—</i> | 100 | — | 170 |
| From Switzerland | 190 | + | 113 | From Germany | 3 | — | 178 |
| Ditto, from 1,000 to 5,000 kg— | 87 | — | 24 | From United States | 10 | + | 3 |
| From Sweden | 28 | + | 6 | From Switzerland | 81 | + | 25 |
| From Switzerland | 31 | — | 58 | <i>Ditto, 1-100 kg—</i> | 1,036 | + | 170 |
| Ditto over 5,000 kg— | 1,904 | + | 1,604 | From Germany | 42 | — | 344 |
| From Switzerland | 1,848 | + | 1,548 | From Sweden | 754 | + | 406 |
| <i>Dry batteries and parts—</i> | 2 | — | 133 | From Sweden | 162 | + | 87 |
| <i>Accumulators—</i> | 38 | — | 66 | Ditto 100 kg and over— | 1,633 | + | 487 |
| From Sweden | 11 | — | 64 | From Switzerland | 1,519 | + | 844 |
| From United States | 24 | + | 18 | | | | |

Business in telegraph and telephone apparatus (which group includes radio receivers) also was bigger, although there was a decline in radio valves.

Germany's share of the Spanish market was dwindling, but that of Switzerland expanded

amounted in value to £506,365 (22,786,425 pesetas). This was over five times the value in the corresponding period of last year—£91,795 (4,130,775 pesetas). The comparative figure for 1938 (three-quarters of the year's total) was £34,272 (1,542,240 pesetas).

CONTROL

OF IMPORTANCE TO YOU

In order that we may give you the best service under the present difficult conditions we appeal to you to utilise standard equipment; avoid "frills" whenever possible.

Your co-operation in this respect will enable us to concentrate on standard production with consequent reduction in despatch time.

USE "STANDARD"



AIR BREAK
STAR-DELTA STARTER

VERITYS LTD., Sales
Headquarters:

Works: **ASTON, BIRMINGHAM 6**

BRETENHAM HOUSE
LANCASTER PLACE, W.C.2

MARTINDALE

Super Blowers

THREE MODELS:

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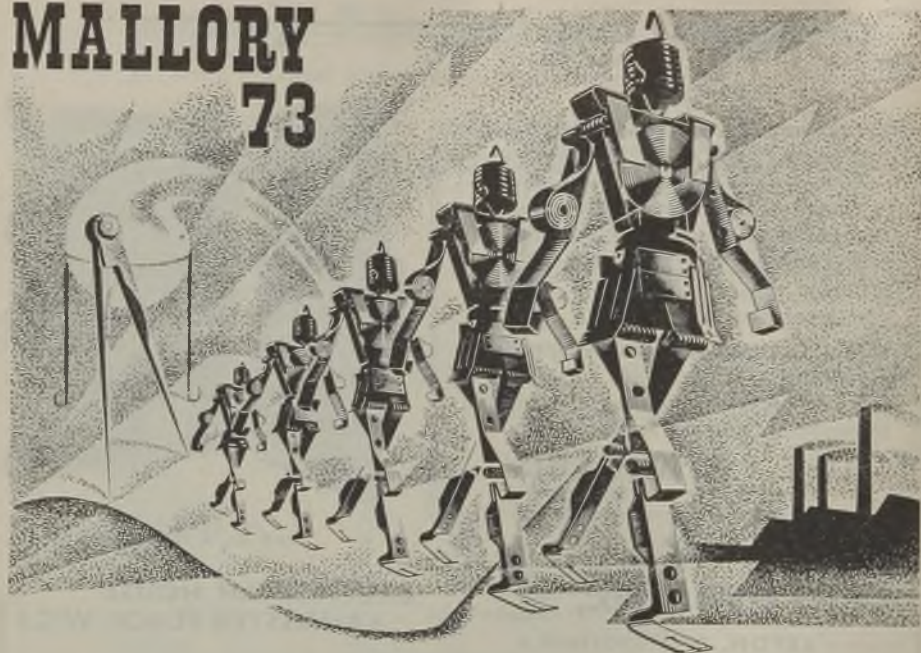
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FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Peto Scott Electrical Instruments, Ltd.—Mr. Campbell Jones, the chairman, stated at the annual meeting last week that during the year an opportunity occurred to take up modern factory accommodation at Weybridge. They had to equip and organize these new works at the same time as the transition was taking place from war to peace production, and in view of these factors the trading profit for the year of £41,310 compared with the record profit of £62,400 earned in the previous year could not be considered unsatisfactory. The directors felt that the benefits of the up-to-date production unit at Weybridge would be felt in due course.

Johnson & Phillips, Ltd.—The directors have resolved to increase the issued share capital of the company by the issue of 200,000 further ordinary shares of £1 each at a premium of £2 5s. per share. These shares will rank *pari passu* with the existing issued ordinary shares. Shareholders registered on October 19th are to have the right to an allotment of these additional shares in the proportion of one new share for every four shares held. The subscription list will be closed on November 18th. These shares are being issued to finance part of the capital expenditure on land and buildings, and plant and machinery and also to finance the increase in liquid assets, which has arisen during recent years and which hitherto has been financed by the company's bankers.

J. & F. Stone Lighting and Radio, Ltd.—In the course of his speech at the annual meeting held on October 30th Mr. N. W. Wild (chairman) said that they had been able to re-open a number of their branches which were closed during the war. The turnover of the retailing business had increased substantially and returns for the current year continued to show improvement.

Crabtree Electrical Industries, Ltd., reports a net profit of the manufacturing subsidiary of £107,178 for the year ended July 31st as compared with £77,982 for the preceding year. The ordinary distribution for the year is maintained at 17½ per cent by a final dividend of 5 per cent and a bonus of 7½ per cent.

Richard Johnson & Nephew, Ltd., have declared an interim dividend of 3½ per cent. No interim was paid in the previous year, but the final payment was 9 per cent.

The Para Electric Railways & Lighting Co., Ltd., reports a gross revenue for the year to November 30th, 1945, of £218,713 (against £221,856), and there was a net working loss on the year of £24,226 (£17,517). After providing for London expenses, directors' fees, etc., the

debit balance carried forward was increased from £113,110 to £140,561. The board recently requested the Federal authorities to accept responsibility for the continuance of the company's operations by appointing a controller, who took up his duties at the end of October.

Glenfield & Kennedy, Ltd., are paying an unchanged dividend of 5 per cent on the ordinary shares excluding those newly issued.

New Companies

Globe & Simpson (National), Ltd.—Registered October 28th. Capital, £20,000. Manufacturers and repairers of, and dealers in, magnetos, dynamos, starters, batteries, appliances, etc. Directors: J. A. Duffy and E. B. Wake. Regd. office: Pitt Street, Sheffield.

Electrical Installations & Motor Rewinds, Ltd.—Registered October 28th. Capital, £2,000. Electrical engineers and contractors, manufacturers of, and dealers in, dynamos, motors, armatures, etc. Directors: F. P. Abbott and E. Anderson. Regd. office: 52, Rawthorpe Lane, Dalton, Huddersfield.

Duplex & Pearson, Ltd.—Registered October 19th. Capital, £5,000. Manufacturers and repairers, importers and exporters of, and dealers in, dynamos, motors, armatures, magnetos, batteries, etc. Directors: A. J. Hicks, J. Pearson, W. Smith and R. J. Boggis. Regd. office: 63-65, Upper Brook Street, Manchester.

Jack Harvey, Ltd.—Registered October 24th. Capital, £7,000. Manufacturers of, and dealers in, electrical and mechanical apparatus, accessories and components, particularly wireless loudspeakers, sets, etc. J. W. H. Harvey is the first director. Regd. office: 7 and 9, South Street, Havant, Hants.

T. B. R. Electrical, Ltd.—Registered October 23rd. Capital, £500. Electrical, radio and mechanical engineers, etc. Subscribers: R. H. Tuck and J. H. H. Russell, both of 109, Great Russell Street, W.C.1. Secretary: R. H. Tuck.

Park, Gate & Co., Ltd.—Registered October 23rd. Capital, £1,000. Electrical engineers and contractors, etc. Directors: G. W. S. Park (chairman), E. Gate and J. Burrow. Regd. office: 9a, Fisher Street, Carlisle.

Electric Utilities, Ltd.—Registered October 24th. Capital, £1,000. Electrical and mechanical engineers, etc. Directors: F. A. French, A. W. Hemmings, M. S. Neville and F. V. Wiggett. Secretary: T. J. Williams. Regd. office: Bridge House, Christchurch, Hants.

Tower Electric Co. (London), Ltd.—Registered October 23rd. Capital, £100. To acquire the business of a radio and electrical engineer and contractor carried on by P. E. L. Mitchell at

25a and 27, Holland Street, Kensington, W.8.
Directors: P. E. L. Mitchell and W. J. Orpin.
Secretary: W. J. Orpin. Regd. office: 25a,
Holland Street, Kensington, W.8.

H. Millwood, Ltd.—Registered October 25th.
Capital, £500. Electrical engineers and contractors, etc. Directors: H. Millwood and B. Millwood. Regd. office: 5, Churchbury Lane, Enfield, Middlesex.

R. C. W. Ballinger, Ltd.—Registered October 18th. Capital, £1,000. To acquire the business of an electrical engineer and contractor carried on by R. C. W. Ballinger at 33, Liverpool Road, Trading Estate, Slough. Directors: R. C. W. Ballinger and P. W. Ballinger. Regd. office: 33, Liverpool Road, Trading Estate, Slough.

Car Electrical (Finchley), Ltd.—Registered October 7th. Capital, £5,000. Electrical equipment specialists, manufacturers of, and dealers in, batteries, accumulators, magnetos, dynamos, etc. Permanent directors: W. W. Clark, L. J. Stinton and R. A. James. Regd. office: 1003, High Road, Finchley, N.12.

Horwood-Cranston, Ltd.—Registered October 8th. Capital, £3,000. Manufacturers of, and dealers in, radio, television and electrical apparatus, appliances and accessories. Directors: J. W. Horwood and W. M. Cranston. Regd. office: Scienta Works, Harwich, Essex.

Green Electrical & Engineering Co., Ltd.—Registered October 15th. Capital, £2,000. To acquire the business of an electrical engineer carried on by L. C. Miles at Laburnum Farm, Seacroft, Leeds, as the "Green Electrical & Engineering Co." Directors: H. Clarkson and L. C. Miles. Regd. office: 35, Burley Street, Leeds.

Electric Maintenance & Repair Co., Ltd.—Registered October 22nd. Capital, £3,000. To acquire the business of electrical maintenance and repairs now carried on by A. E. Mason at 72, Summer Lane, Birmingham, as Electric Maintenance and Repair Co. Directors: A. E. Mason and W. A. Mason. Regd. office: 72, Summer Lane, Birmingham, 19.

Russell Bros. & Brown, Ltd.—Registered October 16th. Capital, £1,000. Manufacturers of, and dealers in, electrical plant and accessories, wireless and television requisites. Directors: Olive M. Russell, J. E. Russell and J. A. Brown. Regd. office: 4, Ferriby Road, Sheffield, 6.

Robert Lyon, Ltd.—Registered October 18th. Capital, £1,000. Insulation engineers and electrical contractors, etc. Directors: R. Lyon, R. R. Lyon and A. J. Lyon. Regd. office: 40c, Peckham Rye, S.E.15.

Daco Refrigeration, Ltd.—Registered October 15th. Capital, £3,000. Directors: D. A. Cross, A. G. Walker and F. Jones. Regd. office: 137, Lichfield Street, Walsall.

Mossburns, Ltd.—Registered October 15th. Capital, £10,000. Manufacturers, hirers, repairers, importers and exporters of, and dealers in, radio receivers and transmitters,

television sets. Secretary: C. Johnson. Regd. office: Mossburn Buildings, Stamford New Road, Altrincham.

Gray & Barr, Ltd.—Registered October 16th. Capital, £1,000. Manufacturers and repairers of, and dealers in, electrical and mechanical apparatus and accessories and components, wireless sets, etc. Directors: M. S. Barker, Mrs. M. R. Barker and R. M. Barker. Regd. office: 140, Morley Hill, Enfield, Middlesex.

Electric Boiling Plates, Ltd.—Registered October 17th. Capital, £7,000. Electrical and general and mechanical engineers, manufacturers of electrical apparatus, etc. Solicitors: Herbert Smith & Co., 62, London Wall, E.C.2.

Autronic Developments, Ltd.—Registered October 17th. Capital, £1,000. Manufacturers of, and dealers in, electrical and mechanical apparatus, etc. Directors: E. T. Williams, G. N. de T. Pownall and R. J. Elsome-Jones. Regd. office: 63, The Strand, Cheltenham.

Colley & Co., Ltd.—Registered October 18th. Capital, £2,000. Electrical engineers and general electrical installation contractors, etc. Directors: G. MacFarlane and H. W. Blackburn. Secretary: S. C. Brannon. Regd. office: 51, Lambs Conduit Street, W.C.1.

Electric Vehicles (Western), Ltd.—Registered October 15th. Capital, £500. Electric vehicle suppliers and repairers, etc. Permanent directors: Mrs. F. K. J. North and A. North. Regd. office: 5, St. Mary's Road East, Newquay.

Arthur Cozens, Ltd.—Registered October 15th. Capital, £5,000. Electrical engineers and contractors, radio engineers, etc. Directors: Mrs. F. K. Cozens, E. G. Norman and G. H. Ross. Regd. office: Queen's Road, Ascot.

Chevron Electric Co., Ltd.—Registered October 23rd. Capital, £1,800. To acquire the business of a dealer in electrical apparatus carried on by Samuel Best at 5a, Salop Street, Wolverhampton. Directors: S. Best and A. J. Groves. Regd. office: 5a, Salop Street, Wolverhampton.

Beers Bros., Ltd.—Registered October 22nd. Capital, £1,000. Electrical engineers and contractors, etc. Directors: D. B. Fletcher, E. H. Beers and R. J. Corner. Regd. office: Copthall House, Copthall Avenue, E.C.2.

Bankruptcies

K. E. Bader, electrical equipment manufacturer, late of Westmoreland Road, Hendon.—At the London Bankruptcy Court on October 24th an order of discharge was granted subject to a suspension of nine months. The Official Receiver reported that the applicant failed in October, 1940, the liabilities amounting to £3,599. In May, 1946, the trustee paid a dividend of 20s. in the £ to all the creditors with the exception of the bankrupt's wife, who had a substantial claim for money advanced. The bankrupt came to this country in 1932 and attributed his failure to difficulties which arose through his internment during the war.

STOCKS AND SHARES

It is increasingly apparent that the Treasury decision to repay the 3 per cent Local Loans, and to issue at par a new 2½ per cent stock with no compulsory redemption date, is influencing investments over a much wider field than that of the gilt-edged market. In reducing still more the yields on Government stocks, this further advance of the cheap money policy automatically lowers the return which money is prepared to accept from more speculative issues. At the same time, the plethora of funds for investment is augmented by the prospective release next January of some £429 million Local Loans money, some of which at any rate will seek better yields than are afforded by purely safety-first stocks. The search for 3 per cent with good security has aggravated the shortage and raised the prices of sound industrial debentures and other prior charges. On electrical equipment ordinary shares, yields are down in a number of cases to the neighbourhood of 3 to 3½ per cent.

Many Price Gains

Outstanding in the week's long list of improvements in electricity supply shares are the gains of 4s. in British Power & Light, now 37s. 6d., and 3s. 6d. in Lancashire Electrics at 37s. Metropolitan, at 48s. 6d., are also 3s. 6d. to the good. Rises of 2s. or more are shown in City of London at 34s., North Easterns at 36s. 6d., Scottish Power at 45s., and Electrical Distribution of Yorkshire at 51s. Advances of 1s. to 2s. 6d. are common. Electrical equipment shares have again advanced, but at a more staid pace. Associated Electrical Industries have done particularly well with a gain of half-a-crown to 68s. 6d. English Electrics are 1s. better at 61s. 6d., and Lancashire Dynamals are noticeably strong at 5½. Reyrolles, at 74s., show no response to the report of a working agreement with Imperial Chemical Industries for the production of fire-proof cables. The latter company's shares, on the other hand, are higher at 43s. 6d. British Rola at 7s. are 1s. up and an active market. Plessey and Burco are both 1s. 3d. better at 35s. and 30s. respectively.

Electricity Supply Shares

Midland Counties Electric shareholders who decided to take up the new shares recently offered to them at 35s. have been quickly rewarded. Dealing in the new shares began on the 18th of last month at a premium of 9s., which has since expanded to 13s. 6d. In the same period, the old shares have risen from 47s. to 51s., ex rights to the new issue. Having put up a signally successful resistance to the drift of prices during September, electricity supply shares as a whole have remained in the van of the upward reaction. In both phases the chief supporting consideration has been to regard the nationalization factor as well discounted in yields of 4 to 4½ per cent from securities which in normal times, were

valued at practically gilt-edged level. Regarded at the worst, as short-term investments repayable in Government stock within a few years, the shares are attracting the attention of investment that is dissatisfied with gilt-edged yields and is prepared to accept the nationalization uncertainty.

Railways and Traction

Following upon last week's rise in British Electric Traction deferred, the stock has added another 20 points to the price, which now stands at 1265. The 8 per cent preferred is 8 higher at 190. Home rails have returned to popular favour. Southern 5 per cent preference at 124½ is 5½ points to the good. The company anticipates spending about £15 million upon extension of its electrification system. Thomas Tilling shares are better at 57.

Cable & Wireless preference has gained 2, at 121½; the ordinary at 115½ lost 1½ of its last week's rise of 5. International "Tel. & Tel." dipped to 19, in a Wall Street slump, but rallied to 21. Radio shares are steady.

G.E.C.

An advance to 5½ in the price of General Electric ordinary shares reflects in part the increased demand for industrials of the best investment character. It also owes something to the direction of notice to the company's interests in the electricity supply field. These interests are not shown separately in the balance sheet item of close on £3 million, representing investments in subsidiaries. Evidently, however, they are of substance and there is a general impression that they are worth something more than the value at which they stand in the company's books. Recent appreciation in the price of electricity supply shares has awakened interest in the possibility of a useful capital profit to G.E.C. if these subsidiaries were to be bought out at anything like present market value.

Company Results

Crabtree Electrical Industries have distributed 17½ per cent (including 7½ per cent bonus) for each year since the registration of the company in 1936. Preliminary figures accompanying this year's dividend announcement indicate a rise of £29,000 to £107,000 in the net profit, after tax, of the operating subsidiary. The announcement drew attention to the consistently sound investment character of the 10s. shares, which have responded with a rise of about 1s. to 46s. 6d. Allowing for the dividend in the price, the yield works out at £3 17s. 6d. per cent. Murex is another steady dividend payer. Trading profits for 1945-6 fell sharply, but as a result of savings in taxation, the net figure was little changed. At the annual meeting the chairman, as mentioned in last week's *Electrical Review*, indicated that the difficulties which lowered last year's profits are still persistent, but he expressed confidence in the longer prospect. The price of the shares at 4½ is 3s. 9d. down.

NEW PATENTS

Electrical Specifications Recently Published

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

AKT.-GES. Brown, Boveri & Cie.—“Control system for pneumatically operated electric circuit-breakers.” 17320/44. September 11th, 1943. (581544.)

Allmanna Svenska Elektriska Aktiebolaget.—“Means for obtaining a constant current from a slightly variable alternating voltage.” 3974/44. February 1st, 1943. (581487.)

Automatic Telephone & Electric Co., Ltd., C. Gillings and C. E. Beale.—“Telephone or like systems.” 10079. April 21st, 1945. (Addition to 563504.) (581679.)

Birlec, Ltd., and R. J. Lean.—“Electric couplings for use with thermo-couples, thermal fuses and the like.” Cognate applications 17557/44 and 1097/45. September 14th, 1944. (581591.)

A. D. Blumlein and E. L. C. White.—“Pulse generating thermionic valve apparatus.” Cognate applications 10484/40 and 910/41. June 17th, 1940. (581561.)

British Thomson-Houston Co., Ltd.—“Luminescent materials.” 15066/44. August 12th, 1943. (581588.) “Safety systems for tap changing devices.” 9328/43. June 13th, 1942. (581640.) “Mercury dispensing apparatus.” 18799/44. October 2nd, 1943. (581656.)

R. B. Canning.—“Electric cable joint boxes.” 4342. February 21st, 1945. (581552.)

Compania para la Fabricacion de Contadores y Material Industrial Soc. Anon, and P. Viteau.—“Electrical measuring apparatus.” 17694. September 15th, 1944. (581611.)

E. C. Cork and M. Bowman-Manifold.—“Radiation projection systems.” 2509. February 15th, 1943. (581570.)

J. A. Crabtree & Co., Ltd., and R. T. Waite.—“Socket tubes of electric couplings.” 17562. September 14th, 1944. (581608.)

A. G. Crossland.—“Electric light fittings.” 19115. October 5th, 1944. (581664.)

R. J. Dippy.—“Wireless signalling systems.” 18287. December 23rd, 1942. (581602.)

“Wireless systems for navigation.” 18288. December 23rd, 1942. (581603.) “Cathode ray oscillograph devices.” 6602/45. December 23rd, 1942. (Divided out of 581603.) (581638.)

English Electric Co., of Canada, Ltd.—“Transformers.” 14863/44. June 1st, 1944. (581506.)

C. Eveson.—“Cooking utensils particularly for use on electric stoves.” 18974. October 4th, 1944. (581661.)

Finch Telecommunications, Inc.—“Synchronizing and phasing arrangements for electric

facsimile transmission systems.” 3056/44. February 20th, 1943. (581485.)

G. R. Fountain, Ltd., and A. E. C. Snell.—“Loud speaking telephone systems.” 11625. July 12th, 1940. (581562.)

W. T. Henley's Telegraph Works Co., Ltd., H. W. Breeze and H. Hubbard.—“Carriers for electric cartridge fuses.” 15163. August 9th, 1944. (581509.)

W. T. Henley's Telegraph Works Co., Ltd., H. A. Tunstall and H. A. Macdonald.—“Floats more particularly for use with buoyant electric cables.” 11392. September 6th, 1941. (581566.)

Hoover, Ltd.—“Suction cleaners.” 17375/44. September 24th, 1943. (581547.)

Igranic Electric Co., Ltd. (Cutler-Hammer, Inc.).—“Controllers for electric towing winch motors.” 18523. November 8th, 1943. (581641.)

Igranic Electric Co., Ltd., and J. R. Taylor.—“Polyphase electric-motor protective equipment.” 17590. September 14th, 1944. (581609.)

E. G. Johnson.—“Electric heating and cooling systems for horticultural houses and cloches.” 11105. June 9th, 1944. (581498.)

B. F. J. Johnson and Power's & Dean, Ransome's, Ltd.—“Electric welding.” 18270. September 25th, 1944. (581631.)

Linde Air Products Co.—“Electrical control arrangements for flame cutting devices.” 12443/44. July 14th, 1943. (581585.)

Maschinenfabrik Oerlikon.—“Contact device for circuit-breakers of the column insulator type.” 2701/45. February 4th, 1944. (581550.) “Compressed air blast electric switch systems.” 19514/44. November 2nd, 1943. (581669.)

Okonite-Callender Cable Co., Inc.—“Terminating of electric cables.” 3485/45. March 29th, 1944. (581551.)

Pirelli-General Cable Works, Ltd., and H. Barron.—“Manufacture of electrically insulated wires.” 9238. May 15th, 1944. (581492.)

Plessey Co., Ltd.—“Electric contact elements.” 4243/45. February 23rd, 1944. (581597.)

Soc. Anon. pour l'Industrie de l'Aluminium.—“Process for the manufacture of furnaces for the electrolytic production of aluminium.” 18064/44. August 23rd, 1943. (581625.)

T. B. Somerville and Metropolitan-Vickers Electrical Co., Ltd.—“Mechanical constraining means and devices for relatively movable members.” 3458. March 2nd, 1943. (581482.)

Standard Telephones & Cables, Ltd.—“Electric high-frequency coupling circuits.” 19244/44. January 31st, 1944. (581667.)

Standard Telephones & Cables, Ltd., and C. W. Earp.—“Oscillation generators.” 17730. September 15th, 1944. (581613.)

Standard Telephones & Cables, Ltd., and

B. B. Jacobsen.—"Arrangements for determining distance and bearing by electromagnetic waves." 14708. November 14th, 1941. (581568.)

Standard Telephones & Cables, Ltd., and S. G. Tomlin.—"Thermionic devices for use with dielectric wave guides." 11078. August 29th, 1941. (581481.)

Standard Telephones & Cables, Ltd., G. C. Hartley and W. J. Reynolds.—"Electrically operated calculating equipment." 5716. May 2nd, 1941. (581565.)

Svenska Turbinfabriks Aktiebolaget Ljungstrom.—"Elastic fluid turbines." 17969/44. November 15th, 1943. (Addition to 534844.) (581623.)

Walsall Conduits, Ltd., and E. Gough.—"Electric tumbler switches." 9429. April 16th, 1945. (581556.)

C. F. Whitehead and F. N. R. Baker.—"Electromagnetically operated valves." Cognate applications 11012/44 and 363/45. June 8th, 1944. (581645.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Abertillery.—November 21st. Sheet-steel kiosks and equipment, e.h.v. and l.v. underground cables and l.v. service cables in connection with the Council's housing site at Penrhiw, Bryn Ithel, Llanhilleth. (See this issue.)

Birmingham.—November 25th. Electric Supply Department. Domestic electrical apparatus. (See this issue.)

Colwyn Bay.—November 15th. Borough Council. Two electric centrifugal sewage pumps for Rhos-on-Sea pumping station. Borough engineer, Town Hall.

Edinburgh.—November 22nd. Electricity Committee. Meters for twelve months. (November 1st.)

November 28th. Cables for switchgear extensions. (See this issue.)

Epsom and Ewell.—December 16th. Electricity Department. One 500-kVA three-phase transformer and one ten-panel 11,000-V 150-MVA truck type switchboard. (See this issue.)

Glasgow.—November 26th. Public Health Department. Five electric vehicles. (See this issue.)

Great Yarmouth.—November 29th. Electricity Department. Domestic appliances for twelve months. (November 1st.)

Harwich.—December 6th. Borough Council. Six sets of electrically driven sewage pumps.—John Taylor & Sons, Artillery House, Westminster, S.W.1.

Keith (Banffshire).—November 16th. Town Council. Electrical work at houses (14) at South Cuthil. Burgh surveyor, Balloch Road.

Littleborough.—November 25th. Electricity Department. One 350-kVA transformer, e.h.v. and l.v. underground cables and switchgear. (See this issue.)

London.—Metropolitan Water Board. 25-H.P., 200/220-V, 1,450 r.p.m. vertical-spindle (or suitable for adaptation as vertical spindle) motor and starter. (See this issue.)

Manchester.—November 15th. Electricity Committee. One motor-driven air compressor and receiver. (October 25th.)

North Scotland.—Hydro-Electric Board. Supply, delivery and erection of a 132-kV transmission line. (See this issue.)

November 25th. H.v. and l.v. lines, Gairloch distribution scheme. (October 25th.)

Plympton St. Mary.—December 6th. R.D.C. Electricity Department. 6,600/415/240-V, three-phase transformers. (See this issue.)

Stoke-on-Trent.—November 25th. North West Midlands J.E.A. Outdoor type static transformers. (See this issue.)

Wallasey.—November 23rd. Corporation. One 500-A three-phase meter testing set. (See this issue.)

Woolwich.—November 27th. Electricity Department. Electricity meters, transformers, h.v. and m.v. cable for twelve months. (November 1st.)

Orders Placed

Birkenhead.—Electricity Committee. Accepted. Six boiler units and ancillary plant (£2,545,780).—Babcock & Wilcox.

Chester-le-Street.—R.D.C. Accepted. Electrical installations in 80 houses in Plawsworth Road and 80 houses on the Barley Mow site.—B. L. Oliver.

Glasgow.—Transport Committee. Accepted. Cables (annual contract).—Scottish Cables. Copper bonds.—British Insulated Callender's Cables. Materials for new cars: Gear cases.—G.E.C. Switches.—Maley & Taunton. Trolley feeder cable.—Scottish Cables. Asbestos wire.—London Electric Wire Co. & Smiths.

Electricity Committee. Accepted. Four boiler units (revised tender £2,614,000).—Babcock & Wilcox. 50,000-kW turbo-alternator (£311,880).—C. A. Parsons & Co. Completion of buildings for Braehead power station (£190,000) and construction of piles (£111,000).—J. Mowlem & Co., Ltd.

Prescot.—U.D.C. Accepted. Electrical work at 38 houses.—Portus & Rhodes (£1,330).

Contracts in Prospect

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

Aberdeen.—School (£200,000) for Corporation Education Department; city architect.

Aldershot.—Houses (64), Kingsway site (£79,887); C. K. Davis, builders, Shepperton Estate Office.

Barnard Castle.—Houses (102) in Station Road for the North-Eastern Housing Association; J. R. Wetherell, architect, Picton Place, Newcastle-on-Tyne.

Barnet.—Houses (188), Chesterfield Estate for U.D.C.; Henderson Building Co., Ltd., 94, Priory Park Road, N.W.6.

Beddington and Wallington.—Houses (140); Prestige & Co., Ltd., builders, 149, Grosvenor Road, S.W.1.

Beverly.—Houses (56), Cherry Tree Lane; R. Preston, town clerk, Municipal Offices, Lairgate.

Bristol.—Group of three primary schools, Southmead; J. N. Meredith, city architect, Eagle House, Colston Avenue.

Cardiff.—Houses (150); city architect.

Chipping Norton.—Houses (40), for R.D.C.; H. Cooper & Sons, 51, Cornmarket Street, Oxford.

Consett.—Houses (20), at Hamsterley Colliery; J. J. Eltringham, U.D.C. architect, Derwent Street, Blackhill.

Cuckfield.—Permanent houses (76), Barn Cottage Estate, Haywards Heath; R. J. Willett, surveyor, Council Offices, "Oaklands," Haywards Heath.

Dumfries.—Houses (54), to cost £70,000; burgh surveyor.

Enfield.—Accumulator room and boiler house for Cosmocord, Ltd., 700 Great Cambridge Road; C. H. Chaston & Co.

Fence Houses (Co. Durham).—Factory for N. Hyer, Ltd.; Cordingley & McIntyre, architects, The College, Durham.

Fifehire.—Rehabilitation centre for miners (£120,000); secretary, Miners' Welfare, Dunfermline.

Fort William.—Houses (122); burgh surveyor.

Glasgow.—Two temporary schools; city architect.

Gosforth.—B.I.S.F. houses (100) for U.D.C.; M. Harrison & Co. (Leeds), Ltd., builders, Leeds.

Three-storey block of flats for U.D.C.; M. J. Liddell & Sons, builders, Hunters Road, Gosforth.

Gower.—Houses (40), Caban Isaac, and Killay, for R.D.C.; surveyor, 8, Uplands Crescent, Swansea.

Havant and Waterloo.—Permanent houses (34), Victoria Road, Emsworth; surveyor, Council Offices, Park Road North.

Hexham.—Houses (24), Wylam, for R.D.C.; R. C. Williamson, builder, Rowlands Gill, Co. Durham.

Ilkeston.—Additional classrooms at the Grammar School; F. H. Crossley, county architect, County Offices, Derby.

Kingston-on-Thames.—Block of 168 flats, site of Cambridge Homes; borough engineer.

Lanarkshire.—Extensions at Crawford Hotel, Crawford (£10,000); D. McDougall, general manager, Public House Trust, Glasgow.

Newcastle-on-Tyne.—Covered-in bus station in the Haymarket; city engineer, Town Hall.

Extension of existing cooking arrangements for school meals and dining accommodation; Education Committee Architect, Education Offices, Northumberland Road.

Portsmouth.—New factory for Leethems, Ltd., Station Road, Farlington.

St. Albans.—Houses (42), Hatfield Road and Sleepshyde Lane (£58,667), for R.D.C.; Davies & Rentowl, builders, Victoria Street.

St. Pancras.—Extensions, Middlesex Hospital, Charlotte Street; Victor Cullen & Sons, surveyors.

Flats (85), Peckwater Street (£167,268); J. M. Contractors, Ltd.

Salford.—Redevelopment West Fleet Street area (£100,000); city engineer.

Skipton.—Houses (32), Keighley Road, for U.D.C.; K. B. Robinson, surveyor, Town Hall.

South Shields.—Houses (150) for T.C.; Cussins (Contractors), Ltd., Jesmond, Newcastle-on-Tyne.

Canteen on the premises of Jackson's (Clothiers), Ltd., King Street; E. M. Lawson, Barras Buildings, Barras Bridge, Newcastle.

Cinema, Ocean Road for W. B. Bolam; J. H. Morton & Son, architects, Martins Bank Chambers, Fowler Street.

Houses (66); Carruthers & Sons, 1, Heugh Terrace.

Thornaby.—Extensions to factory, Thornaby Road for J. A. C. Hoyle.

Wallsend.—Additions to the Monitor Works, Kings Road; T. Clements & Son, builders, Selborne Gardens, Newcastle-on-Tyne.


Wembley.—Houses (64), Sudbury Farm estate; borough engineer.

West Hartlepool.—New offices, Stranton Sawmills, for Christopher Brown, Ltd.; Turnbull & Rowe, architects, Scarborough Street.

Weymouth and Melcombe Regis.—Houses (36), Shortlands Road, Upwey; borough engineer, 6, Pulteney Buildings.

Whitley Bay.—Houses (96) on Roker Avenue; E. Roberts, U.D.C. surveyor.

Wokingham.—Houses (42), King Street Lane, Winnersh, for R.D.C.; Eric G. V. Hives, architect, 3, Cork Street, Reading.



*Stands up to
Polluted
Atmosphere
and Fog*

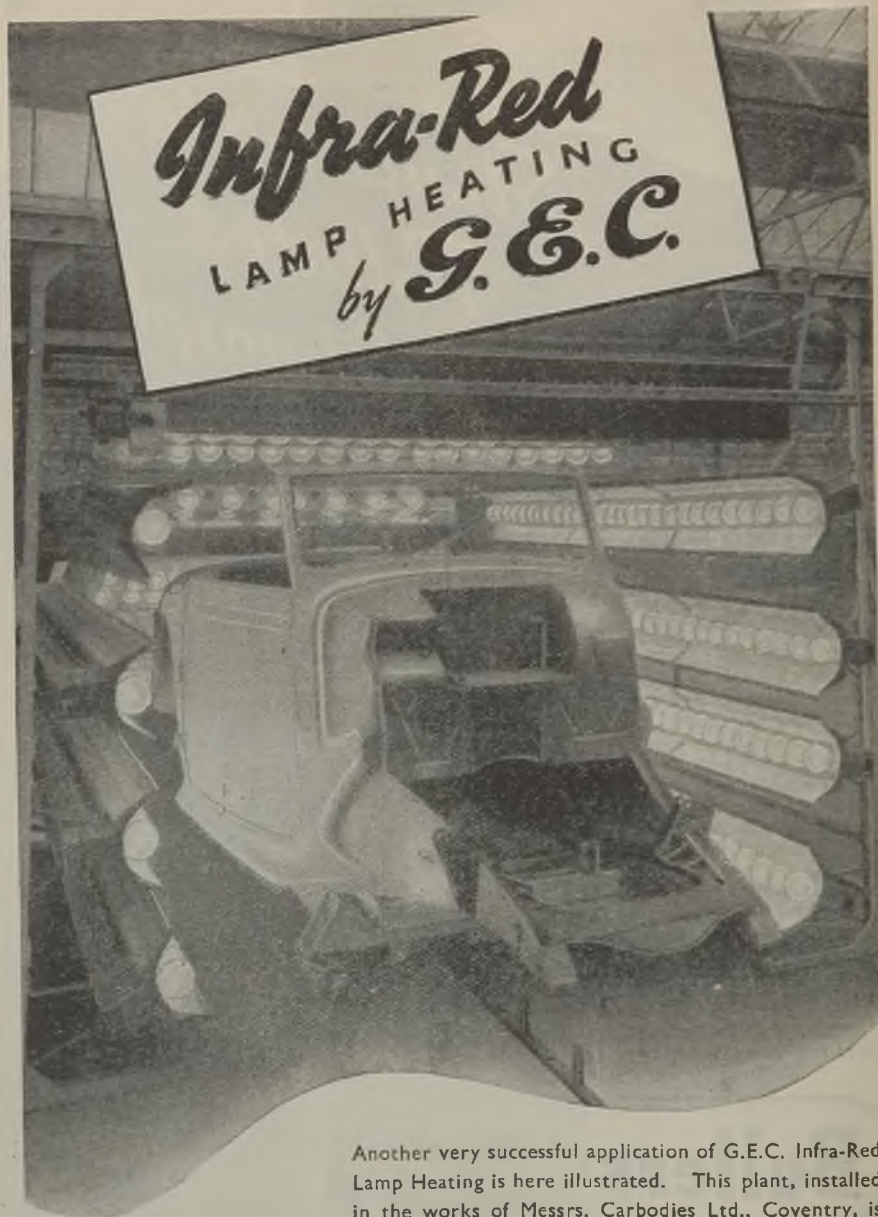
TO overcome these insidious enemies of High Tension System operation calls for long and intimate experience of the problems involved. It entails intensive tests and trials carried out in laboratories equipped with the most modern plant and facilities.

This insulator incorporates the very latest developments in design for combating foul air and fog—and like all Bullers products, stands up to its job.

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Another very successful application of G.E.C. Infra-Red Lamp Heating is here illustrated. This plant, installed in the works of Messrs. Carbodies Ltd., Coventry, is stoving the surface primer coat on Hillman-Minx Coupé bodies. Stoving time, 20 minutes. Loading 79 kW.

For all Infra-Red Lamp Heating consult the G.E.C.

CLASSIFIED ADVERTISEMENTS

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

THE CHARGE for advertisements in this section is 2/- per line (approx. 7 words) per insertion; **ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED**—30/- per inch. Where the advertisement includes a Box Number this counts as six words and there is an additional charge of 6d. for postage of replies.

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF GREAT YARMOUTH ELECTRICITY DEPARTMENT

Domestic Appliances

TENDERS are invited for the supply and delivery of Domestic Appliances required during the period of 12 months ending 31st March, 1948. Specification, conditions and form of tender for all or any items as listed may be obtained from G. T. Alcock, Esq., Chief Engineer and Manager, Electric House, Great Yarmouth:

Large, small and breakfast cookers, boiling rings, toasters, electric kettles, percolators, waterheaters, wash boilers, refrigerators, washing machines, irons, vacuum cleaners, fires, clocks, towel rails.

Tenders, enclosed in plain sealed envelope, properly endorsed "Tender for Domestic Appliances," must reach me not later than 12 noon on Friday, 29th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

FARRA CONWAY,

Town Hall, Great Yarmouth.
19th October, 1946.

Town Clerk.
3242

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of H.V. and M.V. Cables

TENDERS are invited by the above Council for the supply of H.V. and M.V. Cables required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Cables," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18.
18th October, 1946.

Town Clerk.
3199

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of Transformers

TENDERS are invited by the above Council for the supply of Transformers required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Transformers," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18.
18th October, 1946.

Town Clerk.
3198

BOROUGH OF EPSOM AND EWELL ELECTRICITY DEPARTMENT

TENDERS are invited for the supply, delivery and erection of the following: (a) 1 500-kVA, 3-phase Transformer; (b) 1 10-panel, 11,000-v., 150-MVA Truck Type Switchboard.

Specifications and tender forms may be obtained from W. B. Hayden, M.I.E.E., Borough Electrical Engineer, Electricity Showrooms, Church Street, Epsom, upon payment of one guinea, which will be refunded on receipt of a bona fide tender. Additional copies may be purchased at a cost of 5s. each.

Tenders, on the prescribed forms, in sealed envelopes endorsed "Tender for Transformer" or "Tender for Switchgear," as the case may be, must reach the undersigned not later than 10 a.m. on Monday, 16th December, 1946. No name or mark indicating the sender must be placed on the outside of the envelope. Any tender not complying with these requirements will not be considered. The Council do not bind themselves to accept the lowest or any tender.

EDWARD MOORE,

Town Hall,
The Parade, Epsom, Surrey.
31st October, 1946.

Town Clerk.
3357

LITTLEBOROUGH U.D.C. ELECTRICITY DEPT.

TENDERS are invited by the above Council for the supply and delivery of the following: One 350-kVA Transformer; E.H.T. and L.T. Underground Cables; E.H.T. and L.T. Switchgear.

Specifications and forms of tender may be obtained on application to Mr. George Hill, Electrical Engineer and Manager, Council Offices, Littleborough. No tender will be received except in a plain sealed envelope endorsed "Tender" followed by the subject to which it relates, which must not bear any name or mark indicating the sender.

Tenders, on the prescribed form, sealed and endorsed as above, must be delivered to the undersigned not later than 9 a.m. on Monday, 25th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

R. C. CLOUGH,

Council Offices,
Littleborough, Lancs.
6th November, 1946.

Clerk of the Council.
3342

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Annual Contracts for the Supply of Electricity Meters

TENDERS are invited by the above Council for the supply of Electricity Meters required during the year 1st January, 1947, to the 31st December, 1947.

Specification and form of tender may be obtained from the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, upon receipt of a deposit of £1 ls., which will be refunded within one month of the receipt of a bona fide tender.

Tenders, enclosed in a plain sealed envelope and endorsed "Tender for Meters," must be delivered to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, not later than 12 noon on Wednesday, 27th November, 1946. The Council do not bind themselves to accept the lowest or any tender.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18.
18th October, 1946.

Town Clerk.
3200

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPT.

Domestic Electrical Apparatus

THE Electric Supply Committee invites tenders for the following Domestic Electrical Apparatus, to be delivered as required for a period of twelve months from date of contract:—

| Specification No. | Item. |
|-------------------|-------------------------------------|
| APP. 31 | Kettles. |
| .. 32 | Aluminium Saucepans. |
| .. 33 | Cookers. |
| .. 34 | Wash-boilers. |
| .. 35 | Water Circulators. |
| .. 36 | Storage Water Heaters (1½ gallons). |
| .. 37 | Cooker Control Units. |
| .. 38 | Circulator Control Panels. |

The General Conditions of Contract (which include the Corporation's Fair Wages and Conditions of Labour Clause), specifications and forms of tender may be obtained on application to the undersigned, stating which specifications are required.

Sealed tenders, enclosed in the official envelope provided and endorsed for the purpose, must be delivered to the undersigned not later than 10 a.m. on Monday, 25th November, 1946, when they will be opened. Tenders not complying with the foregoing will be rejected.

F. W. LAWTON.

14, Dale End, Chief Engineer and Manager.
Birmingham, 4. 3394

ABERTILLERY URBAN DISTRICT COUNCIL

Tenders for Electrical Works

TENDERS are invited for the supply, delivery, construction and erection of Sheet Steel Kiosks and Equipment, E.H.T. and L.T. Underground Cables and L.T. Service Cables in connection with the Council's Housing Site at Penrhwi, Bryn Ifhel, Llanhilleth.

Specification, schedule of quantities and conditions of contract can be obtained upon application to the Electrical Engineer and Manager, 40, Somerset Street, Abertillery, on payment of a deposit of £2 2s., which deposit will be refunded upon receipt of a bona fide tender.

Tenders, in plain sealed envelopes endorsed "Tender for Electrical Equipment," are to be delivered to the undersigned not later than noon of Thursday, the 21st November, 1946. 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.

H. J. WILLIAMS.

Council Offices, Clerk of the Council.
Abertillery, Mon.
2nd November, 1946. 3401

CITY OF EDINBURGH

THE Lord Provost, Magistrates and Council of the City of Edinburgh invite tenders for the following works at Portobello Power Station: 33-kV, 6.6-kV, 600-v. and 250-v. Paper-insulated Cables for the switchgear extensions to Specification No. E.D. G.C. 193.

The specification, form of tender, General conditions and drawings are now obtainable from the Corporation's Consulting Engineers, Messrs. Kennedy & Donkin, 12, Caxton Street, Westminster, London, S.W.1, on payment of a deposit of £1 ls. for each copy, which will be refunded on receipt of a bona fide tender, and on the return of the specification, general conditions and drawings.

Tenders in duplicate, on the prescribed form, endorsed on the outside with the title of the specification, must be delivered at the office of the undersigned not later than 12 noon on Friday, 22nd November, 1946. The Corporation do not bind themselves to accept the lowest or any offer.

J. STORRAR, S.S.C.

City Chambers, Edinburgh, 1. Town Clerk.
November, 1946. 3420

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

TENDERS are invited for the supply, delivery and erection of a 132,000-volt Transmission Line. Copies of the tender documents may be obtained from the Engineers, Messrs. Kennedy & Donkin, 32, Alva Street, Edinburgh, 2, on sending to them a cheque for £1 ls., returnable on receipt of a bona fide tender. The Board do not bind themselves to accept the lowest or any tender.

T. JAWRIE.

16, Rothesay Terrace, Secretary.
Edinburgh, 3.
29th October, 1946. 3340

NORTH-WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

TENDERS are invited for the following contracts:—

Contract A.296—Outdoor Type Static Transformers.

Contract A.297—Painting of Chimney Stacks.

Copies of specifications and forms of tender may be obtained from the undersigned on payment of £2 (Two Pounds) in currency notes.

Tenders must be delivered to the Clerk and Accountant by the first post on Monday, 25th November, 1946. The Authority do not bind themselves to accept the lowest or any tender.

F. FAVEILL.

York Chambers, Chief Engineer and Manager.
Kingsway, Stoke-on-Trent.
30th October, 1946. 3335

THE CORPORATION OF GLASGOW PUBLIC HEALTH DEPARTMENT

Electric Vehicles

THE Corporation invite tenders for Five Electric Vehicles. Specifications and forms of tender may be obtained on application to the General Manager, Corporation Electricity Dept., 75, Waterloo Street, Glasgow, C.2.

Sealed tenders, marked outside "Public Health Dept., Tender for Electric Vehicles," must be lodged with the Subscriber not later than 10 a.m. on Tuesday, 26th November, 1946. The lowest or any tender may not be accepted.

WILLIAM KERR.

City Chambers, Glasgow, C.2. Town Clerk.
1st November, 1946. 3414

METROPOLITAN WATER BOARD

Tenders for Electric Motor and Starter

THE Metropolitan Water Board require an Electric Motor and Starter, 25 h.p., 200/220 volts, 1,450 r.p.m., vertical spindle or suitable for adaptation to vertical spindle drive. New or secondhand. Particulars of plant available should be enclosed in sealed envelope endorsed "Tender for Electric Motor and Starter," and addressed to the undersigned at the offices of the Board (Room 122).

C. W. STOKER.

Offices of the Board, Clerk of the Board.
New River Head.
Rosebery Avenue, London, E.C.1. 3384

COUNTY BOROUGH OF WALLASEY

TENDERS are invited for the supply and installation of a 500-ampere, 3-phase Meter Testing Set. The Corporation do not bind themselves to accept the lowest or any tender.

Tenders must be endorsed "Tenders for Meter Testing Set" and forwarded to reach the undersigned at the Town Hall, Wallasey, by noon on Saturday, the 23rd November, 1946. Specification and form of tender can be obtained from the Borough Electrical Engineer, Wallasey Road, Wallasey.

EMRYS EVANS, Town Clerk.

3375

RURAL DISTRICT COUNCIL OF PLYMPTON ST. MARY ELECTRICITY UNDERTAKING

THE above Council invite tenders for the supply of 6,600/415/240-volt, 3-phase Transformers. Specifications and forms of tender can be obtained from the undersigned.

Tenders to be delivered not later than 12 noon on the 6th December, 1946. The Council do not bind themselves to accept the lowest or any tender.

PERCY T. LOOSEMORE,

Council Offices, Plympton. Clerk to the Council.
1st November, 1946. 3428

SITUATIONS VACANT

A Midlands house of repute will shortly require the services of two Salesmen, whose qualifications should incorporate a sound knowledge of the electrical and radio trades, coupled with first-class selling ability and retail trade connections. Remuneration will be by salary, commission and expenses. Applicants should state, in confidence, full details of their previous experience.—Box 3075, c/o The Electrical Review.

METROPOLITAN BOROUGH OF FULHAM ELECTRICITY DEPARTMENT

THE Council invites applications for the following positions in the Fulham Base Load Generating Station:—

PROGRESS ENGINEER.—Candidates must have had a sound education and also have good general engineering knowledge. Experience in clerical systems of progressing essential and applicants must have had considerable experience in visiting contractors' works, assessing progress and interviewing at management level. Applicants must also have a pleasant personality which commands respect. The salary will be in accordance with Class L, Grade 8a of National Joint Board Schedule, at present £585 18s. 0d. per annum. It is anticipated that the Station will be re-classified in 1947 to Class M when the commencing salary would be £626 17s. 0d.

TWO JUNIOR TECHNICAL ENGINEERS.—Applicants must be not more than 25 years of age and must have obtained Inter. B.Sc. or give an undertaking that studies will be continued to this end. Candidates must have also served a total of at least nine months as apprentice in an engineering works. Salary according to ability and experience in one of the following grades of N.J.B. Schedule, Class L, Grade 10 £428 8s. 0d.; 10a £400 15s. 0d.; 10b £374 17s. 0d. or 10c £352 16s. 0d. per annum. It is anticipated that the Station will be re-classified in 1947 to Class M when the commencing salary would be Grade 10 £454 13s. 0d., 10a £428 8s. 0d., 10b £400 15s. 0d., 10c £375 18s. 0d.

ASSISTANT CONTROL ROOM ENGINEER.—Applicants who must be not more than 30 years of age must have obtained the Inter. B.Sc. and must have had a sound technical training. Practical experience and knowledge of working on H.T. supplies, load dispatch and control of unit, including isolating and earthing equipment. Salary in accordance with N.J.B. Class L in one of the following grades according to ability and experience: Grade 10 £426 6s. 0d., 10a £400 15s. 0d. or 10b £374 17s. 0d. per annum. It is anticipated that the Station will be re-classified in 1947 to Class M when commencing salary would be Grade 10 £454 13s. 0d., 10a £428 8s. 0d. or 10b £400 15s. 0d. per annum.

BOILER HOUSE INSPECTOR (MECHANICAL).—Applicants must be not more than 40 years of age and must have educational qualifications equal to Inter. B.Sc. They must also have served at least 3 years recognised apprenticeship and have full practical knowledge of fitting and alignment to close limits. Candidates must also have had at least 5 years in a position of responsibility as a Mechanical Engineer, preferably on maintenance of heavy plant. Salary will be in accordance with N.J.B. Class L, Grade 9a, at present £468 6s. 0d. per annum. It is anticipated that the Station will be re-classified in 1947 to Class M when commencing salary would be £501 18s. 0d.

ELECTRICAL INSPECTOR.—Applicants must be not more than 40 years of age and must have obtained Inter. B.Sc. or equivalent and have served at least 3 years recognised apprenticeship. Candidates must have held a responsible position for at least five years in maintenance or manufacturing control of electrical apparatus as found in a Base Load Power Station and must have also had considerable personal experience in handling H.T. and E.H.T. apparatus. Salary will be in accordance with Class L, Grade 9a, of National Joint Board Schedule, at present £468 6s. 0d. per annum. It is anticipated that the Station will be re-classified in 1947 to Class M when commencing salary would be £501 18s. 0d.

Forms of application may be obtained on sending stamped addressed foolscap envelope to the undersigned to whom completed applications must be returned not later than 12 noon on December 11th, 1946.

CYRIL F. THATCHER.

Town Hall.

Town Clerk.

Fulham, S.W.6.

3418

METROPOLITAN BOROUGH OF BETHNAL GREEN ELECTRICITY DEPARTMENT

THE Council invites applications for the position of Junior Mains Engineer and Draughtsman. Salary in accordance with the N.J.B. Scale, Class F (Grade 10), at present £321 6s. per annum (inclusive of cost-of-living bonus).

The appointment will be subject to the Council's Superannuation Acts and By-Laws and Standing Orders, and the successful candidate must pass a medical examination.

Applications stating age, experience, and accompanied by copies of two recent testimonials and endorsed "Junior Mains Engineer" must reach me at the Town Hall, Bethnal Green, London, E.2 by 10 a.m. on Friday, 15th November, 1946. Canvassing will disqualify.

S. P. FERDINANDO.

Town Clerk.

3383

RURAL DISTRICT COUNCIL OF PLYMPTON ST. MARY

THE above-named Council invite applications for the following appointments:—

- District Engineer, at a salary of £330 per annum, rising by three annual increments to £375 per annum, plus bonus (at present £59 16s.).
- District Engineer, at a salary of £330 per annum, rising by three annual increments to £375 per annum, plus bonus as above.
- Junior Draughtsman, at a salary of £270 per annum, rising by two annual increments to £300 per annum, plus bonus as above.

Applicants for post (a) should have practical experience in construction, operation and maintenance of transmission and distribution systems up to 33 kV in rural areas.

Applicants for post (b) should have practical experience in the layout of high and low pressure systems in respect of supplies to temporary and permanent housing estates and large industrial consumers. A knowledge of the Electricity Commissioners' Regulations and procedure is essential.

Applicants for post (a) and (b) should have passed the qualifying examination of the Institution of Electrical Engineers, or equivalent.

Applicants for post (c) should have had experience in a modern drawing office, and preference will be given to candidates having knowledge of design and layout of substation buildings.

The appointments will be subject to the provisions of the Local Government Superannuation Act, 1937, and to determination by one month's notice on either side. The successful applicants will be required to pass medical examinations.

Applications, in writing, giving age, state, qualifications and experience, accompanied by copies of two recent testimonials, must be forwarded so as to reach the undersigned not later than the 23rd November, 1946. Canvassing, either directly or indirectly, will be a disqualification.

PERCY T. LOOSEMORE.

Council Offices,

Clerk to the Council.

Plympton.

25th October, 1946.

3234

CITY AND COUNTY OF KINGSTON-UPON-HULL ELECTRICITY DEPARTMENT

Assistant Mechanical Maintenance Engineer (Turbine House)

APPLICATIONS are invited for the above position from persons available from civilian positions, or from those serving in H.M. Forces.

The candidate appointed will be required to take charge of the mechanical maintenance of all plants in the turbine house. Preference will be given to applicants who have served an apprenticeship with a firm of turbine manufacturers, and have had subsequent experience in the overhaul of large turbines. A graduateship of the Institute of Mechanical Engineers or the holding of a 1st Class Board of Trade Certificate (Steam) would be an advantage.

The salary will be in accordance with the N.J.B. Scale, Class J, Grade 8, rising to Grade 7 (Grade 8, £521; Grade 7, £563/£589) after one year's satisfactory service. The appointment is subject to a medical examination.

On appointment, the applicant must reside within the city boundary (waived during present conditions) and, after three months' satisfactory probation, will be required to contribute to the Local Government and Other Officers' Superannuation Scheme.

Applications should give names of references who may be consulted and should be submitted to the General Manager, Electricity Offices, Ferensway, Kingston-upon-Hull, by 18th November, 1946.

3229

BARNSELY MINING AND TECHNICAL COLLEGE

Principal: H. L. Haslegrave, Wh.Sc., M.A., Ph.D.

M.Sc., M.I.Mech.E., M.I.E.E.

APPLICATIONS are invited for the position of Head of the Electrical Engineering Department. Candidates should hold an Engineering Degree and have had industrial and teaching experience. The salary will be in accordance with Grade I (Head of Department) of the Burnham Scale for Technical Colleges, i.e., £600-£25-£750. Further particulars and forms of application may be obtained from the Principal, Technical College, Church Street, Barnsley, to whom applications must be sent by Wednesday, 20th November.

H. V. LIGHTFOOT.

Director of Education.

3339

BOROUGH OF EPSOM AND EWELL ELECTRICITY DEPARTMENT

Demonstrator

APPPLICATIONS are invited from suitably qualified female candidates for the above appointment. Applicants must be not less than 25 or more than 35 years of age, be capable of conducting demonstrations and advising consumers on the use of all kinds of electrical apparatus, and be willing to undertake general showroom duties when required; a good general education is essential. Applicants should hold the E.A.W. Diploma or equivalent.

Salary according to age in the General Division of the National Scale of Salaries, maximum £240 per annum at 30 years of age, plus £24 weighting for London area, plus cost-of-living bonus, at present £48 2s. per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, in candidates' own handwriting, stating age, qualifications, experience, and when able to take up duties, together with copies of not more than three recent testimonials, endorsed "Demonstrator", must be sent to the Borough Electrical Engineer, Electricity Offices, Church Street, Epsom, so as to reach him not later than the first post on Monday, the 18th of November, 1946. Canvassing of members of the Council, directly or indirectly, for the appointment will disqualify candidates. Candidates are required to state in their applications whether or not to their knowledge they are related to any member of, or the holder of any principal office under, the Council; candidates who fail to do so will be disqualified for the appointment, and if appointed will be liable to dismissal without notice.

EDWARD MOORE,
Town Clerk.

Town Hall,
The Parade, Epsom.
28th October, 1946. 3377

COUNTY BOROUGH OF ST. HELENS ELECTRICITY DEPARTMENT

APPPLICATIONS are invited for the appointment of Deputy Borough Electrical Engineer at a salary in accordance with Class 2, Grade 1 of the N.J.B. Schedule, commencing at £833 per annum.

Candidates, preferably not more than 45 years of age, should possess an Engineering Degree or its equivalent and also Corporate Membership of one of the leading Engineering Institutions. Thorough experience in generation, distribution and the commercial development of an electricity supply undertaking owning a selected generating station is essential, particularly in regard to the layout and erection of modern power station plant.

Applications, accompanied by copies of not more than three testimonials, must be made on the form obtainable from the undersigned, and be received not later than 25th November in an envelope clearly endorsed "Deputy Borough Electrical Engineer." The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

P. BREGAZZI,

Electricity Works, Engineer and Manager.
Carlton Street, St. Helens, Lancs.
1st November, 1946. 3382

CENTRAL ELECTRICITY BOARD

North-West England and North Wales Area

Electrical Fitters for Instrument Work

THE Central Electricity Board have vacancies at their office in Manchester for two electrical fitters with skilled experience in the maintenance and repair of poly-phase integrating, indicating and recording meters, etc.

Remuneration will be in accordance with the rates laid down by the Board, the present rate of pay being 28.61 pence per hour for a 47-hour week.

Applicants should state their age and give full particulars, with dates, of their education, training and experience. The selected applicants will be required to pass a medical examination and to join the Board's superannuation scheme.

Applications must be submitted in writing, addressed to the District Manager, Central Electricity Board, Grid House, Wilmslow Road, East Didsbury, Manchester, 20, and be received by him not later than November 21st, 1946. 3304

CITY OF BRADFORD ELECTRICITY DEPT.

APPPLICATIONS are invited for the following appointments on the staff of the Department:

- (a) ONE ELECTRICAL DRAUGHTSMAN.
- (b) ONE MECHANICAL DRAUGHTSMAN.
- (c) ONE CLERK OF WORKS (Substations).

Candidates must have a sound knowledge of Drawing Office practice and have had experience in the preparation of drawings and specifications for power station and substation plants. Corporate Membership of the appropriate Professional Institution or exempting qualifications will be an advantage.

Applicants for the post of Electrical Draughtsman should have sound knowledge of high voltage and low voltage switchgear installation, and experience of cable work and electrical equipment generally.

Applicants for the position of Mechanical Draughtsman should have experience in the lay-out of boiler plant, turbine plant and pipework.

Applicants for the post of Clerk of Works should have experience in the supervision of erection of buildings and the installation of electrical equipment.

The salaries and conditions of employment will be in accordance with the N.J.B. Agreement, the salary for positions (a) and (b) being that attaching to Class H, Grade 8b (£429/438/447) and for position (c) that attaching to Class H, Grade 9a (£365/375/381).

The selected candidates will be required to pass a medical examination and contribute to a Superannuation Scheme under the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age and giving details of education, technical training and experience, together with copies of two recent testimonials, must reach the undersigned not later than Tuesday, the 26th November, 1946.

T. H. CARR,
Electrical Engineer and
Manager.

45-53, Sunbridge Road,
Bradford.
November, 1946. 3386

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Engineering Draughtsman

APPPLICATIONS are invited for the position of Engineering Draughtsman in the Electricity Department, at a commencing salary of £446 5s. per annum, and increments in accordance with the National Joint Board Schedule, Grade 9, Class J.

Candidates should have had a good general technical education and training, followed by drawing office experience in generating station details and layout. Generating station experience would be an advantage.

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

Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, and received not later than the 20th November, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18.
7th October, 1946. 3240

CORPORATION OF GRAVESEND ELECTRICITY DEPARTMENT

Draughtsmen

VACANCIES exist in this department for two Draughtsmen, at a salary of £413 per annum, Grade 8a, Class F, rising to £429 and thereafter to £442 or £459 according to ability. Considerable extensions are in progress on the distribution system and new offices and workshops are being designed. Power station reconstruction is also in hand. Applicants will be considered from both manufacturing firms and supply undertakings.

One draughtsman will be specifically required to deal with building construction work, while the other will be concerned with mains records, wiring, diagrams, etc.

The conditions of employment are those of the N.J.B. Agreement and successful candidates will be superannuated after passing a medical examination. Applications should be sent to the undersigned before 16th November.

G. V. HARRAP, A.M.I.E.E., M.I.I.A.,
General Manager and Engineer.

3164

BOROUGH OF LUTON ELECTRICITY UNDERTAKING

APPLICATIONS are invited for the following appointments:

(1) **ASSISTANT MAINS ENGINEER (Development).** Candidates must have sound technical training and first-class experience of distribution technique and should give details of distribution work on which planning experience has been obtained. The successful candidate will be required to specialise on development work in urban and rural areas and will work in close co-operation with the Assistant Distribution Engineer (Operation) under the Distribution and Mains Engineer and in close liaison with the Technical and Constructional Engineer. He will be responsible for the detailed layout, estimates and programming of schemes involving underground cables, overhead networks and substations, also changeover from D.C. to A.C. of the remaining D.C. portions of the urban areas. Salary will be in accordance with the National Joint Board Schedule, Class J, Grade 6 (at present £616, rising to £644 per annum).

(2) **DOMESTIC REPRESENTATIVE (2 Vacancies).** The successful candidates will be required to carry out consumer service activity with domestic consumers within the undertakings area of supply. Candidates should be between 25 and 35 years of age and must possess practical experience of domestic wiring installations, be familiar with positioning service terminals and meters and have a full knowledge of domestic appliances and the application of electricity. Preference will be given to candidates who possess specialist experience on water heating. Salary will be in accordance with the National Joint Board Schedule, Class J, Grade 10 (present salary £355, rising to £371 per annum).

The successful candidates will be required to pass a medical examination and to contribute to the Corporation's Superannuation Scheme.

Applications giving age, details of training and experience, present position held, and accompanied by copies of three recent testimonials, should be delivered not later than Friday, 22nd November, 1946, to C. T. Melling, M.Sc.Tech., M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Electricity Offices, St. Mary's Road, Luton. Canvassing directly or indirectly will be a disqualification.

W. H. ROBINSON,

Town Clerk,

Town Hall,

Luton, Beds.

31st October, 1946.

3392

METROPOLITAN BOROUGH OF FULHAM ELECTRICITY DEPARTMENT

THE Council invites applications for the following position in the Electricity Undertaking:—

Second Architectural Assistant.—Candidates must be not more than 35 years of age and must be either a registered Architect or preferably an Associate of the R.I.B.A. Applicants must have had training and experience in the preparation of plans and specifications, bills of quantity, etc. for all types of buildings, including electricity substations, showrooms, etc.

The salary will be in accordance with the A.P.T. Division IV of the National Joint Council for Local Authorities Administrative, Professional, Technical and Clerical Services commencing at £440 per annum and rising by annual increments of £15 to maximum of £485, including London Weighting. Salaries are at present subject to an addition of cost-of-living bonus amounting to £59 16s. 0d. per annum.

Forms of application may be obtained on sending stamped addressed foolscap envelope to the undersigned to whom completed applications must be returned not later than 12 noon on December 11th, 1946.

CYRIL F. THATCHER,

Town Clerk,

Town Hall,

Fulham, S.W.6.

3419

IMPERIAL COLLEGE OF SCIENCE & TECHNOLOGY

City and Guilds College

THERE is a vacancy in the Electrical Engineering Department, on the side of electrical machine and power, for an Assistant Lecturer. The appointment is for a period of three years with salary of £400 p.a. with F.S.S.U. superannuation. An Honours Degree and some practical experience of heavy electrical engineering are essential.

Applications, accompanied by full statement of qualifications, and with references, should be sent to the Head of the Electrical Engineering Department, City and Guilds College, Exhibition Road, London, S.W.7.

3397

COUNTY BOROUGH OF SWANSEA ELECTRICITY DEPARTMENT

Appointment of Generation Engineer

APPLICATIONS are invited from qualified Engineers, not over 45 years of age, unless at present in the service of a local authority, for the position of "Generation Engineer." Applicants must have had a thorough mechanical and electrical engineering training, preferably including experience in a manufacturing engineering works; possess a degree or equivalent technical qualifications admitting to Corporate Membership of the Institution of Mechanical or Electrical Engineers, and have held a similar appointment in a large Power Station operating under the direction of the Central Electricity Board.

The successful candidate will be required to take charge of the operation and maintenance of the Department's Generating Station with any extensions or modifications thereto and to devote the whole of his time to the duties of his office.

The salary will be in accordance with Grade 2, Class J, of the N.J.B. Schedule of Salaries, which, at the present time, is £874, rising to £913 per annum. The appointment will be subject to the provisions of the Local Government and Other Officers Superannuation Act 1937, and the successful candidate will be required to pass a medical examination.

Applications, which must be made on a prescribed form obtainable from the Borough Electrical Engineer and Manager, Guildhall, Swansea, together with copies of not more than two recent testimonials, must be delivered to the undersigned not later than Saturday, the 30th November, 1946. Canvassing, either directly or indirectly, is prohibited and will be a disqualification.

T. B. BOWEN,

Town Clerk,

Guildhall, Swansea.

2nd November, 1946.

3403

BOROUGH OF HASLINGDEN ELECTRICITY DEPARTMENT

Mains Assistant

APPLICATIONS are invited for the position of Mains Assistant in the Electricity Department, at a salary in accordance with Grade I of the Administrative, Professional and Technical Division, National Joint Council's Scale for Local Authorities' Staffs (£430 × £15 to £375 per annum).

Candidates must possess the Higher National Electrical Engineering Certificate and must have had experience in the laying of 6.6 kV high tension mains, three-phase distribution, and maintenance and operation of static substations.

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

Applications, accompanied by copies of three recent testimonials, must be forwarded to the Borough Electrical Engineer, John Street, Haslingden, Lancashire, not later than Wednesday, 20th November, 1946.

L. M. BURTON,

Town Clerk,

Municipal Offices, Haslingden.

28th October, 1946.

3305

BOROUGH OF ABERYSTWYTH ELECTRICITY DEPARTMENT

APPLICATIONS are invited for the following appointments:—

(a) Mains Foreman, at salary on D.J.I.C. Scale,

District 4, £328 9s. per annum.

(b) Plumber-Joiner, D.J.I.C. Scale, District 4, South

Wales, 2s. 5½d. per hour.

(c) Junior Draughtsman and Mains Recorder, wages

£4 per week, plus cost-of-living bonus.

Candidates for (a) should have experience with 11,000-volt overhead and underground transmission, and 4,000/230-volt distribution, both new construction and maintenance, and should be capable of controlling men engaged on this work. Candidates for (b) should have experience of all types of jointing and substation work up to 11,000 volts, and preference will be given to those possessing overhead line construction experience. Candidates for (c) will be required to keep all mains records, prepare plans, and assist in surveys. Some previous experience is desirable but not essential.

Applications, together with not more than two recent references, should be sent to the Borough Electrical Engineer, Electricity Works, Mill Street, Aberystwyth, not later than November 15th, 1946.

3385

METROPOLITAN BOROUGH OF ISLINGTON ELECTRICITY DEPARTMENT

Temporary Electrical Engineering Draughtsman

APPPLICATIONS are invited for the above-mentioned position from persons having a sound experience in the following: Design and erection of substation buildings. Design and layout of E.H.T. substations, switchgear and transforming plant for 33 and 6.6-kV, 3-phase systems. L.T. distribution switch and fuse gear for 415/240 volts. Layout of 33 and 6.6-kV transmission and distribution networks.

The engagement is for a period of twelve months, and the salary and conditions of employment will be in accordance with the National Joint Board Schedule and the Local Government Superannuation Act, 1937. The salary will be from the commencement of Grade 9a to the maximum of Grade 8, according to experience and qualifications, and the engagement will be terminated or reviewed in light of the obligations which may arise to change over the Undertaking's voltage and system to the new standard.

Forms, on which application must be made, can be obtained from the Engineer and General Manager, 341/3, Holloway Road, N.7, and must be returned to him not later than the 15th November, 1946.

Candidates are required to disclose in writing whether, to their knowledge, they are related to any member or holder of any senior office under the Council. The Council are unable to make any arrangements whatsoever for the provision of housing accommodation for the successful candidate. Canvassing, either directly or indirectly, will be a disqualification.

W. ERIC ADAMS,

Town Hall, Upper St. N.1.
October, 1946.

Town Clerk.
3330

METROPOLITAN BOROUGH OF WOOLWICH ELECTRICITY DEPARTMENT

Combustion Engineer

APPPLICATIONS are invited for the position of Combustion Engineer in the Selected Generating Station of the Borough Electricity Department at a commencing salary of £551 3s. per annum and increments in accordance with the National Joint Board Schedule, Grade 7, Class J.

The successful candidate will be required to advise and assist the Station Superintendent with respect to the efficient and economical operation of the boiler units, their associated plant and instruments.

Candidates should have had experience in the capacity described, preceded by a good general technical education and training. A sound theoretical knowledge of thermodynamics and power station heat cycles is essential, and experience of automatic combustion control will be an advantage. Candidates should be members or associate members of a recognised engineering institution.

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

Applications, stating age, qualifications and experience, together with not more than three recent testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, and received not later than 20th November, 1946. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

DAVID JENKINS,

Woolwich, S.E.18.
7th October, 1946.

Town Clerk.
3241

PARK PREWETT MENTAL HOSPITAL, BASINGSTOKE, HANTS

DEPUTY Engineer required at above hospital (1,578 beds), male, having served full engineering apprenticeship and possessing professional qualification of a technical character preferred.

Person appointed will assist chief engineer in supervising the repair and maintenance of plant and buildings, keep records of stores and prepare drawings, etc.

Salary £430 per annum rising by £12 10s. per annum to £455. In addition a house, light and fuel are provided free. Deductions (3% on the total value of the office) will be made under the Asylums Officers' Superannuation Act, 1909.

Applications, together with copies of three testimonials, to reach the Clerk to the Visiting Sub-Committee at above address not later than 14th November, 1946. 3346

BOROUGH OF HARROGATE ELECTRICITY DEPT.

Appointment of Borough Electrical Engineer's Secretary

APPPLICATIONS are invited from suitably qualified persons, male or female, for the above permanent position. The duties will include the supervision of the shorthand-typing and filing staff. Applicants should be expert shorthand-typists and conversant with modern filing methods, whilst a knowledge of the terms in use in the electricity supply industry will be an advantage.

The post is graded within the Clerical Division of the National Joint Council's Scales, salary £315 to £360 (males) and £252 to £288 (females), subject to cost-of-living bonus, at present £59 16s. and £48 2s. respectively.

The appointment will be subject to the National Joint Council Scheme of Conditions of Service, the provisions of the Local Government (Superannuation) Act, 1937, and to the successful candidate passing a medical examination. Canvassing, directly or indirectly, will be deemed a disqualification. Candidates, when making applications, must disclose in writing whether, to their knowledge, they are related to any member or senior officer of the Council.

Applications, giving full particulars of qualifications, should be addressed to me at the undernoted address, the envelopes being endorsed "Secretary," and should reach me not later than the 15th November, 1946. Copies of testimonials are not required but the names of three referees should be given.

A. KELSO,
Borough Electrical Engineer.

Municipal Offices,
Harrogate, Yorks.
30th October, 1946.

3322

PORTLAND URBAN DISTRICT COUNCIL

Appointment of Electrical Engineer

APPPLICATIONS are invited for the post of Electrical Engineer, at a salary in accordance with the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers dated 9th July, 1941, viz.: First year £524, second year £570, third year £616, plus war bonus (at present 23s. per week), and car allowance of £60 per annum. The above salary is based on the units sold during the year ended 31st March, 1946, which were 4,704,557, and of which 1,624,350 were sold to a large consumer.

Applicants should be competent to undertake the complete control and management of the Council's Undertaking, comprising E.H.T. transmission and L.T. 3-phase 4-wire underground and overhead distribution systems.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person selected will be required to pass a medical examination and to reside within the Urban District. He will also be required to devote his whole time to the duties of his office. The appointment will be subject to two calendar months' notice on either side.

Applications, stating age, experience, and qualifications, and accompanied by copies of three recent testimonials, to be sent to me in sealed envelopes endorsed "Electrical Engineer" not later than Wednesday, 20th November, 1946. Canvassing, directly or indirectly, will disqualify.

HARRY WALKER,
Clerk to the Council.

Council Offices, Portland.
1st November, 1946.

3423

SCARBOROUGH CORPORATION ELECTRICITY DEPARTMENT

Junior Shift Engineer

APPPLICATIONS are invited for the position of Junior Shift Engineer, at a salary in accordance with the National Joint Board Schedule, Class F, Grade 9a, at present £327 per annum.

Candidates should have had a sound technical and practical training in electrical and mechanical engineering and some experience in a modern generating station. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, giving age, experience, and training, together with copies of three recent testimonials, should be forwarded to the undersigned not later than 23rd November, 1946.

W. K. FLEMING, M.I.E.E.,
Borough Electrical Engineer
and Manager.

89, Westborough,
Scarborough.

3381

LONDON COUNTY COUNCIL

REQUIRED at the School of Engineering and Navigation, High Street, Poplar, E.14, the following full-time men teachers:—

(1) Graduate Assistants in the Mechanical and Electrical Engineering Departments. Applicants should have had industrial experience and be capable of taking all grades of National Certificate work up to A.2 standard. Knowledge of electronics and ability to take the lower grade of electrical engineering an advantage.

(2) Assistant in the Marine Engineering Department. Applicants should hold the Extra First Class Board of Trade Certificate, or have completed the course for this certificate. This post is temporary in the first instance, but may lead to permanency.

Other things being equal, preference will be given to registered disabled persons. Burnham scale salary £300 x £15 to £525 (men), plus London allowance, minimum £36 a year, and additions for training and qualifications as applicable. Commencing salary according to teaching and industrial experience. Application forms from the Education Officer (T.1), County Hall, S.E.1 (stamped addressed foolscap envelope necessary), returnable by 7th December, 1946. H.M. Forces personnel abroad should apply by letter. 3332

BOROUGH OF WATFORD ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Salesman-Representative. Applicants, who should be between the ages of 25 and 35 years of age and have had experience in electricity showrooms, should be familiar with tariffs and general showroom routine, whilst preference will be shown to those having display ability.

The salary offered is £255/£300 per annum, plus a cost-of-living bonus of £59 16s., in accordance with the Miscellaneous Division, Grade 1, of the National Joint Council Scale of Salaries. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applications, giving full details of age, education and experience, together with copies of testimonials, to be forwarded to the undersigned and be received not later than 5th December, 1946.

A. W. BARHAM,

Chief Engineer and General Manager,
Borough of Watford Electricity Department,
Electricity House, The Parade, Watford. 3323

METROPOLITAN BOROUGH OF WOOLWICH
ELECTRICITY DEPARTMENT

Appointment of Two Control Room Engineers

APPLICATIONS are invited for the appointment of two Control Room Engineers for shift duties at the Woolwich Power Station. Candidates should have had previous experience in a similar position, must have first-class technical qualifications and sound practical experience in the operation of a modern power station.

The salary will be in accordance with Grade 9, Class J, of the National Joint Board Schedule, commencing at £446 5s. per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidates will be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with not more than three testimonials, should be addressed to the Borough Electrical Engineer, Electric House, Powis Street, Woolwich, S.E.18, to reach him not later than 23rd November, 1946. Canvassing, either directly or indirectly, will disqualify.

DAVID JENKINS,

Town Hall, Woolwich, S.E.18. Town Clerk. 3316

SOUTHERN RAILWAY

Electrical Draughtsmen

APPLICATIONS are invited for two Senior Draughtsmen in the London area. Applicants must be qualified in electrical engineering with workshop training, one having experience of the layout and design of electrical traction equipment, and one having similar experience of mercury arc rectifier substation layout and design.

Successful candidates will be engaged on a temporary basis, but will be eligible, if suitable, for appointment to a progressive permanent position. Salary according to qualifications and experience.

Apply in writing, stating age, qualifications and experience, to—Chief Electrical Engineer, Southern Railway, 15, St. Thomas Street, London Bridge, S.E.1. 3314

COUNTY BOROUGH OF MIDDLESBROUGH
ELECTRICITY DEPARTMENT

Appointment of Lady Demonstrator

APPLICATIONS are invited for the above appointment at a salary of £252 per annum rising by annual increments to £288 per annum, plus a cost-of-living bonus of, at present, £48 2s. per annum.

Candidates must have had a good general education, hold the A.W. Diploma or Certificate or other approved qualifications, and have a thorough knowledge of domestic electrical appliances; they must be competent to conduct lectures, cookery demonstrations, advise on the selection and use of electrical apparatus, and competent to advise consumers on the use of such appliances in their own houses. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the successful candidate passing satisfactorily a medical examination.

Applications, giving full particulars of training and experience, and accompanied by copies of recent testimonials, must reach the Borough Electrical Engineer, Corporation Electricity Works, Snowdon Road, Middlesbrough, not later than 9 a.m. Monday, 2nd December, 1946.

E. C. PARR,

Municipal Buildings, Town Clerk.
Middlesbrough.
31st October, 1946. 3374

CITY OF GLOUCESTER ELECTRICITY DEPT.

Assistant Mains Draughtsman

APPLICATIONS are invited for the position of Assistant Mains Draughtsman at a salary in accordance with Class G, Grade 9, of the N.J.B. Schedule (£380 per annum rising by biennial increments to £395 per annum).

Applicants must be fully qualified draughtsmen with a sound knowledge of modern drawing office practice and general mains records, and be familiar with building and structural engineering as applied to substations, etc. The successful candidate will be required to pass a medical examination, and the appointment is subject to the Local Government Superannuation Act, 1937.

Applications, stating age, qualifications and experience, accompanied by copies of three recent testimonials, should be addressed to reach the undersigned not later than first post on Monday, November 25th, 1946.

EMIL BRAATHEN,

Commercial Road, Chief Engineer and
Gloucester. General Manager. 3359

CITY OF LANCASTER

Assistant Shift Charge Engineer

APPLICATIONS are invited for an Assistant Shift Charge Engineer at Caton Road Generating Station. Salary in accordance with the N.J.B. Schedule, at present Grade 9, Class H, £402 per annum.

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

Experience of the operation of large boilers and general power station operation desirable.

Applications, stating age, qualifications and particulars of training and experience, also probable date on which duties can be taken up, together with copies of two testimonials, must reach the undersigned not later than Saturday, November 16th, 1946.

GEO. C. MILNES, M.C., M.I.E.E.,

"Electricity," City Electrical Engineer.
North Road, Lancaster. 3333

LONDON TRANSPORT

LONDON Transport has a vacancy for an Electrical Tester for maintenance work on supervisory control equipment of the automatic telephone type used for the remote control of traction substations. Previous experience of this type of equipment or of auto-telephone exchange equipment is essential. Inclusive rate of pay 134s. per week of 47 hours.

Applications, stating age and giving full particulars of experience and qualifications, together with references regarding general and technical education should be sent to the Superintendent of Recruitment and Training (W.R.S.2278), London Passenger Transport Board, 566, High Road, Chiswick, W.4. 3380

A British firm of Telephone Manufacturers in India has vacancies for experienced Telephone Engineers. Applicants should be capable of planning automatic telephone exchange networks, developing area layouts, assessing traffic data, and generally advising customers on technical requirements. The post offers good prospects to suitable engineers who should, preferably, be aged about 30. Good salary with kit and travelling allowances and usual leave. Apply, giving full details of qualifications and experience and whether married or single, to—Box No. 112, Dorlands, 18/20, Regent Street, London, S.W.1. 3221

A large retail organisation is willing to consider applications from ex-Servicemen for a Senior Buyership, electrical goods; initial salary will be £700 to £800 a year. It is essential, however, that the candidate should have detailed knowledge of radio, as it is hoped that this appointment will lead to a Directorship responsible for buying all electrical and radio goods and will command a salary of between £1,500 to £2,000 a year. Officers who have had outstanding careers in the Signals or Radar branches of any of the three Services would be suitable candidates. Preference would be given to applicants between 35-40, but candidates between 30 and 45 would be considered. Write—Box 336, L.P.E., 110, St. Martin's Lane, W.C.2. 3366

A ACCOUNTANT for senior position required by the Sussex Electricity Supply Co. Ltd. at Littlehampton. Preference given to one with experience of electricity supply or similar public utility undertaking. Appointment will be permanent and pensionable. Applications in writing, giving details of age, experience, etc., and salary required, to—Electricity Office, Littlehampton. 3302

A N important engineering concern in the Croydon district invites applications from males who have passed their matriculation (or equivalent) for the following: (1) Junior Engineers, age up to 26 years, technical education up to the Ordinary National Certificate in Electrical Engineering and studying for the Higher National, experience in telecommunications engineering, specialising in telegraphy an advantage, working knowledge of French, German or Spanish also an advantage; (2) Technical Literature Writers, age up to 26 years, technical education up to Ordinary National Certificate in Electrical Engineering. Ability in the preparation from technical data and under the guidance of a supervisor of technical descriptions of apparatus and technical articles for publication in a lucid and attractive manner; (3) Engineer to Supervise Technical Literature, technical education up to Higher National Certificate in Electrical Engineering, experience in the preparation of technical literature, including descriptions of apparatus and articles for publications, etc., able to supervise the work of technical writers. Applications, giving full particulars of qualifications and experience and salary required, should be addressed to—Box 3334, c/o The Electrical Review.

A APPLICATIONS are invited by a factory in the North-West for Electricity Meter Testers. Candidates must have had sound technical experience and should be thoroughly conversant with the construction and use of single and polyphase metering equipment. Previous experience is essential. Write, giving particulars and salary expected, to—Box 3413, c/o The Electrical Review.

A RMATURE Winder or good Improver required, used to all types of motors. Knowledge of dismantling and assembly of motors a good advantage. Apply to—Messrs. Charles H. Harwood & Co. Ltd., 32, Meyrick Road, Willesden, N.W.10. 114

A RMATURE Winders and Improvers urgently required. Top rates and good conditions.—Collins Electrical Ltd., 22, St. Alban's Place, London, N.1. 85

A RMATURE Winders and Improvers required, A.C. and D.C., top rates, good working conditions.—Electrical Power Repairs (Gillingham) Ltd., Strover Street, Gillingham, Kent. 9664

A RMATURE Winders and Improvers urgently required. Top rates and good conditions.—Box 113, c/o The Electrical Review.

A SSISTANT Accountant (Lady) required by city firm of exporters, No Saturdays. Write—Box N.E.G., c/o 95, Bishopsgate, E.C.2. 3421

A SSISTANT Engineer required by consulting engineers in London. Must have good education to degree standard in electrical engineering and works apprenticeship, including test bed experience. Salary up to £450, according to age and experience. Apply, giving full particulars, to—Box 3393, c/o The Electrical Review.

A SSISTANT Engineer required by established firm of electrical contractors (London). Applicant must be of good education, with practical, technical and commercial experience. Full particulars to—Box 3201, c/o The Electrical Review.

A SSOCIATED Portland Cement Manufacturers Ltd. Senior Assistant Electrical Engineer, with initiative and experience of the installation and maintenance of distribution systems in large factories. Applicants should be capable of negotiating contracts with equipment manufacturers, and should preferably have a degree and have spent some years on the manufacturing side. The post carries with it good prospects of advancement. Salary will be between £600 and £700 per annum, depending upon experience, plus £105 per annum war bonus plus staff bonus. Pension fund. Applications, which should give full details of training and subsequent experience, should be submitted not later than the 22nd November, 1946, and should be addressed to the Chief Engineer, A.P.C.M. Ltd., 192, Ashley Gardens, S.W.1. 3211

B RITISH Insulated Callender's Cables Ltd. require urgently a number of Draughtsmen for steel structural work. Positions permanent, with superannuation scheme; salary according to experience. Apply, giving full particulars, to—Staff Officer, B.I.C.C. Ltd., Prescot, Lancs. 3402

C ABLE Makers in Midlands require experienced Foreman capable of taking complete charge of production of rubber longitudinal and forcing machines, also rubber mixing, callendering, etc. Apply, stating age, experience and salary required, to—Box 3263, c/o The Electrical Review.

C HARTERED Electrical Engineer required for leading group of cinemas with head office in London. Experience of the cinematograph industry not essential if other qualifications compensate. State age, details of experience and salary required. Reply in confidence to Managing Director.—Box 3337, c/o The Electrical Review.

C HIEF Storekeeper, with experience in handling stocks of piece parts, required by a firm mass producing light engineering and electrical products. Orpington area.—Box 3409, c/o The Electrical Review.

C IVIL Service Commission. Applications are invited for the following posts at the Royal Military Academy, Sandhurst: Head of Department of Applied Science and Electro-Technics; Head of Mathematics Department; Head of Department of Modern Studies; Head of Department of Languages (French, German, Spanish); Senior Lecturers and Lecturers in Science (Physics, Chemistry, Engineering); Senior Lecturers and Lecturers in Mathematics; Senior Lecturers and Lecturers in Modern Studies; Senior Lecturer in Languages (French, German, Russian). The inclusive scales of salary are (Heads of Departments) £950 x £30 to £1,100, (Senior Lecturers) £650 x £25 to £350, (Lecturers) £400 x £20 to £600. Every assistance will be given in finding accommodation. Candidates must be of British nationality and must have not less than a second class honours degree. Successful candidates should be prepared to take up duty on 1st January, 1947, or as soon as possible after that date. The posts are permanent with superannuation benefits under the Federated Superannuation System for Universities. Full particulars of the posts and a form of application may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, W.1, quoting No. 1677. Application forms must be returned to him by 28th November, 1946. 3350

C IVIL Service Commission. The closing date for entry into the recently announced competition for posts as Assistant Engineers in the Ministry of Transport has been extended to 1st January, 1947. The salary scales have also been revised since the original announcement; they are subject to provincial differentiation, and in London are £400 (at age 26) rising by annual increments to £650 for men and £380 rising by annual increments to £550 for women. There is also a consolidation addition of £90 for men and £72 for women. Selected candidates aged 26 on appointment will enter at the minimum of the scale; those under 26 will receive £25 less for each year by which they are below that age, and those over 26 may receive an increment for each completed year by which they exceed that age, subject to a maximum of four increments on entry. Assistant Engineers are eligible for consideration for higher posts in the engineering grades. Candidates must have been born on or after 2nd August, 1905, and have reached the age of 25. Selection will be by competitive interview in London held in conjunction with the Civil Service Commissioners. Application forms and further particulars may be obtained from the Principal Establishment Officer, Room 8022, Ministry of Transport, Berkeley Square House, W.1, or from the Chief Officer, Civil Service Commission, the following addresses: (India) 10, Underhill Lane, Delhi; (Egypt) 8, Sharia Tolombat, Garden City, Cairo; (Italy) c/o G.H.Q., C.M.F.; (Germany) c/o 2nd Echelon, G.H.Q., B.A.O.R. The last date for the receipt of completed applications is 1st January, 1947, but applications from non-serving in the Forces will be accepted up to 31st March, 1947. 3351

CHIEF Transformer Designer wanted, with wide experience large and high-voltage transformers. Liberal salary suitable man. Apply—Personnel Manager, C. A. Parsons & Co. Ltd., Heaton Works, Newcastle-upon-Tyne 8, stating age, experience and salary required. 3306

C **LERICAL** Assistant required for stores office. Must have good knowledge of electrical material.—London Electrical Co., 92, Blackfriars Road, S.E.1. 104

D **ELECTRICIS**. Oil manufacturing company, S.E. area, requires graduate, not over 35, to take charge of electrical test laboratory for development and production. Salary according to experience and qualifications. Position is pensionable and has excellent prospects.—Box 3211, c/o The Electrical Review.

D **RAUGHTSMAN** required, experienced up to 500 kV.A. Promising and well-paid position. Apply, stating age and experience, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx. 3237

D **RAUGHTSMAN**, with experience of H.T. and L.T. oil circuit breakers and metalclad switchgear, required for South Midlands. Technical man preferred. Write, giving full details of experience, technical education, age and salary required.—Box 3214, c/o The Electrical Review.

D **RAUGHTSMEN** required by switchgear engineers. Experienced in contract work, protective gear diagrams or design. Applications in writing, with full particulars, to—Ferguson, Pallen Ltd., Manchester, 11. 86

D **RAUGHTSMEN** required in N.E. London area. Two Seniors with sound mechanical knowledge and experience in E.H.T. outdoor switchgear of the oil minimum type. One Senior with experience of steelwork, cable ducting, overhead lines etc., for outdoor switching stations. One Intermediate with experience of control boards, indoor cellular gear and kickers, knowledge of diagrams an advantage. Good salary offered to suitable men. Apply, stating age and experience.—Box 3243, c/o The Electrical Review.

D **RAUGHTSMEN**, preferably with telecommunications experience, required by large firm in the Midlands. Maximum salary £350 plus cost of living bonus. Write, giving details of experience, age, and salary required.—Box 11, c/o The Electrical Review.

D **RAUGHTSMEN** (Senior) required for layout of electrical services, substations and lighting for new wide strip mill. Must be familiar with electrical controls of tandem mills and reversing mills. Office situated Newport, Monmouthshire, later may move to Banbury. Apply—Northern Aluminium Company Ltd., General Engineering Department, Banbury. 3110

E **L** **E** **TRIC** Lamps (miniature) Foreman Charge-hand, South London factory. Qualifications, stem making, bead lamps in particular, sealing, etc. Some knowledge of filaments an asset.—Box 3152, c/o The Electrical Review.

E **L** **E** **TRIC** Wire and Cable Makers in the Midlands invite applications for a vacancy as Chief Inspector. Duties will include quality control of all products during manufacture and final inspection. Applicants should give age, past experience and salary required to—Box 3264, c/o The Electrical Review.

E **L** **E** **CTRIC**AL Engineer for Burma, with B.Sc. degree or equal, or Associate Member of the Institution of Electrical Engineers. Must have experience of power and boiler plant and running maintenance of works plant. Cement works experience desirable but not essential. Three years' agreement, renewable thereafter by mutual consent. First agreement terms according to qualifications. Company provides free passage, partially furnished accommodation and medical attendance. Write, stating age, whether married or single, and enclosing copies of references, to—Box B.487, c/o Streets, 110, Old Broad Street, E.C.2. 3274

E **L** **E** **CTRIC**AL Engineer with practical and general experience of installation, maintenance and fault-localising required, for permanent employment in the specialised field of X-ray engineering. Applicant must be willing to travel in the United Kingdom. Apply by letter, stating age, experience, etc., to—Victor X-ray Corporation Ltd., 15/19, Cavendish Place, London, W.1. 3371

E **L** **E** **CTRICIANS** wanted. Apply—J. H. Plant Ltd., 99, St. Martin's Lane, W.C.2. 3319

E **NGINEER** required by large firm in London area for design and development work on fractional horsepower motors. Previous experience essential. A degree in electrical engineering and qualifications, also salary required, to—Box 3295, c/o The Electrical Review.

E **NGINEERS** conversant with cable machinery required for works in London area. Good prospects. State age, qualifications and salary required.—Box 3356, c/o The Electrical Review.

E **NGINEERS** and Draughtsmen are invited to apply to a large electrical engineering firm in the Midlands which has vacancies in the switchgear department for Technical Sales, Contract, Costing and Design Engineers; also experienced Technical Engineers capable of handling large projects for generation, transmission and distribution. Vacancies also exist for Draughtsmen for circuit diagram and general work.—Box 68, c/o The Electrical Review.

E **X** **P** **E** **R** **I** **E** **N** **C** **E** **D** A.C. and D.C. Winders required, N.W. London.—Box 9839, c/o The Electrical Review.

E **X** **P** **E** **R** **I** **E** **N** **C** **E** **D** Constructional Steelwork Draughtsman, used to transmission lines and masts, required for mast design section. Location of work is at Chelmsford. Basic salary up to £7 10s. per week, according to experience and ability, plus 25% staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3232

E **X** **P** **E** **R** **I** **E** **N** **C** **E** **D** Electrical Inspector and Tester wanted for mercury arc rectifiers and air-cooled transformers, South London district. State experience and salary required.—Box 3354, c/o The Electrical Review.

E **X** **P** **E** **R** **I** **E** **N** **C** **E** **D** Production Engineer required by electrical engineering company (South-West Country), to be responsible for mass production of all types of fractional h.p. motors. Must have initiative and organising ability. State experience and salary required.—Box 3358, c/o The Electrical Review.

F **O** **R** **E** **M** **A** **N** required, take charge electrical assembly and testing fluorescent lighting units. Able train and control male and female staff. East London area.—Box 3327, c/o The Electrical Review.

F **O** **R** **E** **M** **A** **N** wanted by leading firm of cable manufacturers for copper wire mill, including pickling plant and annealing ovens. Applicants should be between 30 and 40 years of age and must be conversant with all modern methods and fully capable of taking complete charge of plant, including die room for the refinishing of synthetic and diamond dies. The position, which is a staff appointment, is progressive, and superannuation benefits are available.—Box 3390, c/o The Electrical Review.

I **N** **D** **I** **A**. Wanted, for 4 or 6 years only, by European firm in India, experienced Electrical Engineer, age about 45-50, with administrative experience in the generation and distribution of electricity for public supply. Education, good standing necessary, and previous service in India most desirable. Salary Rs.2,500 per month, plus Rs.500/- overseas allowance if domiciled in U.K., but no pension or provident fund. Free furnished quarters, light and fuel, and four months' leave on full pay every other year. Write—Box 1390, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3329

J **U** **N** **I** **O** **R** Engineer with experience of large lighting and power installations, estimating, correspondence, progressive post. Write fully, giving particulars of training and qualifications and salary required, to—C. A. Newton & Co. Ltd., St. James Street, Derby. 3355

L **A** **M** **P** Production Engineer. A vacancy exists in a North of England factory for a Lamp Production Engineer with wide experience in the manufacture of all classes of electric lamps. Only applicants with the right experience need apply, giving full details, references and salary required.—Box 3373, c/o The Electrical Review.

M **A** **N** **A** **G** **E** **R** or Managers of good appearance and personality required for high-class electrical and radio retail and art goods business, 30 miles from London. Must be thoroughly capable and able to take full control. Write with particulars, stating age, experience and salary required.—Box 115, c/o The Electrical Review.

M **E** **C** **H** **A** **N** **I** **C** to assist foreman. Small but rapidly expanding organization. Electro-mechanical engineers, world export, require all-round mechanic to understudy and assist machine shop foreman. Eventual promotion for right applicant. First-class opportunity for energetic man who desires progression. London area.—Box 3400, c/o The Electrical Review.

M **E** **T** **E** **R** Repairer and Tester: Applicants must have had considerable experience in the repair and testing of all types of watt-hour meters, indicating instruments and time switches: rate 1s. 10.3d. per hour, plus 8d. per hour war bonus per 47-hour week. Installation Inspector: Applicants must be experienced electricians, conversant with the I.E.E. wiring regulations and able to inspect and report on domestic and industrial installations: rate 2s. 1d. per hour, plus 8d. per hour war bonus per 47-hour week. D.I.C. (No. 10) London Area conditions and wages. Applications to—Chief Electrical Engineer, Hammersmith Borough Council, 154, Uxbridge Road, W.12. 8349

NORTH-East Coast firm requires Engineers between 25 and 30 years of age, as follows: (1) For Turbo-Alternator Department to assist with tenders and following up contracts, etc. Preferably with degree in electrical engineering. (2) For Turbine Works Department to assist with technical work, testing, etc. Preferably with engineering degree covering thermodynamics. (3) For Land Boiler Department to assist with tenders, testing, etc. Preferably with engineering degree. Please give full particulars with application and state salary required.—Box 3208, c/o The Electrical Review.

OFFICE Assistant for Malaya, about 25, accustomed sales electrical equipment, experience stock recording, correspondence and general office routine, with some knowledge accounts. Salary £35 to £40 per month, plus temporary cost of living allowance. Passage paid. Write—Box PH.595, Deacon's Advertising, 36, Leadenhall Street, E.C.3. 3345

OPERATORS wanted, cable trade, North Midlands, for all branches wire drawing, tinning, extruding, diamond polishing, etc. Good steady job and housing arranged for right types. Write in confidence, giving details of experience, etc., to—Box 3121, c/o The Electrical Review.

OPPORTUNITY for young man with flair for publicity and sales promotion and to act as assistant to sales manager in transport engineering concern. Write, stating experience, age, salary, etc., to—Box 3081, c/o The Electrical Review.

POWER Station Attendants for industrial installation. Conversant with switchboard and turbine driving. Rate, 21s. 5d. per shift of 8 hours, 6 shifts worked, 7 paid.—City of Birmingham Gas Dept., Lord St., Birmingham. 3389

PRODUCTION Engineer with good knowledge of modern methods for electrical engineering firm employing 1,000. Must be able to understand and enforce rigidly the system operating throughout the works, stores, etc. Good disciplinarian. Reply, stating experience and salary required.—Box 3228, c/o The Electrical Review.

PRODUCTION Engineer, with planning experience, required for mass production of light engineering and electrical parts on assemblies. Good scope and salary for man well-acquainted with modern flow production methods, time study, shop loading, etc. Orpington area.—Box 3410, c/o The Electrical Review.

PRODUCTION Manager required by engineering firm engaged in the manufacture of A.C. and D.C. motors and switchgear. Applications will be considered from engineers with good academic qualifications together with executive works experience. The position demands capability of controlling functions such as production planning, manufacturing methods, time study and tool design. Excellent prospects with an expanding company for a person with initiative and drive.—Box 3313, c/o The Electrical Review.

RADIO Engineers. Large firm in London area requires experienced Radio Set Designers, previous experience essential. Write, stating age, experience and salary required, to—Box 3320, c/o The Electrical Review.

REFRIGERATION Sales Engineer-Manager required to take complete control of commercial refrigeration department of a large electrical establishment in Yorkshire with many branches. Applicants must have a wide knowledge of all types of domestic and commercial refrigerating plant; also suitable practical and technical knowledge together with commercial and sales organising abilities. Reply fully, stating age, details of experience, sales results and salary required.—Box 3326, c/o The Electrical Review.

REPRESENTATIVE for London, with connections wholesalers, shippers, etc., required at once by makers of lighting fixtures. Commission basis.—Box 9849, c/o The Electrical Review.

REPRESENTATIVE for South Coast required by manufacturer of electric appliances. Must reside in the area. State age, experience and salary required.—Box 3325, c/o The Electrical Review.

REPRESENTATIVE (Junior) required by manufacturer of electric appliances to cover Midlands and South Wales as deputy to senior representative. Must reside in Bham and be car driver. Good progressive opening for ambitious young man. State age and salary required.—Box 3324, c/o The Electrical Review.

REQUIRED, for extensive development programme, Electrical Draughtsmen with experience in steelworks H.T. and L.T. distribution schemes, substation design and layout, A.C. and D.C. heavy industrial control gear. Draughtsmen with similar experience in other industries would be considered. Apply by letter, stating age, experience and salary required, to—Chief Draughtsman, Dorman Long & Co. Ltd., Central Engineering Dept., Britannia Works, Middlesbrough. 41

REPRESENTATIVES required by Internal Telephone Company (rental) for London, Cardiff, Newcastle, Glasgow, Norfolk and Suffolk, Kent. Thorough training given. Applicants must have had previous experience speciality selling and must not be older than 45. Very good income for right men.—Box 3297, c/o The Electrical Review.

REPRESENTATIVE required to obtain contracts for well-established firm of electrical contractors wishing to expand. Expenses allowance or fixed salary and liberal commissions. Excellent prospects for right man. Previous experience and good connections essential.—Box 9842, c/o The Electrical Review.

SCALER in required for electric lamp factory. Good prospects for right man. Applications, giving full details of age, experience and salary expected, to—The Manager, British Luma Co-operative Electric Lamp Society Ltd., Shieldhall, Glasgow. 3372

SENIOR Design Draughtsman for electrical and mechanical design work, experienced in detailing for domestic electrical products for fractional horse-power and small universal motors. Salary from £450 per annum. Age not under 25. Please apply, giving details of age, experience, salary required, to—Box 3379, c/o The Electrical Review.

SHOWROOM Assistant required, previous experience essential. Apply in writing, stating experience, age, and salary required, to—Giles (Electrical Engineers) Ltd., 9/11, Victoria Colonnade, Southampton Row, W.C.1. 3223

SKILLED Armature Winder required for India. £45 per month plus ten per cent. of Bombay concern's profit. Fare paid out and home after four-year period. Must be single man with full winding tradesman apprenticeship.—Box 3191, c/o The Electrical Review.

SOUTH Shields Marine School. Principal, J. Hargreaves, M.A., Ph.D. Required as early as possible a Lecturer in Electrical Engineering. Graduate or equivalent qualifications, and industrial or professional experience required. Salary according to the Burnham Technical Scale with appropriate allowances. Residential accommodation available for a single man. Immediate application is requested. Further particulars and an application form may be obtained by sending a stamped and addressed envelope to the Principal, Marine School, South Shields. 3305

STOREKEEPER Assistant required with knowledge of electrical contractors' stores. Apply in writing, giving previous experience, age and salary required, to—Giles (Electrical Engineers) Ltd., 9/11, Victoria Colonnade, Southampton Row, W.C.1. 3224

SWITCHBOARD Attendant required for Class F station. Should possess technical knowledge and have had experience in the operation of E.H.T. and L.T. switchboards. Present rate of pay 2s. 7½d. per hour. Applications to the Chief Engineer, Slough Estates Ltd., Trading Estate, Slough. 3309

SWITCHGEAR Draughtsmen required for expanding company in the Midlands, some experience circuit breaker equipment for power and substation installations essential. State age, experience and salary required.—Box 3411, c/o The Electrical Review.

TECHNICAL Sales Engineer required by London company to develop the sale of high-grade insulating material in this country. Applicants should have wide practical and selling experience and preferably possess a knowledge of French. Send full details training, qualifications and experience and remuneration required to—Box 3360, c/o The Electrical Review.

TRANSFORMER Design Engineer required, experienced in all types up to 500 kVA. Promising and highly-paid position. Write, stating age and experience, to—Brentford Transformers Ltd., Windmill Road, Brentford, Middx. 3236

TRANSFORMER Draughtsmen required for Production D.O., up to 2,000 kVA. Experienced men are invited to apply, stating full particulars, to—Personnel Officer, Foster Transformers & Switchgear Ltd., Apex Works, South Wimbledon, S.W.19. 3255

WORKS Manager required for electrical manufacturers with works in Brazil. Must be experienced production man, high grade executive ability, modern ideas, knowledge of Portuguese an advantage. Only energetic men of high calibre should apply with fullest particulars.—Box 3338, c/o The Electrical Review.

WORKS Manager with experience radio and electrical instrument manufacture is offered permanent post with good salary and prospects.—Box 3329, c/o The Electrical Review.

X-ray Technician required for India. Must be able to construct, repair and service X-ray equipment of all types. Apply in first instance to—Box 3269, c/o The Electrical Review.

APPOINTMENTS FILLED

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

BOROUGH of Luton Assistant Station Suplt., District Engineer (Urban), and Junior District Engineer, City and County of Lichfield—E.H.T. Plumber Cable Joiner, City of Oxford, Senior Demonstrator; County Borough of Brighton—Chief Constructional Assistant. All applicants are thanked.

SITUATIONS WANTED

A production executive (34), desires responsible position in instrument or radio factory. Good technical and production experience, 14 years in industry.—Box 9816, c/o The Electrical Review.

A DVERTISER (41) desires change. Over 22 years' experience electrical instrument making (18 years' chargeband instrument assembly & calibration).—Box 9783, c/o The Electrical Review.

A M.I.E.E. (32), seeks responsible position in or near London with a growing firm. Flair for compiling advertising literature, technical letters, and replying speedily to customers' correspondence.—Box 9864, c/o The Electrical Review.

A N Electrical Installation Engineer and Draughtsman wishes to open negotiations for a permanent executive appointment in London, Herts. or Beds. Preferably in surveyor's dept. of organisation controlling hotels, multiple stores, etc., or with insurance co., manufacturers or contractors. Sound technical and practical background, 25 years' experience in all branches of contracting and maintenance. Well versed in building and allied trades, and in general engineering. Minimum salary £800 p.a.—Box 9871, c/o The Electrical Review.

A RMATURE Winder, A.C. & D.C. repetition or repair, all classes of winding, or any other electrical job. Over 30 years' experience. Able to take charge.—Box 9782, c/o The Electrical Review.

BUYER, M.P.O.A., with many years' continuous experience buying all classes of materials for engineering trade, both electrical and mechanical, seeks position with company requiring a good organizer and disciplinarian. Salary required £650 per annum.—Box 9766, c/o The Electrical Review.

BUYER, M.P.O.A., 20 years' experience, Birmingham. London, electrical engineering, desires change. Resident Birmingham.—Box 9810, c/o The Electrical Review.

C HARTERED Electrical Engineer (34) desires appointment with managerial responsibility for department. 10 years' experience electrical/mechanical plant inspection, maintenance, repair and installation work. 4 years electrical officer R.A.F. Experienced in maintenance organisation and planning and in plant purchase and repair costing. Has been concerned with many large industrial plants. Would like to join firm expanding on new lines. Particularly interested in agricultural electrification and agricultural plant maintenance. Prepared for small investment or partnership.—Box 9789, c/o The Electrical Review.

C HIEF Draughtsman or Designer desires change. Many years' varied mechanical and electrical experience, including management, tool design and planning. S.W. London.—Box 9796, c/o The Electrical Review.

C HIEF Draughtsman with many years' experience on experimental and production design of domestic appliances, radio equipment, measuring instruments, light mechanisms, etc., seeks position in London.—Box 9818, c/o The Electrical Review.

C OMPETENT Electrical and Mechanical Engineer age 34, foreman or representative desires responsible position. Extensive experience of industrial installations and maintenance of A.C./D.C. power plants, installing motors, control gear, lighting, illuminations, heating, ventilation, lay-outs, records and estimating.—Box 9784, c/o The Electrical Review.

E DUCATION and Training. Young man, 24, college trained, 4 1/2 years' Assistant Apprentice Supervisor at a Midland engineering works (400 apprentices, all trades), requires similar post to extend experience, preferably in South. Willing to initiate scheme if necessary.—Box 9856, c/o The Electrical Review.

E LECTRICIAN Engineer, A.M.I.E.E., age 31, 8 years' experience in light electro-mechanical engineering, including design, development, production problems, etc.; also acted for two years as technical representative, previous experience in heavy engineering. Seeks position, preferably in an administrative or executive capacity.—Box 9847, c/o The Electrical Review.

E LECTRICAL Contractors' Supervising Engineer, long experience, electrical and mechanical, capable, practical, energetic.—Box 9757, c/o The Electrical Review.

E LECTRICIAN Engineer (46) seeks progressive appointment leading to advancement, supervisory or managerial. Design, lay-out, estimating of large private and industrial lighting, power and heating installations. Conversant with office management, control of skilled and unskilled labour.—Box 9786, c/o The Electrical Review.

E LECTRICIAN Engineer (25) D.F.H.(Hons.), Grad. I.E.E. seeks permanent progressive position South of England or Continent. Four years as electrical officer R.N.V.R. following thorough practical training. At present engaged on switchgear development.—Box 9833, c/o The Electrical Review.

E LEC. Foreman, 20 yrs.' exp., large installations and maintenance, requires progressive position, London area, own car.—Box 9827, c/o The Electrical Review.

E LECTRICIAN, 25 years' first-class experience, charge-hand, screwed conduit and heavy industrial installation and maintenance, A.C. and D.C. motors, control, switchgear and plant erection.—Box 9870, c/o The Electrical Review.

E NERGETIC Elec. Eng. requires position at home or abroad as Sales, Buying, or Tech. Rep. Served tech. college, bench, D.O., buying, production and planning; 4 1/2 years' W.O.1 Arm. Art. E., 1/3 Base W/Shops, R.E.M.E.—Box 9855, c/o The Electrical Review.

E NGINEER, A.M.I.E.E., Representative with 12 years' contacts in Birmingham and Midland Counties, desires change; details.—Box 9865, c/o The Electrical Review.

E NGINEER, A.M.I.E.E. (36), 20 yrs.' exper. manufacturing and development. Chief draughtsman all types dynamic electric machinery. Requires progressive position as Assistant Production Manager, or Assistant Chief Engineer, London or Home Counties. Minimum salary £650.—Box 9772, c/o The Electrical Review.

E NGINEER, with initiative and enterprise, requires responsible position. Twenty-five years' successful experience works management, design, development, testing in light engineering and precision instruments, electrical and mechanical. Sound technical and practical training to degree standard. Can introduce new line of manufacture.—Box 9762, c/o The Electrical Review.

E XECUTIVE, M.Inst.W., London office technical sales and publicity management, ex-general manager tramway co. abroad, personal contact S. American, Indian, Continental machinery markets, used to large volume commercial, technical correspondence, statistics, staff control, desires post London area. Would take up £500 shares in well-established company. Basic salary £500. Available immediately.—Box 9868, c/o The Electrical Review.

F OREMAN Armature Winder, 29 years' varied experience, new or repair, rotary or static, industrial power application, conversions, some drawing, requires good position.—Box 9830, c/o The Electrical Review.

F OREMAN Electrician, 30 years' exp. lighting and power installation, factory maintain., free Nov.—Box 9752, c/o The Electrical Review.

Q UALIFIED Instrument Engineer seeks progressive post. Production, development or sales.—Box 9806, c/o The Electrical Review.

R A DIO and Electrical Engineer (32), Higher National Certificate both radio and electrical engineering; 6 years' apprentice in electrical installation and maintenance; 2 years' small electric motor manufacture and repair; 1 year corporation electrical dept. as technical adviser in generating station; 8 years with old-established firm as manager of dept. manufacturing radio and electrical equipment for H.M. ships. Holder of P.O. transmitting licence. Keen radio experimenter.—Box 9851, c/o The Electrical Review.

R ESEARCH Laboratory Mechanic, sound practical knowledge and able to make electronic devices from theoretical circuit diagrams, desires change of position, London area. Box 9859, c/o The Electrical Review.

R UBBER Cables. Post of Production Manager or Manager required for one fully experienced in all types of cables and the production thereof by the most modern methods for quality, efficiency and price. C.M.A. or non-Ing. Replies in strictest confidence.—Box 9858, c/o The Electrical Review.

W . Head, having terminated his agreement with the Sun Electrical Co. Ltd., after 18 years, is now open to receive offers for services. Will consider any proposition where honesty, ability and ingenuity provide mutual financial benefits. Experienced salesman, buyer, representative and branch manager. Well known London, West of England, Essex, Berks and Oxford.—Box 9869, c/o The Electrical Review.

TELECOMMUNICATIONS Engineer (36), B.Sc., A.C.G.I., A.M.I.E.E. having wide experience of telephony including carrier telephony desires post giving opportunity of developing and applying his knowledge of radio engineering.—Box 9788, c/o The Electrical Review.

WORKS Executive, A.M.I.I.A. (42), seeks responsible position. Experience of works management, organising, production planning and control, supervising, time study and personnel administration as applied to all types of precision electrical measuring instruments and radio. Good disciplinarian and used to handling labour to obtain co-operation for best results.—Box 9854, c/o The Electrical Review.

WORKS Executive, qualified mechanical engineer, comprehensive administrative experience covering the application of time and motion study, production control, scheduling, standard costing, process planning to electro-mechanical engineering work. Good organiser with successful record in handling labour and getting results.—Box 9822, c/o The Electrical Review.

FOR SALE

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

CARDIFF RURAL DISTRICT COUNCIL

ONE Brush 150-kVA Outdoor Transformer, 11,000/6,600 volts, 3-phase, 50 cycles, wound delta/star, with cable and boxes, manufactured 1938. Further particulars from, and offers to, the Electrical Engineer and Manager, 20, Park Place, Cardiff. 3344

A. Cooksley & Co. Ltd. offer large selection of used Electric Motors, A.C. and D.C. Write—21/25, Tabernacle Street, London, E.C.2 (Monarch 3357/58). 46

A. Diesel Generating Set by Davey Parman, 25 h.p. A single cylinder, vertical, cold start with belt-driven alternator, 15 kVA, 400/350, 1,000 revs. Cheap for quick clearance.—Box 3426, c/o The Electrical Review.

A. C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victrola Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A. C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). 102

A. C./D.C. 5-valve Superheterodyne Sensitive 3-wave Band Receiver. Excellent tone. Attractive modern cabinets in "Plastic" or polished wood, £16 16s. Usual trade terms and facilities. Early delivery. Trade only.—Morgan, Osborne & Co. Ltd., Southview Road, Warrington, Surrey. 110

A. C. Motors, 1/75th h.p. to 5 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3. 57

A. LTERNATING Sets, 80 kVA, 400/350, engine driven, direct coupled; 2 cold start Diesels (1944) and 2 semi-portable Petrol Sets, unused, all ex-Gov. surplus. Many others.—The Electroplant Co., Wembley, Middx. 3427

A. RGENT Solder, Q.380, in sticks.—Box 3310, c/o The Electrical Review.

A. UDAX Ltd. now have available an extensive range of a new season's designs of high-class Lamp Shades in Plastics and Parchment, together with a range of Table Lamps. Prompt delivery available to all parts of the country. Enquiries particularly invited from wholesalers and electrical factors.—84, Preston Road, Brighton (Tel. Preston 5565). 5583

B. & W. Water Tube Boilers for disposal. Two 50,000 lbs. evaporation, 310 lbs. w.p.; two 50,000 lbs. evaporation, 220 lbs. w.p.; four 30,000 lbs. evaporation, 260 lbs. w.p.; one 20,000 lbs. evaporation, 175 lbs. w.p.; one 12,000 lbs. evaporation, 200 lbs. w.p.; two 16,000 lbs. evaporation, 190 lbs. w.p.; one 9/10,000 lbs. evaporation, 200 lbs. w.p. We install complete including brickwork. Economisers, Pumps, Piping, Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough. Telephone, Middlesbrough 2622. 32

B. ALL Bearings, 120 only of new unused with cage, size 1" o/d x 7/32" bore x 7/32" width, at 3s. 6d. each. One lot.—Box 3353, c/o The Electrical Review.

B.ATTERY Chargers for home and export, 4 models, 2-6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

B. T.H. Cap. Motors, 230 v., 1,425 r.p.m., 1/5, 3, 1/2 h.p. Offers.—Box 9838, c/o The Electrical Review.

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B. T.T.A. A comprehensive service is now available for all classes of tools and equipment for the accumulator trade.—B.T.A., 246, Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 92

C. HOKES, suitable for 80 w. fluorescent tubes, 220/230 v., 50 c. Reputable manufacture, immediate delivery.—Hardman & Co. Ltd., The Baum, Rochdale, Lancs. Tele. No. 4151. 3307

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E. LECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 volts. Also 220 volts. Stock delivery, £6 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

E. LECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Second-hand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

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400 kVA oil-cooled Transformer, 6,600 v. primary, secondary 100, 90, 80, 60 and 50. Three truck-type Switch Cubicles. Infra-Red Mould Drying Units. S. C. Bilby, Crosswells Road, Langley, Nr. B. ham. 3192

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

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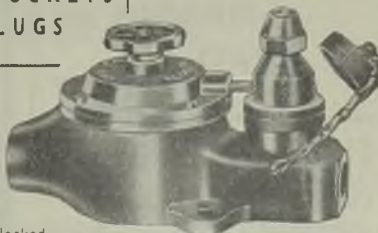


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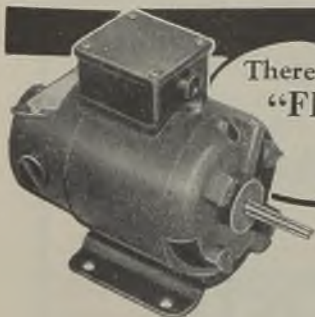
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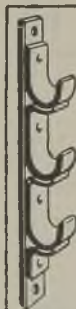
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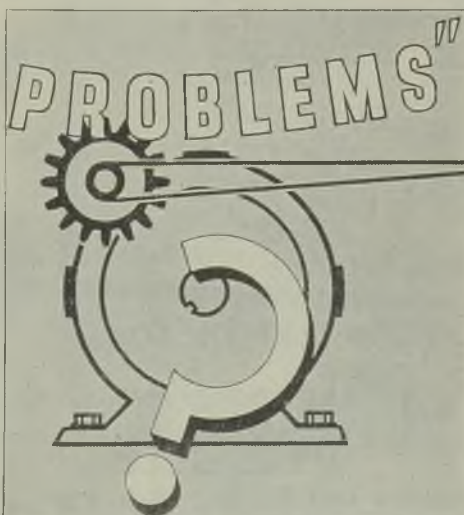
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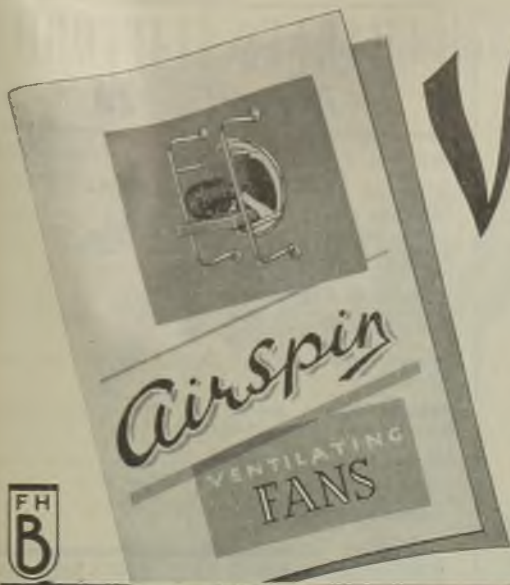


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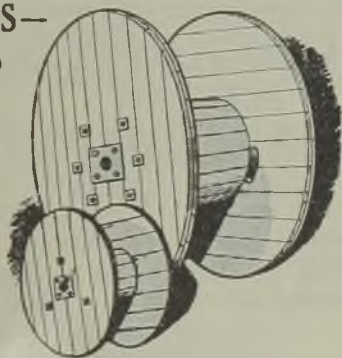
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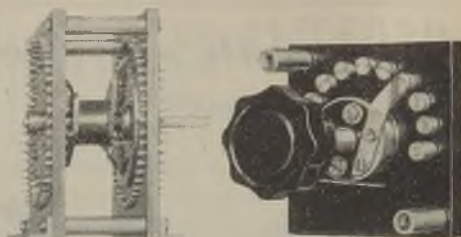
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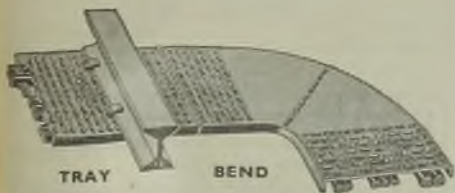
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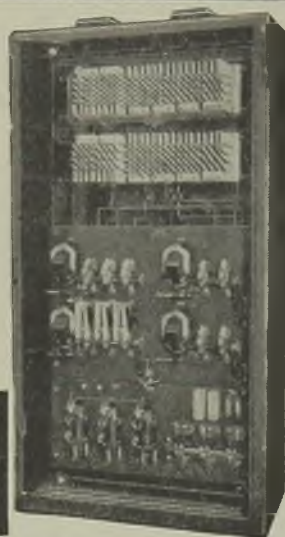


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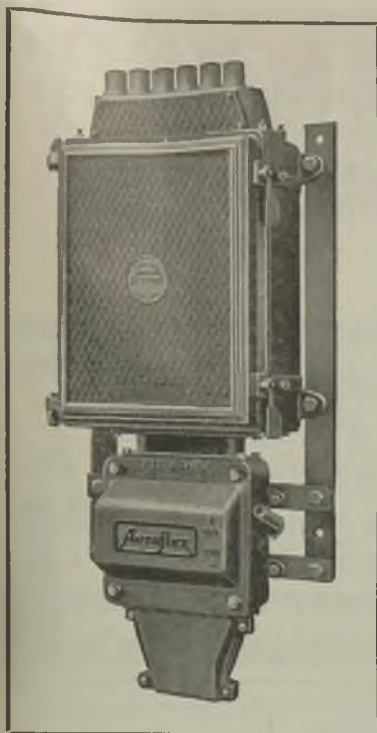
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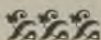
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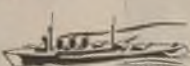
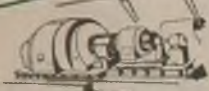
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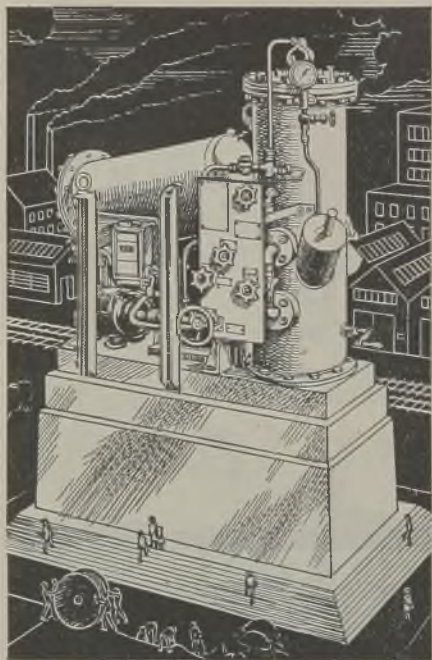
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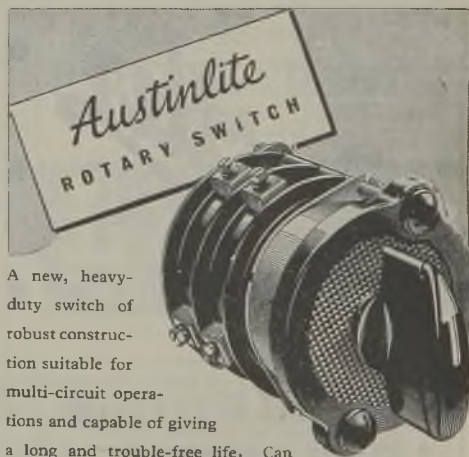
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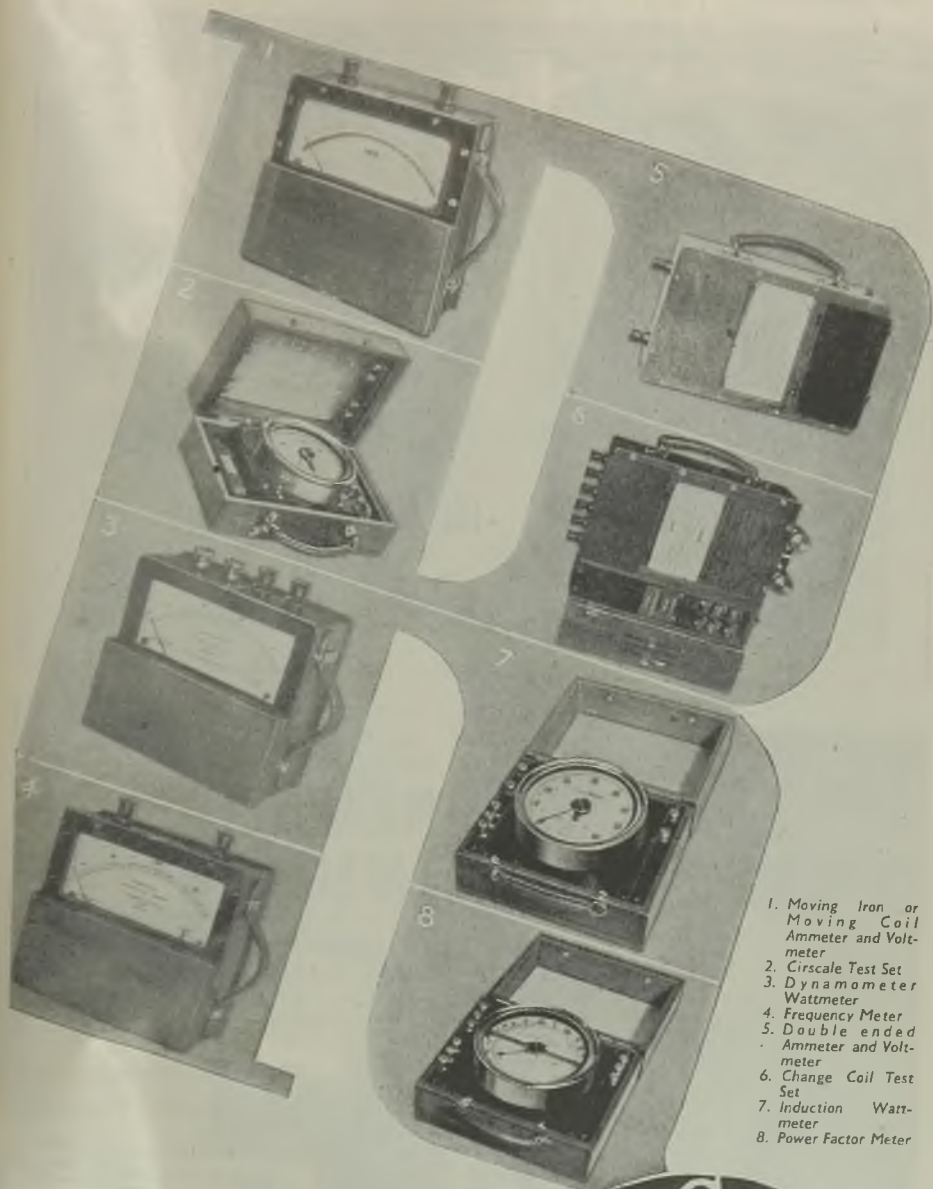


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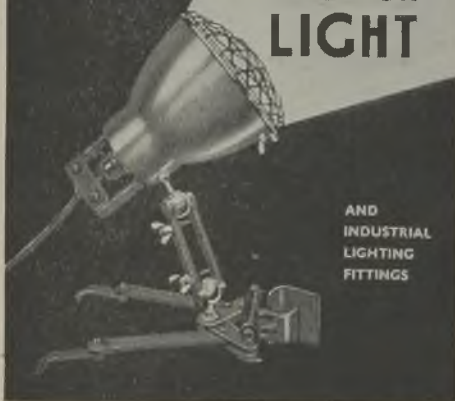
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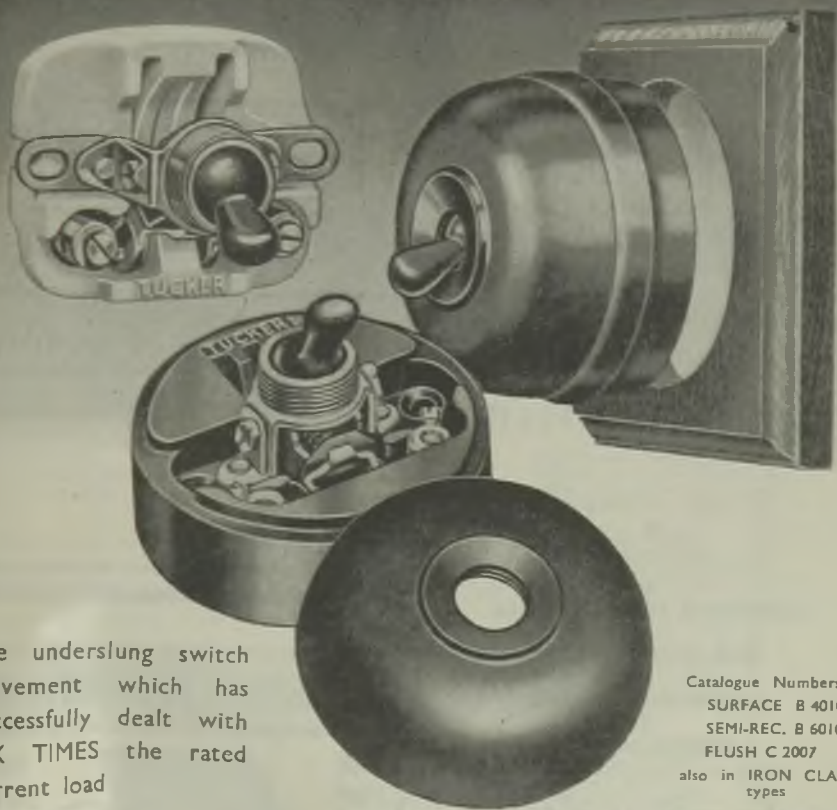
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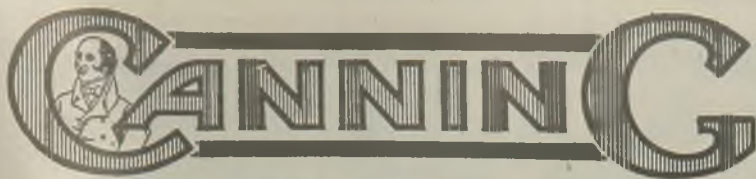
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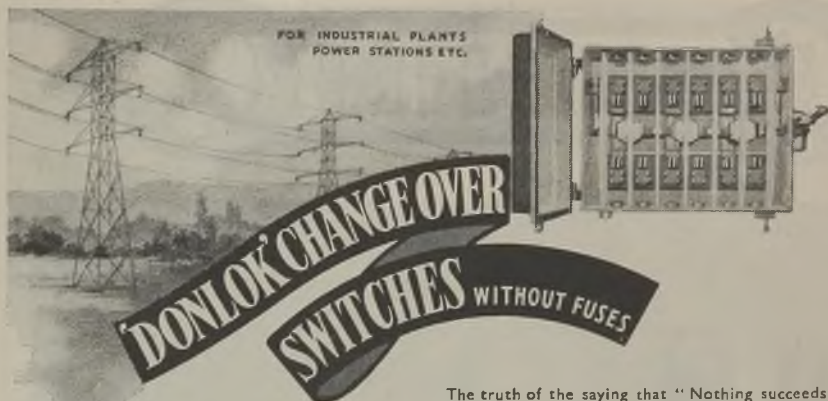
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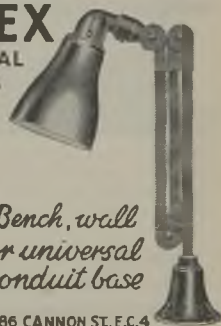
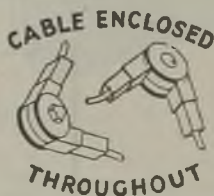
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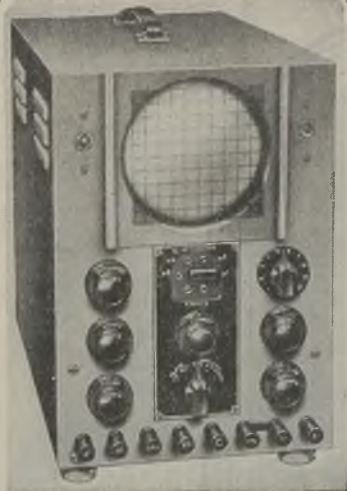
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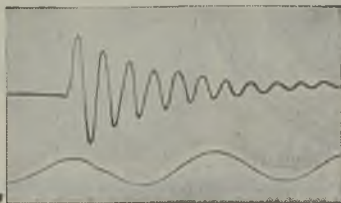
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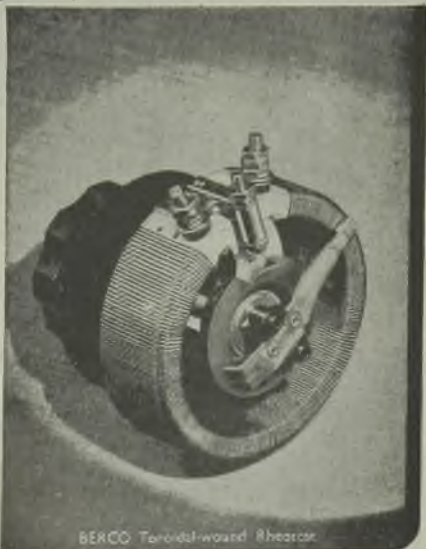
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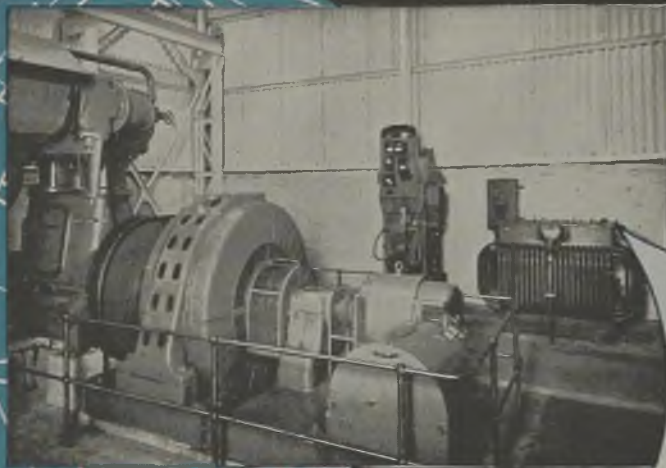
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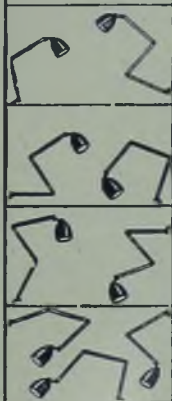
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