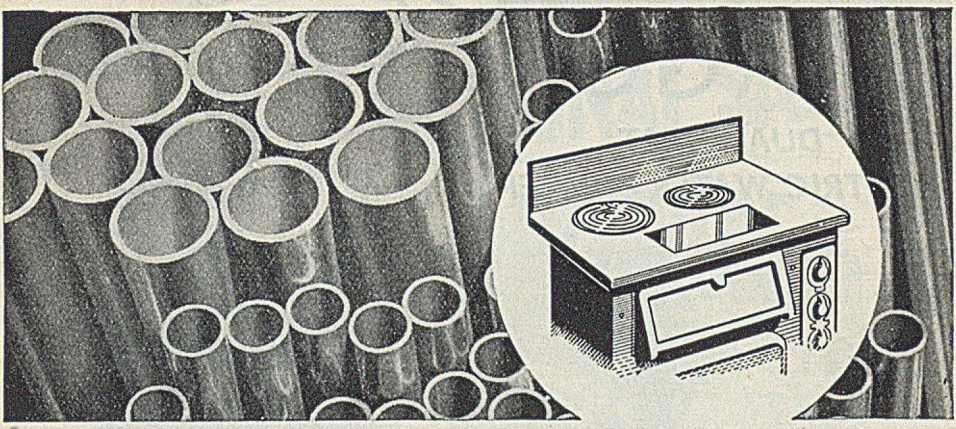
ELECTRICAL REVIEW

VOL. CXL JUNE 27, 1947 NO. 3631

FOUNDED 1872 NINEPENCE WEEKLY



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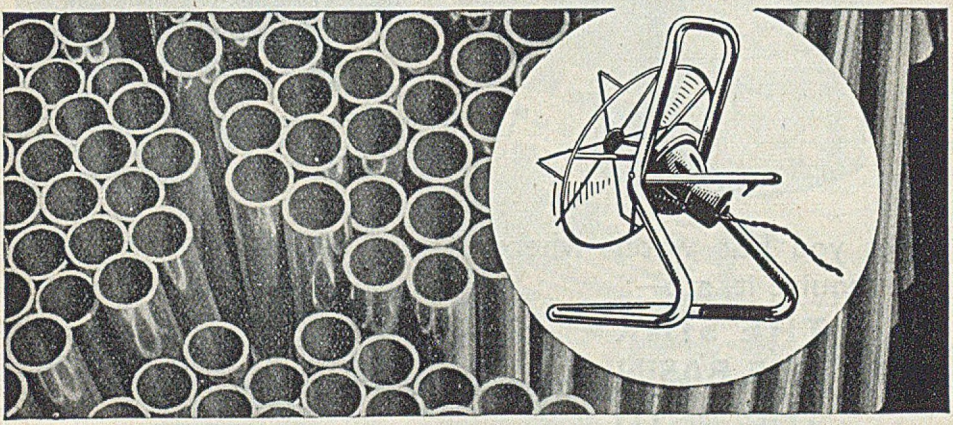

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Electrical Review, June 27, 1947

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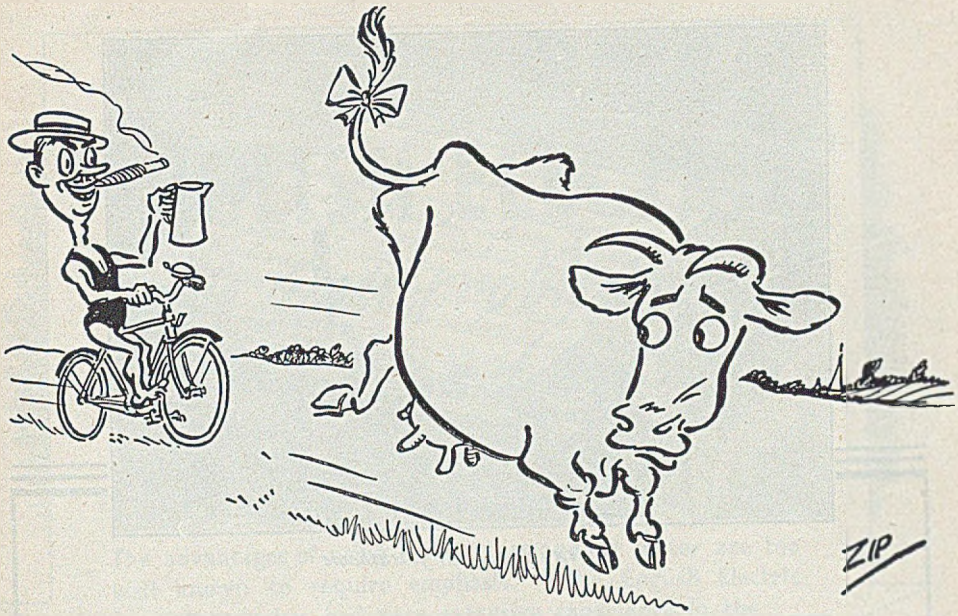

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It should be noted that the complaint is superficial in character, and manifests itself solely in those with a strong sense of obligation towards the strict honouring of promises. It is rarely found in opportunists, black marketeers and the like.

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A14

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ELECTRICAL REVIEW

June 27, 1947

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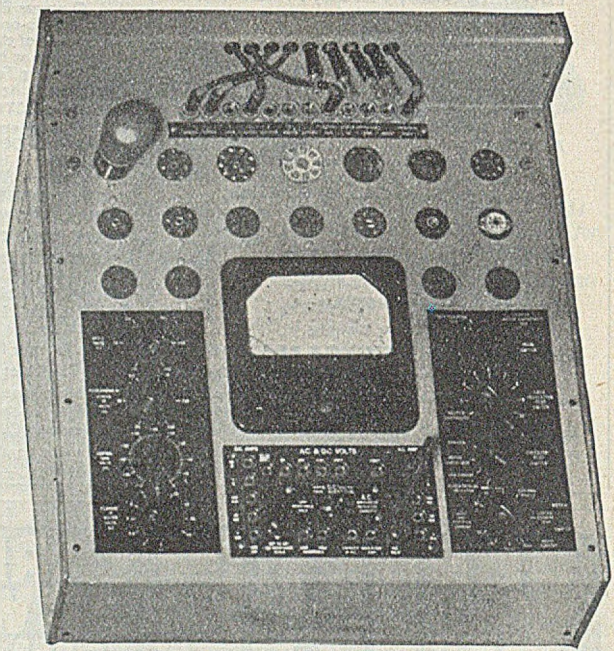

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXL. No. 3631 JUNE 27, 1947 9d. WEEKLY

Supply Industry's Future

Importance of the Human Touch

THE address delivered on Tuesday last by Mr. J. S. Pickles, as president of the Incorporated Municipal Electrical Association at Bournemouth, ably summarized the position of the electricity supply industry up to 1944 and put forward views on the possible course of events in the immediate future.

Mr. Pickles expressed the opinion generally held in the industry that although improvements in some respects were desirable, the industry could fairly claim a good record, a forward-looking policy, an adequate and contented personnel, and full confidence in its ability to meet all needs. It is true that this last claim seems at the moment to be a little doubtful, but nobody regards the present stringency as anything more than a temporary check.

Local Authorities' Voice

By its nature the I.M.E.A. could not but welcome reorganization on the basis of public ownership, although nationalization was thought to be not the only possible form. As things are turning out the local authorities, equally with the companies, are losing control of their undertakings and are not quite certain how much say they will have in electricity supply in the future. The Electricity Bill certainly provides that local authorities shall nominate not less than half of the members of the Consultative Councils but that is something quite different from controlling affairs in their own areas. Moreover, the effectiveness of these Councils has been much questioned; Mr. Pickles suggested that some alteration in their composition or functions might be necessary. He attached hopes to the Organizing Committee, which consists of men with long experience of the industry.

At such a gathering the foremost immediate question was naturally that of the Association's own future. As Mr. Pickles said, it is quite obvious that it cannot continue as at present constituted. While local authorities may still retain separate committees to keep an eye on electrical matters they will not have electrical engineers and will thus lose direct touch with technical and administrative questions. Any association in emasculated form could only be a counterweight to the new electricity organization: as an advisory body it would be considered superfluous in view of the composition of the Consultative Councils. Would the Government tolerate a counterweight? It is doubtful whether such an Association could exist without official sanction.

Personal Relationships

But men matter more in the electricity supply industry than organizations and Mr. Pickles was justified in insisting that no industry, however well organized, could be wholly successful unless it possessed the right spirit. We suppose that in no other industry (not even in the gas industry) does such harmony exist as in electricity supply. There is a spirit of service to the public which stands out all the more prominently to-day when relations between suppliers and customers in other spheres have badly deteriorated. Mr. Pickles gave a number of reasons

for the existence of this spirit, some of which may be jeopardized under the new arrangements unless great care is taken.

To a very large extent the remarkable development of recent years has resulted from personal relationships between management and staff, between staff at the higher and lower levels, and between the undertakings' officials of all grades and the public. If progress is to continue at the same rate there must be no rigidity of form and full encouragement must still be given to the energy, initiative and enterprise of those who will be absorbed into the new organization. Only in this way will the drastic reorganization of the industry be justified.

Report Stage

THIS week the Electricity Bill, as amended in committee, was reported to the House and a three-day debate was arranged which was still in progress as we went to press. The principal endeavours of the Opposition, led by Mr. Walter Elliott and Mr. Robert Hudson, were aimed at securing the separation of Scotland from the general structure, to protect consumers against "undue preference" and to ensure that the Consultative Councils would be so constituted as to be really representative of the consumers. Much was also made of the terms on which local authority undertakings are to be acquired and the Government conceded a further £5,000,000 as compensation.

Generating Practice

IN the wide-angle view presented in his I.M.E.A. paper, Mr. F. W. Lawton has filled a gap. In addition to bringing up to date the record of power station design and operation, he has indicated trends that are likely to be followed for several years ahead within "the economic frame of reference." Variations from these are likely in the main to be due to factors that disturb the balance between coal prices and capital charges (taking into account the whole life of the plant) which has hitherto largely determined practice.

Electricity Law

MR. R. BIRT'S paper at the I.M.E.A. Convention showed admirably how the present complicated mass of legislation relating to electricity supply had grown up over a period of sixty years or more. His intention was to show how far the Electricity Bill now before Parliament superseded previous measures and thus cleared away a little of the mess. But it was inevitable that a Bill designed to change the whole basis of ownership would introduce further complications and Mr. Birt demonstrated the need for an early codification of electricity supply law and appealed for immediate assistance from the Government in the shape of a reprint of the earlier Acts as amended by the new measure accompanied by a "comprehensive index or explanatory memorandum."

Purchase Tax Remission

GRATITUDE to Mr. Dalton for removing the purchase tax from electric cooking equipment, kettles, wash-boilers and irons is tempered by the consideration that it should never have been imposed against the advice of E.D.A., backed by the local authority electricity supply undertakings, and the industry generally. Retailers will have a busy and perhaps trying time during the next few weeks repaying the tax to those who have bought appliances since early April. Proof of purchase will frequently be difficult as not all buyers preserve their bills. Yet the Chancellor could not do otherwise than date back the "concession" to Budget Day. In the meantime the position with regard to washing machines, vacuum cleaners, etc., is "fluid" as the Chancellor has not yet made up his mind about them. We trust that he will yet be convinced that these are necessities in modern servantless homes.

Consultants and Empire

IT may be that good wine needs no bush. It is certain that British prestige in engineering is based upon achievement backed by a high ethical code. That is a long-term factor of inestimable value, but it is not necessarily decisive in regard to any new project unless its practical bearing is immediately obvious. It would be out of keeping with the character of consulting engineers to publicize their own successes, but it should be done by others in the position and with the aptitude to do so. Their experience placed at the disposal of the Dominions and colonies is, as the Minister of Transport pointed out at the function reported in this issue, an indispensable bond between the far-separated parts of the Empire.

I.M.E.A. at Bournemouth

Full and Varied Convention Programme

VISITING Bournemouth for the first time since that unique occasion when the Incorporated Municipal Electrical Association joined forces with other electrical organizations to hold the National Electrical Convention, most of the 1,650 delegates attending the Association's convention which opened last Monday have found it somewhat difficult to realize that twelve years have elapsed. To some it may seem longer: very distant are those happy days of 1935 when the thoughts of war, let alone nationalization, were far from their minds. When one looks at the almost unchanged face of Bournemouth, happily but little scarred by the war and almost everywhere bright and shining with a coat of new paint, it seems only yesterday since we last went to the Pavilion under Mr. E. E. Hoadley's presidency.

Though the first official functions, the opening of the exhibition and the reception by the President of the Association, Mr. J. S. Pickles, and Mrs. Pickles at the Pavilion, did not take place until Monday, there was a good sprinkling of delegates in Bournemouth by Saturday night, the view apparently being taken that if this was to be the last I.M.E.A. Convention it behoved them to make the most of it. It made quite an interesting pastime trying to pick out from the crowds in the town the still badgeless pairs of engineers and committee chairmen.

The weather was cloudy and much cooler on Monday for the delegates to make their pilgrimage to the Convention offices at the Pavilion for the collection of their badges. Apparently with the intention of getting there early to miss the crush, most people arrived soon after the offices opened with the result that the I.M.E.A. staff had a very busy time for an hour or two.

Delegates outside the Pavilion in the concert hall of which the meetings are being held

The cooler weather was not so noticeable at the Electrical Exhibition at the Majestic House Garage, where the temperature became progressively higher as one descended the succession of ramps connecting the various floors on which the displays were arranged. Congratulations are certainly due to the British Electrical Development Association, the organizers of the exhibition, for the lay-out of the difficult building.

The President (Mr. J. S. Pickles), accompanied by Mrs. Pickles, receiving his badge from the Secretary (Mr. J. W. Simpson)

C†

At the official opening of the exhibition in the afternoon Mr. V. W. Dale, general manager and secretary of E.D.A., introduced the President, who performed the ceremony.

The President declares the exhibition open

Mr. Pickles said that the exhibition was an outstanding event in all I.M.E.A. Conventions and the Association greatly valued the co-operation of the manufacturers. At Blackpool they were given a peep into the future and although they had hoped that the supply position would have been better by now austerity was still with us. Manufacturers still had not all the materials they required and electricity supply undertakings had not the facilities for meeting all demands. The Association appreciated greatly the efforts made by the E.D.A. staff in organizing the exhibition, which he hoped would result in useful business contacts in the future. Mr. E. G. Batt, chairman of the British Refrigeration Association, thanked Mr. Pickles for opening the exhibition.

Later in the afternoon the Committee of the Smaller Municipal Electricity Supply Undertakings held its annual general meeting at the Town Hall, Alderman S. Myott, J.P., chairman presiding. Unanimous support was given to a motion which the New Mills Urban District Council was to propose at the I.M.E.A. annual general meeting on Friday to the effect that the I.M.E.A. should endeavour to secure an amendment to the Electricity Bill so that, in addition to any other amounts to which they may be entitled, undertakings shall also receive compensation for losses sustained by the authority and met out of the general rate fund.

Councillor G. S. Hyde (New Mills) explained the position as it affected his undertaking and Mr. W. P. Lilwall (Fleetwood) agreed that as there were so few undertakings in the position of New Mills, unless a move was made they would be overlooked.

Contending that the I.M.E.A. should have adopted a bolder attitude in its endeavours to persuade the Government to substitute District Committees in place of Consultative Councils, Mr. A. J. C. DeRenzi, secretary, declared that he believed that it was still possible to bring this about.

A resolution proposing the continuation of the Association after the vesting date was unanimously adopted and all the existing officers were re-elected. Mr. DeRenzi then presented Mr. W. P. Lilwall with a canteen of cutlery to mark the Association's appreciation of his services since its inception in 1937. Mr. Lilwall, he said, had been a tower of strength to the Association and there was nobody whose judgment he valued more.

Inspection of the stands by the President

Several more speakers paid tribute both in their official capacity or personally to Mr. Lilwall and the chairman wished him every happiness in his retirement. Mr. Lilwall, replying, said that he was convinced that if they had not got together at the time of the White Paper most of the small electricity supply undertakings represented at that meeting would now be under company control.

There was a slight drizzle for half an hour or so after this meeting had concluded but blue skies had returned in time for the President's reception.

Despite a perfect summer morning the Pavilion was packed for the official opening by the Mayor of Bournemouth (Councillor

1. The President and Mrs. Pickles receive Mr. W. C. P. Tapper. 2. At the President's table during the dance on Monday evening :—The President, Mrs. Moore (Mayoress of Bournemouth), the Mayor (Councillor J. W. Moore), Alderman Sir William Walker, Mrs. Pickles, Mrs. Eccles and Mr. J. Eccles (president-elect). 3. Mr. E. E. Hoadley (hon. secretary), Mrs. H. Towers, Mrs. J. W. Simpson, Mrs. Hoadley and Mr. J. W. Simpson. 4. Dancing in progress

J. W. Moore) on Tuesday. Nothing was more important to the country's recovery than the electricity supply industry, he said. It was necessary to speed up transport and production so that we could increase exports

Mr. DeRenzi making a presentation to Mr. W. P. Lilwall. Councillor J. Selwyn-Jones seated

to enable the country again to become a creditor rather than a debtor nation. An electricity supply organization would be required even more in the future than in the past and he hoped that although the I.M.E.A. in its present form might have to be discontinued an association of a similar character would be established.

Before presenting his address the President proposed that a telegram of greeting should be sent to the King.

There was general approval of the main point of Mr. Pickles's address stressing the necessity, in the process of the nationalization of the electricity supply industry, to retain the public goodwill and to have the right spirit in the industry.

Particular attention was also paid to Mr. Pickles's remarks on rural electrification in view of the outstanding success of his undertaking in this field, and he was warmly applauded for pointing out that, with the possible exception of one or two small compact countries, there is none in which rural development is superior to ours, having regard to degree of penetration, adequacy of mains, and services provided.

Mr. W. J. Cooper (electrical engineer, Hamilton) thanked the President for his address.

An interesting discussion developed on Mr. F. W. Lawton's paper on "Recent Developments in Power Station Practice" on Tuesday afternoon. Those who spoke included Mr. J. W. J. Townley (West Ham), Dr. S. Whitehead (E.R.A.), Mr. R. S. Thwaites (Manchester), Mr. F. Nicholls (Leeds), Mr. W. N. C. Clinch (Northmet Power Co.), Mr. H. Pryce-Jones (Brighton) and Mr. J. F. Field (Edinburgh). Topics discussed ranged from district heating to the testing of generating plant, the future of gas-turbine and atomic plant, the utilization of inferior coal, coal cleaning, the use of pulverized fuel, precipitation plant, soot blowing, the disposal of collected dust, hydrogen cooling of alternators, standardization of plant, the functional design of power stations and the need for a new approach to the problem of steam plant design to secure increased efficiency.

Some of the delegates were guests of Johnson & Phillips, Ltd., on a visit to the *Queen Elizabeth* at Southampton during the afternoon, and a further attraction was a tea given by the Dumfries County Electricity Committee to meet Mrs. Pickles.

After (at least) two late nights and a busy day on Tuesday, some of those who were going on Wednesday for the boat trip round the Isle of Wight or on the coach tour to Cheddar Gorge and Wells found it a bit difficult to get up in time for the early start. Nevertheless large numbers did "make it" and thoroughly enjoyed themselves. The half-day trips to the New Forest and Swanage and Corfe Castle were also well patronized, as was the visit to the new Poole power

Mr. V. W. Dale, Mr. H. J. Randall, Councillor J. Selwyn-Jones and Mr. F. Tillotson (West Hartlepool)

station site, though many left that pleasure until the second chance this afternoon.

Yesterday afternoon Mr. R. Birt read his paper on "The Law Relating to Electricity Supply" and a report of the discussion will appear in our next week's issue. In the evening there was a banquet, followed by a ball and cabaret. The annual general meeting takes place this morning.

Presidential Address

Mr. J. S. Pickles Surveys the Prospects

IN his address on Tuesday the President (Mr. J. S. Pickles) said that the past year had been quite exceptional in the call it had made on the Association's officers and Council on account of the new legislation.

Mr. Pickles said that it was thought that the wartime checks and restrictions on electricity consumption were merely temporary. It was also thought that the expected reorganization would be evolutionary and that there would be preliminary reports and inquiries. It was anticipated that substantial wartime loads would be lost which would release plant and mains capacity for peaceful and more permanent uses, and a resumption of normal competitive expansion was looked forward to.

Mr. J. S. Pickles, B.Sc., M.I.E.E., is county electrical engineer of Dumfriesshire

But the national demand had risen so rapidly as to outstrip available generating capacity and so it might be necessary to refuse or restrict the connection of certain types of new load for several years. Restrictions were necessary also to ensure adequate stocks of coal for next winter and fuel efficiency must be vigorously pursued.

Reviewing prospects of power from other than fuel-fired stations, the President quoted Professor Blackett's views that within five years it would be possible to design reliable large-scale atomic power units and that within twenty years a large proportion of our industrial power would be derived from this source. The position would be greatly relieved by the completion of some of the hydro-electric schemes now under construction. At present about 250,000 kW of water power was in use for public supply, with another 100,000 kW in the electro-metallurgical industry. The Scottish schemes provided for 450,000 kW in five years, 850,000 kW in ten years and ultimately not less than 2 million kW.

As regarded rural electrification, much more had been done in this country than was commonly appreciated. It appeared that, with the possible exception of one or two small and compact countries, there was none in which rural development was superior to ours.

After a reference to the Association's relations with other bodies in the electrical industry Mr. Pickles turned to his main theme—electricity supply nationalization. Briefly surveying the industry's history, he said that the consumers now numbered over 11 millions and the invested capital exceeded £800 millions.

In 1933-34 each section presented its views on reorganization and in 1945 the Government announced its intention of nationalizing the industry. The industry, both company and municipal, could fairly claim a proud record of achievement; an enterprising post-war programme; an adequate and contented personnel; and confidence in its ability to meet all needs.

The Association had always stood four-square for public ownership and the industry had had twenty years' experience of public ownership in the shape of the Central Electricity Board which had been very successful. Local authority undertakings were responsible for nearly two-thirds of the country's electrical output and thus had the major stake in the reconstruction of the industry. Moreover they enjoyed an immensely valuable local goodwill. Was not this system too valuable to be lost? From this aspect the Association had striven to secure for local authorities administrative responsibility at local or district levels but it seemed that they would have only a consultative role in the new structure.

Mr. Pickles wondered what the future position of the local authorities, the manufacturers and the contractors would be; how nationalization would affect the Association and kindred bodies; how engineers and staff would be affected; and how long reorganization would take.

He said that a good theoretical case could be made out for nationalization on the grounds of a smaller number of undertakings, uniformity of tariffs, standardization of systems, better conditions for personnel and extended research. But real success depended on human factors—good management, the right spirit within the industry and public goodwill.

The main structure of the proposed organization was the Minister, with consider-

able powers of direction and regulation; a Central Authority with financial powers and general responsibility; and Area Boards, with rather limited autonomy, responsible in the main to the Central Authority. The public board was a device to secure public responsibility without incurring the risks and complications of direct State trading. Its main difficulty was to combine public responsibility with commercial enterprise. Fortunately in this connection useful experience was available in the electricity supply industry from local authority trading undertakings and the Central Electricity Board.

The preferable form of board was one with one or two whole-time members and a number of part-time members. This type seemed to be more responsive to public opinion and the intention appeared to have such bodies. It was to be hoped that Ministerial and Treasury control would be minimized and that the Area Boards would be given the maximum amount of freedom.

Selection of the right men for these Boards was of supreme importance and it was to be hoped they would take a real human interest in the personnel. The proposed Area Consultative Councils were thought by some to be rather large and there was a possibility of duplication or confusion with the Area Boards' functions. It might be found in practice that alterations in their composition or functions might be necessary. Generally, it was felt that there should be more flexibility.

Transition Period

There would be a long taking-over period during which, with suitable control by the Boards, existing organizations would be required to carry on as semi-independent units pending gradual, or evolutionary, formation of new district units by amalgamation. It might be some years before the ultimate pattern was completed.

On the generation side, presumably the Central Authority would set up a technical body perhaps not differing materially from the present Central Electricity Board. Some questioned the wisdom of separating generation and main transmission from distribution. The generation organization might be based on the same areas as those of the Area Boards, thus facilitating co-operation.

On the distribution side it was probable that area executive staffs would be set up with decentralization in the form of self-contained district units responsible for day-to-day operations. While the present higher executive staff would ultimately find their responsibilities enlarged in some respects and restricted in others the staff at lower levels would not feel the change so soon or to the same degree. General standardization of technical practice, and broad uniformity of general policy should be possible fairly quickly.

In the meantime the industry could not stand still or even pause and most existing organizations, possibly in modified form, would be required to carry on until the Board's plans were completed.

Future of I.M.E.A.

It was obvious that the Association could not continue under its present constitution. Any reconstitution would have to embrace all local authorities who would then have a vital interest in the nationalized industry. Whether such an association would be justified, or whether it was more practicable for existing local authority associations to cater for these interests, was a matter for early consideration by the local authorities.

No industry, no matter how well organized, could be successful unless it possessed the right spirit. In the supply industry harmonious relations existed between all concerned. Dealing with the main reasons for this satisfactory state of affairs Mr. Pickles said that the intrinsic interest of a profession based on a natural science and the uninterrupted expansion and prosperity of the industry should continue unless enthusiasm was dulled by "integration" of electricity with gas or solid fuel.

It was doubtful whether the industry fully realized how admirably it had been served by the technical press. Although in one way part and parcel of the industry, it had preserved the independence of outlook and comment which was so necessary and which it was hoped would be retained.

The stimulus of competition and rivalry must also be retained. The development of a corporate spirit in the district units should be encouraged and there should be rivalry between areas. Staff should be allowed some freedom of choice, including transfer from one area to another, so that a vital element in the present spirit of the personnel might not be lost.

Finally Mr. Pickles expressed his confidence in the future of the industry. He quoted Sir William Walker's statement last year that he would not cease to devote his energies to the cause of electricity supply because some other form of government of the industry was proposed, suggesting that this would be the attitude of local authorities.

Modern Power Stations

Comprehensive Review of Practice

Abstract of paper read at the Convention by Mr. F. W. Lawton, M.I.E.E., M.I.Mech.E.

THE paper contributed by Mr. Lawton dealt with "Recent Developments in Power Station Practice" and covered the period since the paper presented by Messrs. H. C. Lamb and K. Baumann at the 1938 Convention.

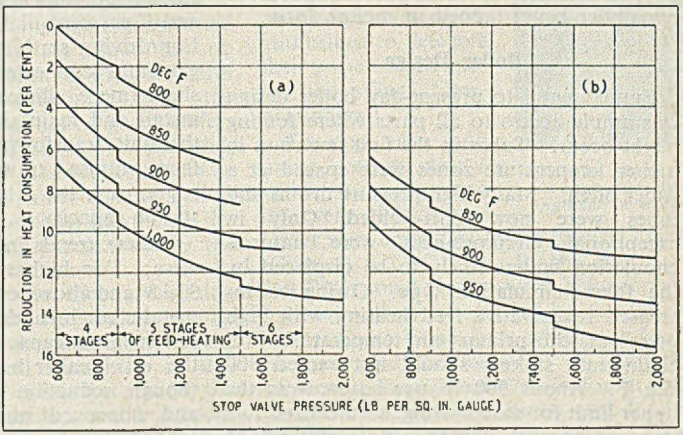
Mr. F. W. Lawton is chief engineer and manager of the Birmingham Electric Supply Dept.

The principal problems facing designers related, he said, to higher steam conditions, higher speeds for turbines of greater output, boiler availability and higher generation and transmission voltages. During the period 1938 to 1945 the national peak had increased by 33 per cent and the kWh sent out by 60 per cent, raising the load factor to 43·8 per cent. The highest yearly station load factor was 88·28 per cent and the smallest number of men employed for operation and maintenance was 1·3 per 1,000 kW of maximum demand. Average overall power station efficiency had, however, not appreciably advanced, owing to a reduction of 7 per cent in the calorific value of coal and to the running of obsolete plant.

Cost of coal had risen by not less than 114 per cent and of new plant by 87·5 per cent. Weight of fuel pulverized had more than doubled and that of stoker-fired fuel had increased by less than half. The Central Electricity Board estimated that of the boilers to be installed within the next five years 66·9 per cent would be equipped for pulverized fuel, 27·4 with chain grate and retort stokers and 5·7 with spreader stokers. Steam pressures would be 600 lb per sq in. for 49·7 per cent of the new plant, 900 lb for 37·5 per cent and 1,250 lb for 5·2 per cent, the remainder being at 300 to 400 lb. Cooling towers were generally designed for 28·5 in. Hg at 60 deg F and 80 per cent humidity.

Lower back pressures than 29 per cent were of doubtful financial value, even for riverside stations, in view of limiting wetness factor in low-pressure blading, which sometimes reached 12 per cent. Hydrogen cooling, which improved efficiency by 0·8 per cent, could be justified only for 3,000-r.p.m. alternators of not less than 50,000 kW at load factors over 40 per cent, at which figure, with coal at 55s. per ton and plant costing £40 per kW, steam conditions of 900 lb per sq in. and 900 deg F were justifiable. The average overall power station efficiency would probably not exceed 25 per cent within the next ten years.

Large steam turbines supplied with high-pressure steam had facilitated the employment of extensive regenerative heating; this necessitated the use of air heaters, the corrosion and choking of which were accentuated at exit gas temperatures of 250 deg F or so and of high steam temperatures in order to avoid excessive steam wetness at the exhaust, which had increased liability to bonded deposits.



Reduction in heat consumption with increasing steam pressure and temperature: (a) with regenerative feed heating and (b) with one-stage reheating

Boiler cleaning difficulties increased with size; stoker-fired units were more subject to fouling than p.f. units, particularly in regard to low-temperature deposits. The outstanding development in chain-grate stokers had been the increased use of secondary air to complete combustion above the grates. "Archless" furnaces enabled a wide variety of fuels to be burned efficiently. The new spreader stoker embodied over-feed fuel injection, the finer grades being burned in suspension and the larger falling on to a fixed dumping or moving grate (according to size); the bed was thin and sublimation of the ash constituents was avoided, which was expected to eliminate high-temperature bonded deposits. Chain-grate stokers appeared at present to be limited in output to 250,000 lb per hr at 900 lb per sq in. and 900 deg F. The cult of the retort stoker was declining.

Pulverized-fuel furnaces were almost invariably of the unit type and most were of the dry-ash-bottom design with open-mouth hopper. Only one slag-tap furnace was in use in this country. A development of the latter was the cyclone furnace which burned coarse crushed fuel as distinct from pulverized fuel. The first example had been in service in the Calumet station (United States) for two years, giving 76 per cent availability. Advantages claimed were 25 per cent reduction in floor area and saving in capital cost of 30s. per kW. Dust caught amounted to 10 per cent of the total ash in coal, the remainder being tapped in molten form.

Boiler Design

Fundamental to present-day boiler design was ample access to all parts where fouling might occur. Tubes in the first few rows in higher temperature zones were spaced at a wider pitch. Many high-pressure drums and tubes were now butt-welded. Only in exceptional circumstances were natural-circulation boilers likely to be displaced by the forced-circulation type. Owing to increased regenerative feed heating with high pressures, the primary-air temperature with chain-grate stokers should not exceed 300 deg F. About 900 lb per sq in. was the upper limit for stoker firing. Pulverized fuel imposed no such limits; air at from 500 to 600 deg F was required to dry the moisture in the coal, usually entailing the sandwiching of two sections each of the economizer and air heater.

Convection superheaters (draining) were now preferred to the radiant type. Plain carbon steel was used up to 850 deg F and plain carbon molybdenum steel up to 950 deg; above that temperature chromium steel might be employed. The most notable feature of modern boilers was the extensive use of the steaming economizer which allowed higher rates of heat transfer than did the equivalent boiler convection surface. Other aspects of boiler plant were dealt with under the headings of feed-water treatment and dust emission (including tests on various methods) and steam piping.

Turbine Practice

Three-cylinder turbines were employed for large units at high steam conditions; the small rotating masses, short and stiff shafts and limited temperature range per casing facilitated two-shift working. Automatic unloading had superseded the atmospheric valve as relief in the event of vacuum failure. A new device, directly responsive to changes in load and anticipating the action of the speed governor, had been adopted on some recent installations.

An investigation by the author showed that the additional capital cost of a machine designed with economic rating identical with maximum continuous rating did not warrant its adoption in place of the normal 80 per cent of m.c.r. For turbine blading low-carbon stainless steel was satisfactory up to 900 deg F; for higher temperatures austenitic steels containing about 18 per cent chromium and 8 per cent nickel were coming into use. For driving station auxiliaries the auxiliary generator connected to the main alternator shaft (more efficient and less expensive to install and maintain than a house set) and the unit transformer with duplicate supply from house transformers competed for supremacy, the latter saving 5s. per kW of station capacity at 1945 prices.

Present trends in power station switchgear were: For highest rupturing capacities at 33 kV and above, either minimum-oil-content metal-clad breakers or air-blast breakers. For medium capacities at 11 kV and 33 kV, the oil breaker had no serious competitor, though reduction of inflammable material and improved maintenance facilities were looked for; for auxiliaries, air-break switches up to 3·3 kV and 150 MVA were available.

Generation at 33 kV had proved satisfactory, but the trend towards switching at transmission voltages had led to the direct connecting of large transformers to 11-kV

alternator terminals to step up to 66 and 132 kV. Cables of 33, 66 and 132 kV with mass-impregnated paper dielectric filled with nitrogen at 200 lb per sq in had been installed in four power stations. Tappings on generator transformers reduced the range of excitation required on alternators and mitigated problems of alternator stability. Reactors were becoming increasingly common and in inter-bus units were designed to pass up to 70 MVA with 15 per cent or more reactance.

The case for ferro-concrete construction of buildings was stated with reference to its economic advantages and its merits of "functional realism." In considering the most economic design of station, the author emphasized the need to base calculations on the probable average yearly load factor throughout the economic life of the plant. For example, the load factor on new plant might be 80 per cent, but might fall as new plant was installed elsewhere to 20 per cent or less.

The financial gain of incorporating district heating in the main power station heat cycle was extremely doubtful, particularly if it bore a proper proportion of capital costs on plant and the associated losses. Gas turbines were unlikely to have appreciably better efficiencies than steam turbines operating at higher steam conditions and the oil they required was expensive. Capital charges, however, would be lower, so their use would probably be confined to peak-load working. Regarding atomic energy, he believed the present methods of generating electricity would prevail until elements more abundant and cheaper than uranium could be applied to the purpose.

Electricity Supply Law

Need for Codification Emphasized

Abstract of paper read at the Convention by Mr. R. Birt, B.Sc., F.C.I.S., Barrister-at-Law.

THIS review of legislation relating to electricity supply began with a reference to the first Select Committee on Electric Lighting appointed in 1879. This committee was told by scientific witnesses that in future electricity might be extensively used to transmit power as well as lighting to considerable distances and the opinions expressed led the committee to give the view that no legislative restriction should interfere with development. It recommended that the municipal authorities should be given preference to control distribution and use and, failing acceptance, their monopolies should be given to private companies for a period sufficiently long to remunerate them, the undertakings then being purchasable by the local authorities.

In the same year the first Electric Lighting Act—the Liverpool Act—reached the Statute Book, and in 1882 the Act which formed the foundation of electrical legislation in this country was passed. This Act made the granting of a licence subject to the consent of the local authority, although if that consent were refused the undertakers could ask the Board of Trade for a Provisional Order. The local authority's consent was necessary to the placing of overhead wires. Any person could require a supply and limitations were placed on charges but not on dividends. This Act was later held to be restrictive and an Act was passed in 1888 raising the period of tenure of companies from 21 to 42 years and amending the terms of purchase. The Electric Lighting (Scotland) Act, 1890, enabled certain Scottish authorities to delegate their powers and duties to the Gas Commissioners.

Mr. R. Birt is borough electrical engineer of Ealing

To save time and money, certain clauses which were repeated in every Provisional Order were embodied in the Electric Lighting (Clauses) Act of 1899. By the end of 1900 354 Provisional Orders were being operated by local authorities and 164 by companies.

The Cross Committee which sat in 1898 recommended the inclusion of compulsory powers in Provisional Orders for acquiring the sites for power stations and lands or easements for pipes and mains, etc. It also considered that powers should be given for the supply by an undertaking of electricity in bulk to other authorities in an area and it recognized that the existing purchase terms were not applicable to such an undertaking.

Subsequently, between 1903 and 1906, four Bills based generally upon the Cross Committee's recommendations were introduced but failed to reach the Statute Book. But in 1900 five Private Bills were considered by a House of Commons Committee under the chairmanship of Sir James Kitson. Four of these were passed thereby setting up power companies with exemption from purchase but with limitations on prices and dividends.

Further Private Acts were passed and in 1909 the next Public Act appeared. Its provisions enabled the Board of Trade to grant Provisional Orders for, *inter alia*, the compulsory acquisition of land for generating stations; the breaking up of roads outside the area of supply; the supply of electricity in bulk and to railways, etc.; the adaptation of the provisions of the Electric Lighting Acts as to the purchase powers of local authorities to the case of generating stations, etc., supplying electricity within the districts of two or more local authorities but situated outside that district; and the exercise of powers under the Acts by a joint committee or board of two or more local authorities. This Act did not, however, grant the exemption from purchase rights recommended by the Cross Committee and embodied in the power companies' acts.

Commissioners and Joint Authorities

Several reports were issued during and immediately after the 1914-18 war and the next measure—the 1919 Electricity (Supply) Act—was largely based on the Williamson Report of 1918. This set up the Electricity Commissioners with the duty of determining electricity districts and provided for the formation, where necessary, of joint electricity authorities. It transferred to the new Ministry of Transport, for delegation to the Commissioners, the electricity rights hitherto exercised by the Board of Trade and it substituted Special for Provisional Orders.

After two abortive attempts to legalize certain clauses cut out of the 1919 Bill a modified Bill was passed in 1922 which enabled joint electricity authorities to borrow money and electricity undertakers and local authorities in an area to lend money or guarantee loans to joint authorities. It limited the joint authorities' powers in power company areas and granted additional powers to the Electricity Commissioners.

Following recommendations by the Weir Committee in 1925 a Bill was introduced which, after considerable modification, was passed in 1926. It established the Central Electricity Board and placed upon the Electricity Commissioners the preparation of schemes for the determination of selected stations. It provided for the erection of main transmission lines and standardization of frequency, etc. Although this was a great step forward in the unification of generation and bulk supply the Act has been criticized, particularly the clauses relating to tariffs.

Later Acts dealt with compensation for displaced employees (1928 and 1933); arrangements between the Central Electricity Board and non-selected station owners and supplies to railway companies (1935); and meters (1936).

McGowan Proposals

In 1936 the McGowan Committee on Electricity Distribution reported against complete public ownership of the electricity supply industry but recommended a considerable reduction in the number of separate undertakings by transfers and amalgamations. The report was followed by an "Outline of Proposals" (published as a White Paper), and the 1938 King's Speech contained a reference to electricity legislation, but international problems intervened.

After the rejection of a number of private Bills aiming at the development of Scottish water-power resources the Cooper Committee was set up and its proposals formed the basis of the Hydro-Electric Development (Scotland) Act of 1940.

The various reports which preceded the introduction of the Electricity Bill now before Parliament were briefly referred to in the paper, and Part II detailed the alterations in existing law which the Bill seeks to make.

Mr. Birt pointed to the need long advocated by the I.M.E.A. for the codification and simplification of the Electricity Acts and expressed confidence that early steps would be taken in this direction. To help representatives of the supply industry between the vesting date under the new Bill and the date when it was possible to codify the Electricity Acts he suggested that the Government should provide a reprint of the Acts as amended by the Bill and a comprehensive index or explanatory memorandum with adequate cross-referencing.

Although, Mr. Birt concluded, members possibly disagreed more or less with some provisions of the Bill, they would be united in their endeavours to ensure that the new organization was successful.

Views on the News

Reflections on Current Topics

THE restoration of the Conversazione to the list of I.E.E. functions proved most popular, the number received by the President and Mrs. Ferranti reaching 2,500, more than at any pre-war gathering, I believe. The Science Museum, with its mechanical severity tempered by music, seemed a more appropriate background having regard to its engineering associations, although some had nostalgic feelings about the Natural History Museum, for many years the scene of these meetings, but still suffering from its war wounds. The very much greater proportion of extinct species among the exhibits in the Science Museum prompted comparisons between the rate of obsolescence of the works of nature (*pace* Tennyson) and of human intelligence.

* * *

In the second (July) issue of *Registration* the official review of the National Register of Electrical Installation Contractors, attention is drawn to the rather unsatisfactory position created by the existence of the Ministry of Works register of building and civil engineering contractors (which term covers certain electrical contracting work). Quite legitimately firms or individuals receiving the Ministry of Works certificate (which is no guarantee of good workmanship) may describe themselves as "registered contractors," a fact which militates to some extent against the N.R.E.I.C. The remedy for this trouble, which is considered to be a passing phase only, is for those on the National Register to publicize the Register itself and use the full description "registered electrical contractor."

* * *

While from the point of view of maximum food production the Government's decision not to reintroduce Double British Summer Time next year may be a good move, it would be interesting to know if Mr. Shinwell and Sir Stafford Cripps are as happy about it as the farmers. D.B.S.T. was brought back this year as one of the devices for facilitating the staggering of working hours (with a resultant spreading of the electrical load) and for saving an hour's use of electricity for lighting in the evenings. Everyone will be delighted if this latest decision indicates the Government's confidence that the fuel situation will have so far improved next year that a relaxation in our efforts towards economy may be contemplated. In view of the warnings that it may be 1950 or even later before we can reasonably expect to be out of the wood, it seems somewhat early to take any step which may in the slightest way contribute towards another fuel crisis, which would be much more serious than the hardships suffered by the farming community on account of D.B.S.T.

* * *

The American *Electronics* for June invites inventions which will call listeners or viewers when important items are to be broadcast. It says:—"Several times now, the NBC television station in New York has sprung unannounced coverage of important news events, while the larger part of the audience was doing the dishes, blissfully unaware that exciting signals were titillating the dipole." Who will decide what is an important news event? I suggest that it will be the advertiser who is prepared to pay the extra for a "general call!" Personally I should prefer to do the dishes, blissfully unaware.

* * *

From the *New Zealand Electrical Journal* of April 25th:—

> "This editorial is written by candlelight because Wellington (like other parts of the North Island) is in the dark, making it obvious to all sections of the community that the long-predicted power shortage is no myth. The present position is bad enough, but what is worse is that people are completely in the dark about the probable extent of the shortage and are therefore not inclined to co-operate to the limit with harassed supply authorities."

* * *

The death of a man through being trapped in a refrigerator indicates the necessity of means for opening refrigerators from the inside. With heavily insulated walls and doors it is not easy for a man caught in this position to make his plight known, although in the case in question tests showed that shouts and knocking could be heard from the outside.—**REFLECTOR.**

PARLIAMENTARY NEWS

By Our Special Reporter

DURING the committee stage of the Finance Bill in the House of Commons, amendments were moved to reduce the increased rate of purchase tax on various electrical domestic apparatus.

Mr. Dalton, Chancellor of the Exchequer, said that it must not be forgotten that these taxes were put on because too much electricity and gas were being used, and we must still be mindful of the need to save electricity and gas. In considering what cases the tax could be withdrawn or modified he must make it quite clear that it was essential to retain the purchase tax on heating equipment. He was also doubtful if anything could be done about water heating. His mind was, on the whole, set against making any concession in respect of water heating, but he would listen to further arguments.

On the other hand, it was equally clear there should be a remission in the case of cookers and cooking apparatus, and he agreed that cookers should be exempted altogether from the tax. He thought the electric kettle could also be exempted. There were many ancillary things, like boiling rings, grillers and hot-plates, which he was prepared to take out of the field of the tax.

A case had been made out with regard to wash-boilers, which he was inclined to exempt, and he would like to examine the definition of electric washing machines in respect of which there was a case for doing something, as there was in the case of electric irons.

The more debatable articles, which it could not be argued were necessities for very wide sections of the community, included refrigerators and vacuum cleaners. In those cases, he asked for a period of reflection. They did not consume a great deal of electricity, but he did not want to carry exemption too far. There were one or two other cases—he would not continue to elaborate—in which he would like more time to think.

By making the concessions he had mentioned, he would be giving away in revenue something like £8,000,000 this year and about £12,000,000 in a full year. He thought any relief should be made retrospective to Budget Day and that anyone who had purchased since that day any of the articles to be exempted should be entitled to a refund. He was advised that could be done, and would make suitable arrangements.

He hoped that on the undertakings he had given, hon. members would withdraw their amendments, and he would propose necessary alterations on the report stage.

The amendments were withdrawn.

Natural and Methane Gas

In reply to Mrs. Middleton, the Minister of Fuel and Power said that the total production of natural gas in the United Kingdom was small and was considered to be declining. About 200,000 cu ft per day was available at present. Exploration was continuing and if sufficient quantities were available the gas would be used as a fuel. The quantity of methane available was not at present sufficient for the production of carbon black and chemicals on an economic basis or for the generation of electricity.

Purchase Tax Remissions

FOLLOWING the announcement by the Chancellor of the Exchequer in the House of Commons on June 17th regarding the removal of purchase tax from certain electrical equipment, the Commissioners of Customs and Excise state that the purchase tax of 66⅔ per cent on gas and electrical domestic apparatus provided for in the Budget Resolution (see Notice No. 78G, dated April, 1947) will not be applied to the following. This change will be retrospective to April 16th:—

(i) cooking stoves incorporating ovens; and boiling rings, grillers and hot-plates, except appliances designed for use also as space heaters (e.g., electric boiling rings adaptable for alternative use as electric fires);
(ii) electric kettles and other cooking utensils incorporating heating elements;
(iii) wash boilers and wash coppers;
(iv) smoothing irons and pressing irons.

The pre-Budget exemption applicable to the above articles will accordingly be restored and registered traders will not be accountable for tax on them under Notice No. 78G. Provision will be made in the Finance Bill giving the purchaser of any articles of these descriptions which have been delivered at a price including the 66⅔ per cent tax, the right to reclaim from the seller the tax element in the price. It is emphasized that repayment of tax should not be claimed from the Customs and Excise Department.

The position of washing machines, refrigerators, vacuum cleaners and other gas and electrical appliances is to be reconsidered. Until a decision is notified to registered traders, they will continue to be accountable for tax on appliances not enumerated in paragraphs (i) to (iv) above, and a printed notice will be issued by the Commissioners to all registered traders concerned as soon as possible.

Electricity Bill

Debate on Report Stage

WHEN the Electricity Bill was reported to the House from committee on Monday last Sir Arnold Gridley moved a new clause providing that where as a result of changes in the system of supply, consumers had to replace apparatus the cost should be borne by the Area Boards. He said that this had been the practice with existing undertakings.

Mr. Shinwell said that a principal object of the Bill was to protect consumers. While he did not disagree with the substance of the amendment he did not think it possible to include this point in the Bill. He gave an assurance, however, that the matter would be taken care of in the regulations which the Minister was empowered to make under Clause 52.

Valuation of Assets

Mr. R. S. Hudson moved a new clause to provide that each Electricity Board should carry out a valuation of its capital assets within twelve months from the vesting date and that the Minister of Fuel and Power should prescribe rules upon which the valuation was to be carried out, including depreciation rates.

Mr. Gaitskell, Parliamentary Secretary to the Ministry, resisted the clause on the grounds that the Bill already made provision for the presentation of accounts and the Boards could not possibly carry out a valuation within a year. The matter must be left to the Central Authority. The clause was negatived.

A clause moved by Mr. Walter Elliott to prohibit tax-free payments to members of the Boards was also negatived after Mr. Shinwell had said that when the appointments were made the salaries would be announced to the House and that no responsible Minister would suggest that they should be tax-free.

Safeguards against "Victimization"

Mr. Boyd Carpenter moved a new clause designed to protect those engaged in the industry who had opposed the Bill. He said that certain speeches by the Minister had given rise to apprehensions and it was feared that the opponents of the Bill would be in a precarious position. Mr. Shinwell scouted the idea that there was likely to be any victimization, stating that the employees' organizations would not allow it. He thought, however, that it would be quite improper to appoint to a Board any chairman of an electricity undertaking who had attacked the Bill as dangerous or fatal to the future of the country's electricity supply. But they would not allow the Boards to inquire into any employee's political opinions. Chairmen or directors of electricity supply companies who possessed the necessary qualifications would have an opportunity of serving the industry irrespective of their political views, but that did not mean that they would be appointed to the boards of management.

Mr. Hudson contended that the Minister's statement made clear the necessity for the clause. Opposing the clause Mr. Palmer said the directors of one company had tried to press their engineer and other employees to argue against nationalization when dealing with consumers. The clause was defeated.

Mr. Walter Elliott proposed an amendment by which Scotland would be excluded from the provisions of the Bill, maintaining that it would be to the benefit of the Scottish people if there were a separate Scottish board.

Mr. Shinwell thought that in the long run an integrated British electricity authority would be better for Scotland than a Scottish board completely divorced from the English authority. The amendment was rejected.

On Tuesday and Wednesday a number of other new clauses and amendments were put forward, the matters covered including compensation to local authorities in respect of the severance of their undertakings from other activities. A sum of £5,000,000 is to be allocated to this object. The position of "composite" companies and a proposal to set up one Area Board for Wales were other matters raised. A fuller report will be given next week.

I.E.E. Measurements Section

THE last of this session's informal I.E.E. dinners took place at the Connaught Rooms last week, when Mr. J. W. Matthews presided over 250 members and guests of the Measurements Section. It was also the last occasion on which Mr. V. Z. de Ferranti (principal guest) would be called upon to speak as president of the I.E.E. He congratulated the Section—incidentally the smallest, but its annual function was the largest—on its meetings, particularly on its servo-mechanisms convention, which was so well attended. Delegates had come to it from several European countries and applications were still being received for copies of the papers, especially from the United States and research organizations.

Mr. J. W. Matthews, in reply, said the Section's activities continued to increase and its membership to grow, being now 1,347, thus fulfilling the hope cherished by Mr. E. H. Miller (past chairman), now happily restored to health and present at the dinner.

Mr. E. W. Moss proposed the toast of "The Guests," on whose behalf Professor Willis Jackson responded, remarking upon the "quite low" standard and especially composition of technical papers submitted for "refereeing."

CORRESPONDENCE

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

Induction Motors and Load Shedding

IN your issue of June 13th Mr. J. W. Milligan dealt with the effect on induction motors of reduction in frequency. It has been the practice to increase frequency during the night to compensate for low frequency during the peak hours. One would not expect this to prove troublesome as a motor would normally take less current at higher frequency: however it can be so.

A water company found that its large pump motors overheated at night; the load had increased in proportion to the cube of the frequency and was further augmented by a fall in pump efficiency; the result was an appreciable net increase in current.

Kenton, Newcastle. E. ANDERSON.

Earthing Conductors

WITH regard to the letter from Mr. Natton, I fail to see his point in distinguishing between small and large installations. Surely the earth wire is the most important wire going to the motor. If a phase wire breaks the motor will soon tell you, but if the earth wire breaks the attendant may not be in a position to tell you.

There is only one place for the earth wire and that is inside the flexible conduit.

Guildford. R. E. BRISTOW, A.M.I.E.E.

Installation Safety and Competition

CONTINUALLY recurring correspondence with regard to safe installations and supply authorities' responsibility leads me to wonder if my recent experience in a South Coast village has been repeated or is becoming a practice in other parts of the country.

My attention was drawn to a type of cable used in a village school by the contracting department of a local supply authority. I was rather amazed to find that this lighting and heating plug installation had been carried out in house service overhead system type cables. Surely competitive estimating and an endeavour to keep installation costs as low as possible against rising prices hardly warrants this misuse of cable designed for other application and especially so when it is used by an authority which, in my opinion, should set an example to local contractors, to whom I have previously and apparently erroneously attributed the misuse of this type of cable.

Apart from the doubt whether this complies with regulations I fail to see how, with examples of this sort, the greatly needed incentive to carry out safer and better class installations can be realized. My own opinion is that this is the great opportunity of the electrical contracting industry to get as far away as possible from the cut-throat, apprentice-installed and shoddy material installation of the pre-war years.

PRIVATE ENTERPRISE.

Electric Vehicle Progress

THE progress made in the use of battery vehicles is indicated in the annual report of the Electric Vehicle Association. The number registered at November 30th last, namely, 7,765, was 756 more than a year before and new registrations totalled 2,660, comprising 1,317 vans, 1,042 pedestrian operated "prams," 203 invalid chairs and 98 vehicles exempt from Road Fund licence (unspecified weights). Of the electric vans 187 were of not more than 12 cwt unladen weight, 642 of 12 cwt-1 ton, 446 of 1-1½ tons and 42 of over 1½ tons.

Production of electric road vehicles, excluding "prams," totalled 2,300 in 1946, the difference between this figure and that of registrations being accounted for by exports. Production increased each month during the year, the December figure being nearly six times that for January. This obviously resulted in a large number of completed but unlicensed vehicles at the end of the year.

Investigations into progress made overseas show that in the U.S.A., while the number of electric road vehicles in use has declined steadily due mainly to the low price of petrol, the production of electric industrial trucks has increased considerably, there being about 40,000 in use in 1945. In France the number of electric road vehicles increased from approximately 1,000 in 1939 to 4,500 in 1946, the majority being of 4-, 5- and 6-ton payload. A further report on manufacturing activities in Germany is to be published shortly by the Ministry of Supply.

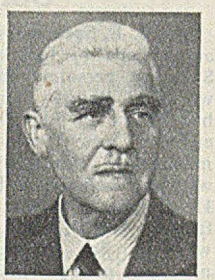
At the annual general meeting held recently Sir Felix Pole was re-elected president, Mr. A. W. Barham chairman, Mr. A. J. Fippard vice-chairman and Mr. Hamlyn Drake hon. treasurer.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT a recent meeting of the Croydon Corporation the recommendation of the Electricity Committee that the salary of **Mr. F. N. Rendell-Baker**, chief engineer and general manager of the electricity undertaking, be increased from £2,400 to £3,000 per annum was approved.

Last week we reported that among the new O.B.E.'s were **Mr. C. F. Booth**, M.I.E.E., assistant staff officer, G.P.O., and **Mr. T. F. Lee**, A.M.I.E.E., secretary of the Telephone



Mr. C. F. Booth and Mr. T. F. Lee who received the O.B.E. in the Birthday Honours

Apparatus Bulk Supply Committee. We are now able to reproduce photographs of these two gentlemen.

Mr. J. B. McGillivray, who has been associated with James Howden & Co., Ltd., for fifty-four years, and has been a member of the board since 1922, has retired and **Mr. J. S. Niven** and **Mr. H. L. Paul** have been appointed to the board.

Mr. E. J. Sutton, M.I.E.E., was recently elected chairman of the Association of Supervising Electrical Engineers for the ensuing year. Mr. Sutton, after taking courses at the Borough and Battersea Polytechnics, served an apprenticeship with Tredegars, Ltd., and from 1931 to 1935 was with T. Clarke & Co., Ltd., London. He then joined the electrical department of Stinton Jones & Partners, consulting engineers, and was responsible for the design and supervision of a number of large electrical installations. In 1938 he was appointed chief engineer and manager to the Bective Electrical Co., Ltd., then becoming chief engineer to W. Gillam, consulting engineer. While in this position he was responsible for a number of large installations for various Ministries, including that at the Telecommunications Research Establishment at Malvern where most of the radar research was carried out. In 1946 Mr. Sutton was appointed manager of the electrical department of G. N. Haden & Sons, Ltd., a position which he still occupies. From 1934 to 1936 Mr. Sutton lectured in electrical installation work at Willesden Technical College.

Mr. E. J. Sutton

Mr. A. Watt, who has been appointed electrical engineer to the L.N.E.R. at Newcastle in succession to Mr. H. W. Green, retired, joined the company in 1935. He is a B.Sc. of Glasgow University.

Mr. S. B. Sumner, A.M.I.E.E., of Poplar, has now taken up his duties as mains superintendent with the Barking Corporation undertaking.

Mr. W. E. Loveridge has been appointed resident director of Richardsons, Westgarth & Co., Ltd., Hartlepool, in succession to Mr. W. Nithsdale, who has retired.

Mr. W. R. Coleman, Associate I.E.E., has been appointed manager of the Arora Co. (a subsidiary of Messenger & Co., Ltd., Loughborough) in succession to Mr. F. S. Grogan who died recently. Mr. Coleman was formerly assistant manager with Berry's Electric, Ltd., Manchester, and in 1942 returned to their Birmingham works to assist with war contracts.

Mr. W. R. Coleman

Mr. J. Entwistle, Associate I.E.E., for many years a member of the sales staff of the Simplex Electric Co., Ltd. (a subsidiary of Tube Investments, Ltd.) has retired. Mr. Entwistle joined Simplex Conduits, Ltd., in 1919 as branch manager at Cardiff and held similar positions in Newcastle and Manchester. On the formation of the Simplex Electric Co. he was appointed manager of the company's Croydon branch, where he remained until his retirement.

Mr. H. M. Anstey retired from the position of manager of the Leeds branch of the Jackson Electric Stove Co., Ltd., on May 31st. Mr. Anstey, who has served for twenty-three years with the company, and opened this branch in 1929, did much to promote the use of electric cookers in the early days. He will continue to live at 153, Street Lane, Leeds, 8 (tel: Leeds 62690). **Mr. J. Hurry**, who succeeds him as manager of the Leeds branch, joined the company in 1933 and has been attached to that branch since 1934.

Mr. A. S. Jones, the manager of the Cardiff branch of the Jackson Electric Stove Co., also retired on May 31st. He commenced his career as an apprentice to Triger Bros. of Brecon, electrical contractors, and subsequently went to sea. In 1901 he joined John S. Brown of Swansea and then worked at the Cardiff branches of Veritys, Ltd., and Edison Swan. He was later with Witty & Wyatt, Ltd., Cardiff, and opened the Cardiff branch of the Jackson Co. in 1930. He is continuing to live at 3, Lonisa, Rhiwbina, Cardiff. The Cardiff branch is being managed at present by Mr. K. Gunney, who joined the company in 1934.

Mr. F. C. Barford, A.M.I.E.E., who has been appointed district manager for the B.T.H. Co., Ltd., at Newcastle-on-Tyne, was previously at

Mr. F. C. Barford

Mr. J. Clement

the Glasgow office of the company up to the beginning of the war. He was demobilized with the rank of lieutenant colonel, R.E.M.E. in 1945, since when he has been at the Manchester office.

Mr. J. Clement, B.Sc., M.I.E.E., has been transferred from Newcastle to take up the position of district manager, Midlands area, at the Birmingham office of the B.T.H. Co., Ltd. Mr. Clement, who has been in Newcastle-on-Tyne [for the last seventeen years, is taking over all the commercial work for the Midlands, including that carried out by Mr. D. J. Strutt, who retired recently.

Two new appointments are announced by E. K. Cole, Ltd., in their recently formed subsidiary, Ekco-Ensign Electric, Ltd. Mr. E. S. Evans becomes lighting sales manager operating from the main Southend offices. Mr. F. L. Cator becomes manager of the Illuminating Engineering Department, located at the London offices.

On May 31st the South-Western Sub-Centre of the Institution of Electrical Engineers held a one-day summer meeting in South Devon. After lunch at the Seymour Hotel, Totnes, the party, numbering seventy-nine, enjoyed a steamer trip on the River Dart with a short visit to sea outside the estuary. Later high-tea was partaken at Totnes. Mr. H. C. Widlake, the chairman, presided.

Over 700 members of the E. K. Cole organization, including friends and relatives, went from Southend Pier on June 14th in the *Queen of Kent* for the first post-war Ekco annual outing to Margate.

Holland House Electrical Co., Ltd., Glasgow, recently held its staff outing when a visit was paid to Solway Firth. Lunch was served at Dumfries and tea at Castle Douglas, and during the day a short sports programme was carried out. Among those who attended the outing were Messrs. A. Glenister, A. S. Wraight, J. Bairner and G. Paterson, directors, with their wives.

Obituary

Mr. L. F. Spearing.—The death has occurred at the age of forty-six of Mr. Leonard F. Spearing, personnel manager at the Blackburn works of Philips Lamps, Ltd. Mr. Spearing had served the Philips group of companies for eighteen years. He started as production manager at Mitcham Works, Ltd., and then went to Blackburn in 1938 in the same capacity. He engaged the first labour there when the factory, which now employs nearly 4,000 workers, first started. He was appointed personnel manager in 1942.

Mr. T. A. G. Margary.—We learn with great regret of the death of Mr. T. A. G. Margary who until his retirement in 1944 was borough electrical engineer of Wolverhampton. Mr. Margary received his engineering training at King's College, London, and with the Oxford Engineering Co., London. From 1898 to 1912 he was with the Islington Electricity Department and then went to Callender's until the 1914-18 war when he became chief electrical engineer at an Edinburgh high-explosives factory. He joined the Wolverhampton undertaking in 1919 and became "chief" there eleven years later. He was elected an associate member of the I.M.E.A. this year.

The late Mr. T. A. G. Margary

Mr. E. F. MacKay.—We regret to record the death on June 9th of Mr. Edward F. MacKay, manager in Scotland for Dorman & Smith, Ltd. and its associate company D.S. Plugs, Ltd. Mr. MacKay was educated at Allen Glen's School, Glasgow. He joined James Howden & Co., Ltd., Glasgow, and later became assistant district engineer with the Clyde Valley Electrical Power Co. in the Coatbridge area. After serving for some years with that company he joined Dorman & Smith, Ltd. as their manager for Scotland.

Power Cables on Brackets

Methods of Installation

By P. E. Williams, A.M.I.E.E., A.M.I.Mech.E.

IN railway work the restricted space available between the tracks and the boundary fence does not permit of laying cables direct in the ground. Further, tunnels, bridges and viaducts are usually more conveniently approached by cables on brackets above ground than by cables rising out of the ground over each short section.

Other advantages offered by a bracket run supported on a line of reinforced concrete posts are as follows. The posts can be used as a general purpose run to accommodate power, signal, and communication cables and even service pipes. Cables can be insulated from earth along the route if required. Although capable of carrying many cables of varying types, the post run occupies only a small cross-sectional area. Cables are easily accessible for inspection, repairs or diversions, and extra cables may be added up to the full capacity of the bracket space available. Damage to cables is immediately apparent; track slewing operations can encroach on the line of buried cables, but cables on posts must be taken into account.

Disadvantages of Method

These advantages are offset by difficulties arising from the wide range of temperature to which the cables are subjected due to seasonal changes and solar rays, these being superimposed on the heating effects of the load. With cables laid direct in the ground and also to some extent with those drawn into ducts, the external temperature is sensibly constant and the cables are constrained so that movement is negligible. Cables on brackets are supported but only partially constrained and the wide temperature range affects their ratings and results in appreciable expansion and contraction, which must be controlled. Other disadvantages are that the maintenance of the post run includes work caused by ground subsidence or bank slips. Adjacent grass banks must be cleared occasionally to minimize risk of damage from grass fires.

The simplest method of supporting a single cable is on brackets equally spaced at a distance which will enable expansion and contraction to be taken up automatically in each section between them by varying sag due to temperature changes and the weight of the cable.

If the spacing is too close, longitudinal expansion will cause the cable to move along the brackets to points where a non-standard span or change of direction or profile enables it to collect or to be forced off the brackets. If the bracket spacing is too wide the weight of the cable tends to draw it back into the spans. Here again the cable may be drawn out of the brackets where a change of direction or profile occurs.

The optimum spacing is dependent, therefore, on the weight of the cable and its stiffness. For example, an armoured cable 2¾ in. in diameter should be supported on brackets 8 ft 0 in. apart. The cable, laid straight on the brackets, will automatically take up the required sag between brackets due to its own weight. The dimensions stated refer to an existing installation which has given satisfactory service for many years. An improvement could be made, however, by fitting brackets with wide shelves curved along the line of the cable to avoid a tendency for the cable to kink at the bracket edges.

In practice few cables are installed in conformity with the above arrangement, as other factors have to be considered. For example, a general-purpose run must provide for cables of varying size and type and traffic vibration may introduce troubles with sheathing if the cable is in tension under its own weight; with a number of cables, the weight to be supported on each post may, in certain types of soil, make the run unstable.

Some Actual Installations

A few examples of existing installations will illustrate these points. One method entails the use of hardwood battens bolted to the bracket shelves and extending along the line of the cable. For an armoured cable, 2½ in. diameter, a typical installation has posts spaced at 6 ft 6 in. centres with hardwood battens, 3 ft 6 in. long by 4 in. wide, fixed to the bracket shelves with countersunk head bolts. The upper ends of the battens are chamfered so that the cable does not rest on sharp edges. The front lip of the bracket shelves projects above the top of the battens and prevents the cable working off. The armour is firmly

anchored at the joint positions. In this case the cable is supported over 3 ft 6 in. of each 6 ft 6 in. span. It cannot sag, but it is free to move on the battens.

The method most widely used is to space the brackets at 18 to 24 times the cable diameter, e.g., 3 ft 9 in. to 5 ft 0 in. spacing for a 2½ in. diameter cable, and to deal with expansion difficulties as they arise, usually by providing expansion bays. In one case many scores of miles of unarmoured lead-alloy-sheathed power cable is installed on brackets spaced 4 ft 0 in. apart.

Heavy Armoured Cables

A third method has shown good results with heavy armoured cables up to 4 in. diameter, the post spacing being predetermined at 4 ft 0 in. by the necessity for providing a general-purpose run accommodating smaller cables. As the stiffness of the heavy cables prevented a sufficient sag between the brackets, the bracket run was made up of four normal line brackets followed by two long shelf brackets, this sequence being maintained throughout each length between joints. The cables fit snugly into the curved shelves of the four normal line brackets and little lateral movement is possible. The next two brackets have flat shelves about 8 in. long. When expansion or contraction takes place the cable, which is installed with a slight bow on the expansion bays, slides laterally on the flat shelves and the movement is not cumulative longitudinally. This has a neater appearance and minimizes vibration and post loading troubles.

Each post should be firmly set with at least a third of its length in the ground. Stability of the post line can be improved by fitting flat concrete anchors projecting at right angles to the post and just below the ground surface. These may be fitted at every post in difficult ground or over sections where the run changes direction and at intervals, say every fourth post, on a straight run in good ground. Stiles should be provided for crossing the cables where necessary.

Where the cables pass over steel bridges, heavy vibration may be encountered, but this gives little trouble if the cables are suspended by raw-hide thongs from studs fixed to the bridge framework. In all types of armoured-cable installation, the armour should be securely anchored at the joint position in order to relieve the joints of the thrust and twisting forces set up by cable expansion. The joints should be supported.

Where cables are installed above ground, the widely varying temperatures will produce marked effects at the joints. In railway installations, joints occur in the restricted space of tunnels, and in any case, bulky joints call for special arrangements at regular intervals on a general-purpose post run. In one HSL installation, this was overcome by using joints longer than normal and with a smaller cross-sectional area, the phase joints being arranged in line astern. To illustrate the temperature difficulties involved, the case of an 11-kV three-core paper-insulated lead-covered cable with lead-alloy joint sleeves 4 in. internal diameter, 24 in. long, and filled with hard-setting compound, can be considered.

Heating, external and internal, cause the compound in the cable to expand and distend the lead sheathing. When the cable cools, the sheathing does not contract to resume its original size and negative pressures are set up in the cable. This process is continuous, due to the heat cycles, and the joint compound tends to migrate into the cable, thus setting up negative pressures in the joint sleeves, which tend to collapse.

Trouble with Sleeves

A sleeve wall ⅜ in. thick will resist this tendency, but the partial vacuum inside the sleeve, coupled with the occurrence of a porous wiped joint, means that air or moisture may be drawn in. In one large installation, the original joint sleeves had a wall thickness of ⅛ in. and were filled with a semi-fluid compound. Scores of these sleeves collapsed, but no failures occurred, as regular maintenance inspection enabled them to be replaced when necessary. Replacements were made with ⅜ in. sleeves filled with hard-setting compound. One of these failures was found to be due to moisture having been drawn in through a porous wipe round a filling cap. Adjacent joints with ⅜ in. sleeves were opened for inspection and showed a marked loss of compound due to migration. These were replenished and re-sealed.

Compound must be given time to cool completely before the sleeve is sealed, as cooling afterwards will set up an initial negative pressure in the sleeve. It has been suggested that in new installations, where the conditions are comparable, the joint sleeves should first be filled with cable compound and inspected and replenished at intervals of, say, twelve months. They could then be drained, refilled with hard-setting compound and permanently sealed.

Electricity Supply Costs

Change in Proportions of Fixed and Running Components

By F. J. Elliott, M.I.E.E.
(Borough Electrical Engineer, Wolverhampton)

CLAUSE 1, sub-clause 6, paragraph D of the Electricity Bill lays down a policy of simplification and standardization of the methods of charge for supplies of electricity.* The multiplicity and complexity of the tariffs in force to-day are due largely to the impossibility of measuring, or even accurately assessing, a large proportion of the total costs of supply, particularly in the case of domestic and other comparatively small users.

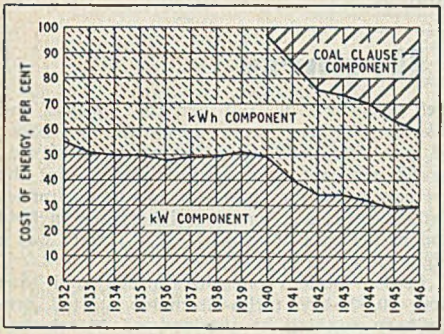


Fig. 1.—Analysis of cost of energy expressed as percentages of total

The increase in the cost of fuel has materially altered the build-up of costs of electricity at consumers' terminals and in such a manner as to facilitate the desired simplification of tariffs inasmuch as a greater proportion of the total cost of supply is now directly governed by the consumption of electricity.

The absence of the annual returns of the Electricity Commissioners for the last three years makes it impossible to prepare figures on a national basis, but the facts quoted in this article apply to an undertaking purchasing electricity on a tariff similar to that of the Central Electricity Board, and it is reasonable to assume that trends similar to those illustrated would be revealed by an examination of the statistics of all undertakings.

From Fig. 1 it will be observed that before 1940 the kWh component of the cost of energy represented approximately 50 per cent of the total cost. This proportion has been increased since that date until it has now reached some 70 per cent, thus reducing to 30 per cent the m.d. component of this cost which is so difficult to apportion equitably among individual consumers.

Whilst it is appreciated that the enhanced capital cost of the generating plant now projected may tend to restore the kW component to its previous proportion, this tendency will, to some extent, be offset by the probable lower interest charges of British Electricity Stock.

Fig. 2 depicts the dispersal of the total income of an undertaking during the last nineteen years, the outstanding feature being the great increase in the proportion of the income absorbed by the cost of energy:—1928—36 per cent; 1946—72 per cent.

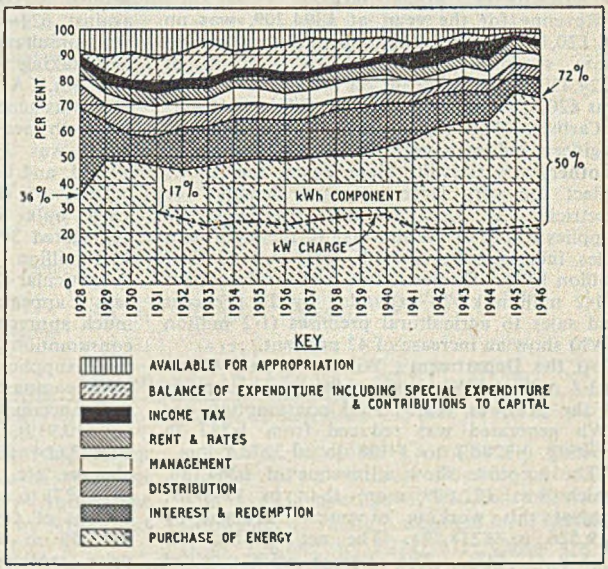


Fig. 2.—Dispersal of gross income expressed as percentages of total

* Added in Committee stage.

Another factor which emphasises the growing importance of the running cost component is the great increase in the energy consumption per consumer.

In an undertaking where the usual form of two-part tariff for domestic consumers has remained unaltered for many years, the following changes have occurred in the proportion of the total revenue obtained from the fixed and running charges under a two-part rateable-value tariff:—Revenue from fixed charge: 1938, 50 per cent; 1946, 35 per cent. Revenue from kW charge: 1938, 50 per cent; 1946, 65 per cent.

Again referring to Fig. 2, between 1931 and 1946 the proportion of the total income absorbed by the kWh cost increased from 17 to 50 per cent. Conversely the imponderable portions of the cost have been reduced from 83 to 50 per cent of the total. It is submitted that these changes in the build-up of the total costs of energy, coupled with the increase in the energy consumption, have facilitated the simplification of the methods of charging for supplies of electricity, particularly in the case of the smaller consumers comprising some 80 per cent or more of the total.

Municipal Reports

Burton-upon-Trent.—The first report and accounts we have received from a municipal undertaking for the year ended March 31st last come from Mr. T. Hall, borough electrical engineer of Burton-upon-Trent. Total sales of electricity are shown to have increased by nearly 8 per cent to 83·8 million kWh. The maximum load on the generating station rose from 36,800 to 43,200 kW, the highest yet recorded; kWh generated increased from 142·3 million to 165·4 million kWh.

Indicative of the demand for electrical equipment is the fact that 19 of the 23 tenants of new permanent houses on the Waterside-Stapenhill estate have had electric cookers installed. Destruction by fire of all the Department's meter stocks has held up transfers from flat rates to the " all-in " tariff.

Revenue for the year, at £394,209, was up by £20,147, but working expenditure advanced more sharply—by £32,984—to a total of £324,439. The net profit on the year's working was £20,458 compared with £32,689 in 1945-46.

Carlisle.—The report of the city electrical engineer and manager, Mr. A. C. Thirtle, is another early arrival. Here, again, the results reflect the very large potential demand for electricity. In spite of the curtailment of supplies owing to the shortage of fuel and plant sales increased by over 10 per cent to 50·7 million kWh. Domestic two-part tariff supplies (21·2 million kWh) expanded by 25 per cent and sales to agricultural premises (1·2 million kWh) show an increase of 42 per cent.

At the Department's Willow Holme station 363·4 million kWh was generated, the same as in the previous year. Fuel consumption per kWh generated was reduced from 1·337 lb (costing 0·328d.) to 1·308 lb (0·327d.).

The accounts show a revenue of £284,136, which was £22,609 more than in 1945-46; against this working expenses increased by £19,526 to £218,771. The net surplus was £3,549 (£2,488). The average price received per kWh sold of 1·33d. was only 9·1 per cent more than in 1939-40 although the cost of fuel has risen by 170 per cent, wages and salaries (for the same personnel) by about 50 per cent, and stores, replacements, etc., by 58 per cent. An analysis shows that the average price for domestic two-part supplies (1·055d.) was 3·2 per cent higher than in 1940 and in the case of farms (1·227d.) there was a slight reduction in price.

Leeds.—Besides extensions at Kirkstall—one new 30,000-kW turbo-alternator started preliminary running at the end of March and another set should be in commission to meet the peak demand next winter—construction of a new power station at Skelton Grange is in hand. The report of the city electrical engineer (Mr. F. Nicholls) states that the kWh generated at Kirkstall and Whitehall Road in 1946-47 constituted a record, amounting to 688·7 million against 624·4 million in the preceding year. The simultaneous maximum demand on the undertaking was 167,650 kW (154,210 kW in 1945-46). At Kirkstall where 635·6 million kWh was generated, coal consumption averaged 1·388 lb per kWh; at Whitehall Road the figure was 2·620 lb. Generating costs were 0·355d. and 0·742d. per kWh respectively.

Sales of electricity, excluding 13·2 million kWh bulk supplies to other undertakings, aggregated 390·2 million kWh, an increase of 45·1 million (13 per cent). Domestic supplies in particular were much greater and the engineer says it appears that the value of electricity is so much appreciated in this sphere that the large consumption has come to stay. Residential tariff supplies last year totalled 139·6 million kWh compared with 57·3 million in 1939.

The accounts show gross receipts of £1,748,701 (£1,510,919), working expenses amounting to £1,407,604 (£1,269,259). After meeting loan charges, etc., but before contributing £27,231 (£18,627) to capital expenditure there was a net surplus of £69,816 compared with a deficit of £11,359 in the previous year. The average price received per kWh sold was 0·984d. (0·987d.). Consumers at the end of March numbered 170,229 (167,412).

Overseas Electrical Trade

Sharp Fall in Generating Plant Exports

GOVERNMENT policy in restricting exports of generating plant in view of home needs is reflected in the Board of Trade returns for May. As will be seen from Table I, the value of exports of plant of over 200 kW last month was only £76,951 compared with £615,085 in the corresponding month of last year. Exports of electrical equipment as a whole were valued at £5,300,100 against £5,654,875 in April and £5,435,170 in May, 1946.

Goods and apparatus alone (i.e., excluding machinery), at £3,736,221, showed an improvement of £143,311 on a year ago, an outstanding item in this group being domestic radio receivers, exports of which amounted to £431,469 against the 1938 monthly average of only £36,755. Cooking and heating apparatus exports have also swollen considerably, last month's value of nearly a quarter of a million pounds comparing with a 1938 average of £30,664. Similarly, shipments of vacuum cleaners have increased from £26,662 to £221,751. Cable exports were lower than in May, 1946, when there was an abnormally large shipment to France.

Table I.—Electrical Exports and Imports

Class	Exports			Imports		
	May, 1947	May, 1946	Monthly Av., 1938	May, 1947	May, 1946	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables, submarine	33,068	56,083	17,289			
Ditto, not submarine	162,606	354,235	71,803			
Wires and cables, other than telegraph and telephone, rubber insulated	328,737	279,302	117,533	6,436	1,162	31,246
Ditto, insulation other than rubber	400,294	451,417	153,256			
Commercial radio apparatus	141,634	129,849	28,296	*	*	*
Domestic radio receivers	431,469	276,810	36,755	1,104	10,458	10,148
Telegraph, telephone and signalling apparatus	† 519,206	400,630	242,716	11,518	7,533	9,243
Other radio, etc., apparatus	182,856	128,416	57,848	40,835	95,860	47,870
Valves	129,609	167,914	41,272	18,802	862	10,893
Electric carbons, furnace	*	*	*	35,163	448	4,054
Other electric carbons	*	*	*	1,305	4,238	2,301
Electric lamps	108,690	124,010	49,440	4,225	8	10,265
Other lighting apparatus	226,798	183,703	48,565	5,637	1,288	38,662
Primary batteries	40,566	65,251	13,572	992	686	3,549
Accumulators, portable	148,657	138,226	28,874	*	*	*
Ditto, stationary	10,491	14,805	19,773	*	*	*
Ditto, parts and accessories	42,784	49,522	*	*	*	*
Electric cooking and heating apparatus	243,544	125,029	30,664	*	*	*
Commercial electrical instruments, including ammeters, voltmeters, etc., and parts	77,856	53,715	15,878			
House service meters	59,284	41,756	15,791	11,511	8,091	32,057
Other electrical instruments	58,913	46,369	9,612			
Electro-medical apparatus other than X-ray	30,276	14,955	3,038	*	*	*
X-ray apparatus, vacuum tubes and parts	49,611	67,305	4,881	24,132	22,614	9,734
Insulating materials, not elsewhere specified	99,596	130,603	19,343	*	*	*
Unclassified electrical goods and apparatus	209,676	293,005	108,083	22,347	10,577	52,980
Generators, complete, up to 200 kW	118,142	102,296	38,071	*	*	*
Ditto, over 200 kW	76,951	615,085	119,079	*	*	*
Ditto, parts	166,176	71,335	*	*	*	*
Railway and tramway motors	38,692	34,429	15,977			
Other motors up to ½ H.P.	25,162	18,449	9,001			
Ditto, over ½ H.P. but under 1 H.P.	29,559	10,044	2,470	9,767	9,517	26,033
Ditto, 1-250 H.P.	255,930	168,478	96,637			
Ditto, over 250 H.P.	18,183	35,380	20,960			
Converting machinery	49,921	3,841	101,304	*	*	*
Transformers including coils	178,129	230,739		*	*	*
Rectifiers for power house use	16,982	9,405	3,463	*	*	*
Motor starting and controlling gear	72,770	77,543	50,866	*	*	*
Switchgear and switchboards, other than telegraph or telephone	251,336	301,824	184,533	*	*	*
Other electrical machinery	25,224	23,553	15,497	45,710	2,551	14,455
Electric vacuum cleaners and parts	221,751	93,708	26,662	*	*	*
Other electrically-operated portable appliances	18,971	46,151	10,394	6,293	2,056	24,627
Total	5,300,100	5,435,170	1,829,198	245,777	177,949	328,117

* Not classified separately. † The figures for 1947 are not completely comparable with those for previous years.

British India was the largest market for goods and apparatus last month (£547,730), and with a total of £2,597,866 for the first five months of the year leads South Africa by £449,050. Sweden, Norway, the Netherlands, Belgium and Portuguese East Africa have also continued to take large quantities of British electrical goods.

Table II.—Distribution of Exports of Electrical Goods and Apparatus

Destination	May, 1947	May, 1946	Monthly Av., 1938
	£	£	£
Eire	124,271	108,270	37,726
Channel Islands	36,788	26,195	12,177
Palestine	56,421	159,312	8,426
British West Africa	42,552	36,424	12,889
Union of South Africa	499,620	416,618	162,584
Southern Rhodesia	22,390	31,498	9,632
British East Africa	31,413	43,114	7,893
British India	547,730	387,496	123,789
Burma	55,205	27,020	5,337
British Malaya	95,344	107,526	32,792
Ceylon	32,835	29,512	15,048
Hong Kong	48,387	32,802	12,939
Australia	205,789	225,272	197,366
New Zealand	173,775	124,144	96,225
Canada	47,739	15,413	12,547
British West Indies	48,528	22,585	12,954
Other British Countries	69,687	71,119	21,265
Soviet Union	52,701	57,527	36,781
Finland	25,805	26,680	5,969
Sweden	120,240	93,346	14,948
Norway	109,910	61,604	12,881
Iceland	37,025	30,465	2,796
Denmark	53,923	76,183	18,907
Poland	31,884	22,663	9,702
Netherlands	102,380	97,519	22,010
Belgium	109,599	107,382	11,208
France	27,202	221,444	16,082
Switzerland	28,639	17,609	3,768
Portugal	85,820	125,208	6,512
Spain	24,253	72,803	3,813
Czechoslovakia	32,138	68,549	7,256
Yugoslavia	13,632	580	1,475
Greece	28,055	683	4,926
Turkey	25,561	68,905	7,684
Portuguese East Africa	20,969	2,076	6,942
Egypt	114,836	110,626	13,176
Iraq	46,063	64,540	5,530
Iran	69,045	60,465	16,345
China	34,592	22,356	4,119
United States of America	13,983	6,874	5,839
Mexico	35,124	26,124	1,466
Venezuela	20,495	15,672	2,936
Chile	12,991	3,080	6,635
Brazil	57,405	37,136	11,164
Argentine Republic	44,335	74,537	45,452
Other Foreign Countries	219,142	155,954	46,371
Total	3,736,221	3,592,910	1,134,284

India also figures prominently in the machinery section, with generating plant shipments valued at £121,998 against £28,521 a year ago. Other destinations for power plant, with May, 1946, comparisons in parentheses, were as follows:—South Africa £30,518 (£45,923); Aden, £32 (£44,000); Burma, £13,000 (£51,721); Australia, £9,655 (£132,671); Canada, £4,559 (£12,759); other British countries, £64,617 (£13,771); Soviet Union, £13,343 (£134,020); Spain, nil (£237,869); and other foreign countries, £103,547 (£87,461).

Imports of electrical equipment have shown a tendency to rise in recent months and the May total of £245,777 was the highest for a considerable time. America was once again the principal supplier of goods and apparatus (last month £76,202 out of a total of £184,007), followed by Canada, £58,235. Furnace carbon imports were substantially higher—£35,163, against £448 in May last year.

External Boiler Deposits

TECHNICAL Paper No. 2, The Analysis of External Deposits from Boilers, by H. E. Crossley, A. H. Edwards and D. Flint, has been reprinted by the Boiler Availability Committee from the Journal of the Society of Chemical Industry.

Part 1 describes the nature of these deposits and the methods used for examination. The analytical difficulties arising from the presence of such radicals and elements as sulphate, phosphate, arsenic and boron and methods for avoiding them are discussed. A rapid method is given for the determination, as mixed sulphates, of sodium and potassium in the water-soluble fraction of a deposit.

Part 2 deals with methods of analysis for deposits rich in phosphates. Where the phosphate concentration (as P205) exceeds 6 per cent, sulphates also being present, a known excess of ferric sulphate should be added for the removal of phosphate to the solution prepared for the precipitation of mixed oxides. Methods for the determination of phosphate, sulphate and alkalis are also included.

The last part of the paper describes a method for extracting the water-soluble fraction, which is separated into three parts for determinations of (1) acidity, (2) sulphate and alkalis, and (3) silica, mixed oxides, lime and magnesia. The Paper is obtainable on application from chief engineers of undertakings owning power stations.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Eire.—Firm of cartridge fuse manufacturers wishes to import indicators for these fuses from Great Britain. (X.184.)

COMMERCE and INDUSTRY

U.N.O. and Power Shortage.

THE United Nations Economic Commission for Europe has recommended the immediate setting up of two standing committees to deal with electric power and industries and materials. It described the shortage of electric power as being as serious a bottleneck for European reconstruction as that of coal. A coal or fuel committee is proposed to replace the existing coal organization after 1947.—*Reuter* (Geneva).

Wages in the Contracting Industry

The National Joint Industrial Council for the Electrical Contracting Industry has agreed that a joint special committee shall be appointed with the following terms of reference:—To consider the wages structure of the industry; to consider an application submitted by the Electrical Trades Union for an increase in the basic wage rates; to consider wages in relation to production; to recommend any interim adjustment in wage rates which may appear to be expedient; and to consider hours of work in relation to the Government's Economic Survey for 1947.

The committee is to report to the N.J.I.C. at the earliest possible date upon any matter within its terms of reference but in any case not later than September 30th next.

Dredgers for France

An important contract has been placed with the B.T.H. Co., Ltd., for the supply of the complete a.c. electrical equipment for five floating dredgers which will be used to cut a canal between Donjere and Mondragon in the south of France. The canal, part of an extensive project to exploit the possibilities of hydro-electric power on the Rhone, will also facilitate the passage of barges up the river.

The supply to the dredgers will be at 13,500 V, taken from overhead land-lines running parallel to the projected line of the canal, a 380-V, three-phase, 50-cycle supply being obtained from the secondary of a 1,000-kVA transformer mounted on each dredger.

The electrical equipment also includes h.v. switchgear with protective equipment, l.v. ironclad distribution switchboards, control gear, and induction motors, mostly of the slip-ring type.

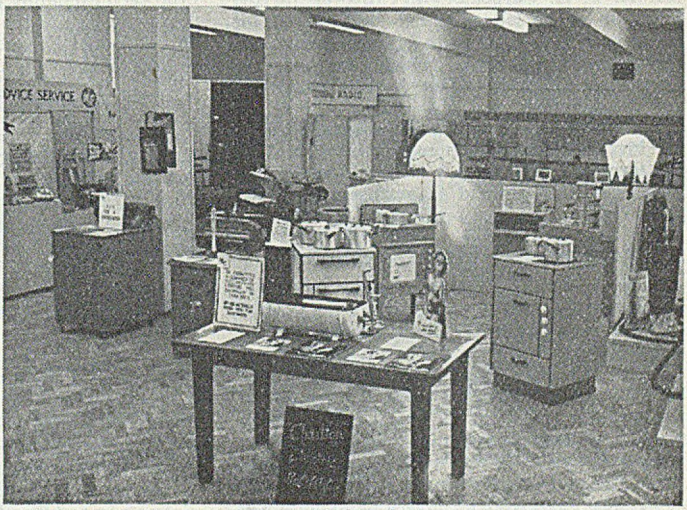
The motors total 1,080 h.p.: the bucket chain motor is rated at 350 h.p., and several motors ranging from 50 to 140 h.p. are required for the conveyor belt system used to convey the spoil to the shore.

The electrical equipment has special features, and was designed by the B.T.H. Co. to meet the mechanical requirements of the shipbuilders, M. Verschure & Co., Ltd., Amsterdam. A sub-contract for the supply of motor control gear has been placed with Brookhirst Switchgear, Ltd.

Review of Electricians' Wages.

New Leyton Showrooms

Last week we referred to the jubilee of the Leyton Corporation electricity undertaking and the opening of the new showrooms by Mr. E. Shinwell, Minister of Fuel and Power. Mr. A. E. Morgan, the borough electrical engineer, has now sent us a photograph, which we reproduce herewith, showing the general lay-out of the ground floor showroom.



Ground floor of the new showroom of the Leyton Electricity Department

Export of Resistance Welders

At a recent meeting of the manufacturers of resistance welding machines (who form a section of B.E.A.M.A.) it was stated that in spite of the difficulties they are experiencing in obtaining raw materials, exports of spot, seam, projection and flash resistance welding machines during the first few months of 1947 were greater than the figure for the corresponding period of 1946

and the volume of outstanding orders for both home and overseas had been reduced slightly. Particular interest is being shown by overseas buyers in British resistance welding machines, and manufacturers have established a firm overseas market which they are now developing.

British Exports to New Zealand

The continued predominance of Great Britain in New Zealand's electrical import trade is shown by statistics relating to the last quarter of 1946. Of the insulated wire and cable to the value of £N.Z. 247,000, Great Britain's share accounted for about £240,000. Imports of electric motors had a total value of £91,000 and Great Britain was responsible for £67,470 of this. Lamp imports of £11,700 included £7,940 from Great Britain. In the radio trade the United States was slightly ahead of this country.

Relay Patent Extended

In the Chancery Division on Friday Mr. Justice Vaisey had before him a petition by Mr. R. E. H. Carpenter, of Croydon, for the extension of his letters patent No. 315,496 for an invention relating to improvements in electro-magnetic relays, which he said the Germans used during the war in the construction of " V2 " bombs.

Mr. James Mould, for the petitioner, described the invention as of outstanding merit and on the threshold of tremendous development.

His Lordship granted an extension for seven years from the date of application in 1944.

Farming and Home Exhibition

At a recent farming and home exhibition sponsored by the Glamorganshire and Monmouthshire Agricultural Executive Committees and the National Farmers' Union, MacWhirter, Ltd., of Cardiff, distributors for the Pressed Steel Co., Ltd., exhibited a range of " Prestcold " refrigeration equipment. One exhibit comprised a working dairy with a 100 cu ft coldroom equipped with a " Prestcold " AR.25 unit and CPE 300 coil together with a 25-g.p.h. milk cooler also operated by " Prestcold " equipment.

Fuel Economy Festival

On June 13th sixty members from the north and south parts of the S.E. England Area of the E.A.W. attended a " Fuel Economy Festival " at 35, Grosvenor Place, S.W.1, opened by Alderman Mrs. Armitage, president of Watford Branch. Miss Caroline Haslett, Director, addressed the conference, and was followed by Miss Grange, of the Ministry of Fuel and Power, who spoke on the background history of fuel economy. A demonstration of meter reading and electricity consumption was given by means of dialogue and models by Mrs. E. E. Edwards and Miss M. Reading, E.A.W. area organizers. A talk on cookery and fuel economy was given by Miss A. M. Pilkington, E.A.W. housecraft lecturer, and a representative of Easiwork Cookers, Ltd., spoke on pressure cookery. Fuel economy in home washing was explained by a representative of Crosfield, Watson & Gossage. First prize in the competition for the best fuel economy hint was won by Miss M. Bennett, of Walthamstow, while the second prize went to Mrs. E. J. Harrington, of Erith.

Decca Navigator in Colliers

Having received a report from the captains of two of the Fulham undertaking's colliers that the Decca Navigator equipment installed experimentally had proved of very material assistance, the Electricity and Lighting Committee has recommended the installation of the device in all of the Council's vessels.

Television Set Hire-Purchase

It was reported to Fulham Borough Council last week that the manufacturers had designed a television set to meet the requirements of the Council and production would be started shortly. The sets would cost approximately £100 each excluding purchase tax, and assuming the tax to be £28 the hire-purchase terms would be an initial payment of £25 with monthly payments of £3 for three years.

Graham Bell Exhibition

An exhibition showing the progress in communications since Graham Bell's first telephone is being held by the P.O. in Glasgow to mark the centenary of the birth of the inventor. It opened on June 23rd and will continue to July 3rd at the Corporation Gas Showrooms, Sauchiehall Street. A replica of Bell's telephone is on view, also one of the latest automatic exchanges and one of the first directories, dated 1860.

Lead-Melting Furnace

In the article under the above heading in our May 30th issue the gas consumption figure (p. 900) should have been 1,200 cu ft per hr, not 2,100 cu ft as printed.

The Young Idea

Pupils of the Public School, Penicuik, Midlothian, are including electrical generation and distribution in their curriculum and as part of their electrical education they were recently conducted on a short tour of the system of the Lothians Electric Power Co.

Gauge and Tool Export Catalogue

With a view to assisting buyers of precision tools and gauges, the Export Committee of the Gauge and Tool Makers' Association has published a catalogue of the products of member-firms particularly interested in export trade. In preparing the catalogue the importance was appreciated of printing it in the langiage of the country to which copies were being sent. Accoraingly, the first issue of the export

catalogue is in four editions, namely, English, French, Spanish and Portuguese; it is probable that other languages will be included at a later date. The catalogue is preceded by a buyers' guide index giving a general indication of the products available for export. This is followed by illustrated particulars of the products of member-firms. The catalogue is arranged in alphabetical order of the names of the firms and will be sent free of charge to all overseas inquirers; in the case of inquiries from firms, agencies or persons in Great Britain, there will be a nominal charge of 2s. 6d. per copy, which includes postage. The catalogue is obtainable from the offices of the Association, Standbrook House, Old Bond Street, W.1.

"Enterprise Scotland" Exhibition

The selection committees which will choose the designs to be included in the "Enterprise Scotland" Exhibition have now been appointed. The names of the committee appointed for the domestic appliances industry are as follows:—Trade representatives: Mr. W. D. Brassington, burgh electrical engineer, Motherwell, and Mr. D. Ross, burgh electrical engineer, Paisley. Exhibition representatives: Mr. F. R. Yerbury, Director, Building Centre, London, and Mr. J. Patterson, acting chief architect for the Department of Health, Edinburgh.

Fluorescent Lighting Installations

The lighting of the British Pavilion of the annual Lisbon Fair has been designed by the Illuminating Engineering Department of Thorn Electrical Industries, Ltd., the equipment employed being the "Atlas" 80-W fluorescent tube and fittings. Two other fluorescent lighting installations recently carried out by Thorn Electrical Industries are in the Council Chamber at St. Marylebone Town Hall and the planning offices of Vauxhall Motors, Ltd.

Chemists' Factory Power Supply

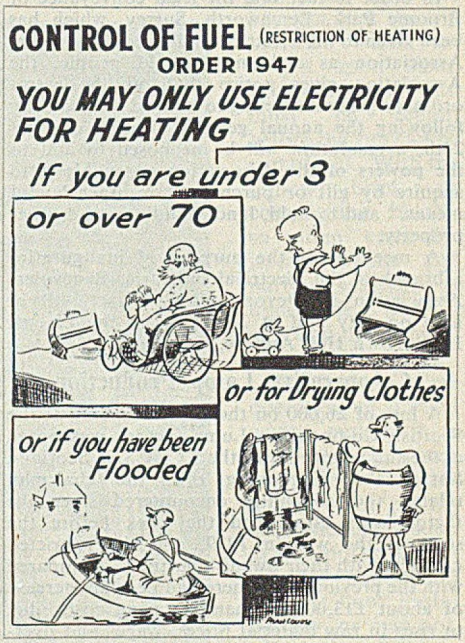
It is reported in the staff magazine of Boots Pure Drug Co., Ltd., that to meet increasing demands for steam and power the company is planning to extend its power station at Beeston and to build a new station at Nottingham to replace the existing plant in Island Street. The new station will continue the company's present practice of back-pressure generation.

Refrigeration Handbook

The re-appearance of the "Handbook of British Refrigeration Material and Refrigerating Catalogue" in its first post-war edition will be welcome to many who need a guide to all sections of an industry in which much recent development has been made. This enlarged illustrated buyers' guide to all departments of the refrigeration industry is circulated widely overseas, and will thus be of service to exporters of refrigeration machinery and accessories. The inclusion in this well-printed and attractively bound volume of technical tables and refrigerating data will meet the need of refrigerating engineers and others, and there is also added an up-to-date list of all the cold stores and ice factories in Great Britain. The price of this annual is 5s., and it is published by *Modern Refrigeration*, Empire House, St. Martin's-le-Grand, London, E.C.1.

Oxford Fuel Saving Campaign

The Oxford City Electricity Department has arranged a special window display at its showrooms in connection with the fuel saving campaign. This includes a graph showing the



"Fuel saving" cartoon displayed in the showroom window of the Oxford City Electricity Department

kWh saved since the heating restrictions were introduced and illustrates the amount of coal consumed at power stations to supply an electric fire for one hour. A lighter touch is given by a cartoon (shown in the accompanying illustration) reminding consumers that only in special circumstances can an electric fire be used.

Purchasing Officers' Association Conference

A week-end conference of the Purchasing Officers' Association was held at Cheltenham on June 13th-15th, under the presidency of Mr. P. T. Appleby (John Harper & Co., Ltd.), when current purchasing problems were discussed. The two members' papers were "The Purchasing Officer's Responsibility to Industry" by Mr. D. Wragg (Thos. Firth & John Brown, Ltd.) and "Some Thoughts on the Future of

Industry " by Mr. A. Elliott (Churchill Machine Tools, Ltd.). Other papers included " Prices in the Semi-Planned Economy " by Mr. A. A. Shenfield and " The Purchasing Department as seen by the Works Manager " by Mr. E. C. H. Parmenter (Fielding & Platt, Ltd.). The principal guests at the dinner held on June 14th were Sir George and Lady Kenning, and the Deputy Mayor of Cheltenham. The " Sir John Nicholson " Golf Cup was won by the holder, Mr. L. C. J. Carvill of the British Thomson-Houston Co., Ltd., Rugby.

E.I.B.A. New Powers

In order to facilitate the legal conveyance of Broome Park, Betchworth, Surrey, which has been given to the Electrical Industries Benevolent Association as a home for old people, the Association gives notice that, at the extraordinary general meeting to be held immediately following the annual general meeting on July 24th, a resolution will be proposed to add to the powers of the Association to enable it to acquire by gift or purchase " or other lawful means," and to hold, land, buildings, and other property.

A meeting for the purpose of inaugurating a branch of the Electrical Industries Benevolent Association in Devon and Somerset will be held on July 2nd at 3.30 p.m. in the Electric Hall, Town Hall Annexe, Torquay.

Co-operative Lamp Production

A loss of £6,000 on the year's working at the Scottish Co-operative Luma factory was noted at the annual meeting of the S.C.W.S. in Scotland last week. Explaining this, the chairman related the difficulties encountered since the factory was established the week before the start of the war in 1939, and the restricted contacts with their Swedish partners. Compared with the previous year there had been an increase of about £13,000 in manufacturing costs, due to rises in raw material prices, wages and overhead charges. Taking everything into consideration, they had done exceedingly well and net sales for the year showed an increase of £8,300. It was also pointed out that the whole expenditure involved in setting up the fluorescent lighting department had been included in the current balance sheet.

Trade Publications

Pye, Ltd., Cambridge.—A well-illustrated description of the installation of the company's radio-telephones in the " Anchor " tugs of the France Fenwick Tyne & Wear Co., Ltd.

Thorn Electrical Industries, Ltd., 105-109, Judd Street, London, W.C.1.—A folder illustrating examples of lighting in public libraries by means of " Atlas " fluorescent lamps.

Evershed & Vignoles, Ltd., Acton Lane, Chiswick, London, W.4.—Illustrated leaflet (No. 218/1) on a distant pressure recorder for gas works.

Frederick Smith & Co., 24, Queen Anne's Gate, Westminster, London, S.W.1.—Four leaflets on " Anacos " alloys, including copper-chromium sections and forgings for welding electrode tips and jaws; copper-silver commutator sections, bars, strip and wire; machined components; silver-clad copper wire and rolled strip for electrical contacts.

Cantie Switches, Ltd., Northgate Works, Chester.—Illustrated and priced catalogue (No. CC.1) of metalclad switches, switch-fuses, distribution gear and cable accessories.

Trade Announcements

Marryat & Scott, Ltd., have appointed the Colston Electrical Co., Ltd., 29, Orchard Street, Bristol, as their sales and service agents in the Western Counties, and Mr. C. G. Reeks, who has represented Marryat & Scott in the Western Counties since the end of the war, will co-operate with the Colston Electrical Co. to form a sales and service organization throughout the Western Counties area.

Following the death of Mr. E. F. MacKay, manager in Scotland for Dorman & Smith, Ltd., and its associate company, DS Plugs, Ltd., the Scottish representation will for the time being be handled at 135, Wellington Street, Glasgow, by Mr. G. Sumner.

The Lancashire Dynamo and Crypto Group Publicity Department has moved to 25, Shaftesbury Avenue, London, W.1. (temporary telephone number: Gerrard 6881).

The Rockman Engineering Co., Ltd., has moved to Woodstock Mills, Meek Street, Higginshaw, near Oldham, Lancs.

The trade counter and office of the Coventry branch of Walsall Conduits, Ltd., have been transferred to Albion Street, Coventry. All goods consigned to this depot should be addressed to Rudge Road, Coventry.

The works of Bruce Peebles & Co., Ltd., Edinburgh, will be closed on July 4th and re-open on July 14th.

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 makers of the following :—

Manufacturers or suppliers of " Transotape " transformer tape.

Address of Barry & Co., England, manufacturers of small air pumps for aquarium tanks.

House Wiring

Attributes of Non-Metallic "Gilflex" Flexible Conduit

THE appearance of a new wiring system, although it is primarily designed to overcome some of the present-day difficulties resulting from shortages of materials and labour, raises again the question of the most efficient and satisfactory way to wire small domestic and similar premises. For so long has the standard method been based upon the use of rigid steel conduit that the fact has been obscured that however suitable, even indispensable, metal tubes may be for certain types of installation, in industrial buildings for instance, they are not right for the special conditions now being encountered in small houses.

The use of rigid systems in houses means the employment of excessive labour in cutting ways for the conduit, both in the slotting of timber joists and the chasing of walls. The use of standard braided cables eliminates conduit of a smaller outside diameter than ⅝ in. and such sizes must be chased into brick walls and breeze partitions if there is not to be a serious risk of rusting. The fact that the rough surfaces of walls before plastering will not accept a conduit flat upon them means that at some points the wall chasing must be the full depth of the conduit; even the use of t.r.s. cables does not in all cases avoid this necessity, as it is usual to provide conduit runs down to switch points, etc.

T.r.s. cables do impart a certain flexibility to the installation, but this does not go far enough. Although it avoids the necessity to slot joists, they must be drilled and it is debatable whether any time is saved thereby while it is still often necessary to provide conduit to switch and socket points, involving almost as much wall chasing as is required for a complete conduit system. With standard brick walls chasing is not difficult, but it takes a long time; whereas with breeze block partitions it often happens that the top blocks, with no weight upon them, become loosened and must be rebuilt before the run can be completed. With the hollow brick or composition blocks, so often used for internal walls and partitions, chasing is impossible without affecting the stability of the wall.

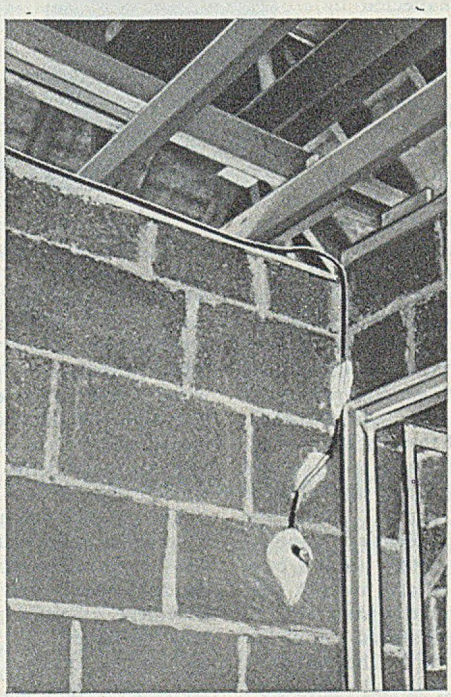


Fig. 1.—Flexible conduit run under joists to avoid slotting and in wall angle to dispense with chasing

The whole time operation of a rigid wiring system in a small house seems completely uneconomic. The electrician attends as soon as the roof is on and cuts his conduit into the first floor joists; he may, or may not, place the wiring in position at the same time, but if he observes the regulations he will not. He then leaves the building until the floor is laid and the internal partitions are erected upon it, hurrying back with the hope of using time available between that work and the subsequent plastering of the walls for the installation of conduit and wiring.

Present shortages of conduit boxes and fittings often entail further delays and many makeshifts are employed to keep the wiring work moving. The contractor has to hold so many types and sizes of conduit boxes and fittings that it is almost certain that at any given time he will lack one or more of them.

The absence of even a small reducing nipple causes a serious problem for the wireman, who is too often tempted to omit it altogether rather than interrupt his work, trusting that its omission will not be too obvious when the continuity test is applied. The designers of the new method of wiring have attempted to overcome all these difficulties by the following simple means:—

In the first place the conduits are flexible, being formed of a specially tough p.v.c. compound and are thus non-inflammable and unaffected by moisture and chemical action when embedded in plaster or cement. The method of installation adopted to eliminate joist slotting and wall chasing is shown in Fig. 1, which depicts ½ in. conduit run on the underside of the joists and in the wall angle. It is held in position before plastering by cement patches at intervals, although some mechanical fixing may be necessary here and there.

It is possible to use a ½-in. conduit for this run because the cable it contains is braidless. The smooth interior of the tube makes any such mechanical protection for the wiring unnecessary and either v.r.i. and taped or p.v.c. cables may be used. As a simple point-to-point method of installation is used, there are no conduit fittings to drag the wiring through, or round, and the absence of condensation in the conduits means that the wiring can be installed together with the conduits without risk. With attention to bends at angles the wiring can always be withdrawn at any time for alteration or extension.

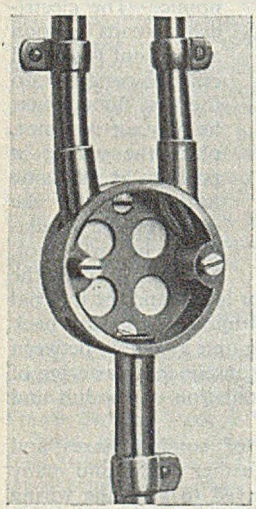


Fig. 2. — Universal junction box with six knock-outs in sides and four at the back

Wiring need not be begun in the building until the floors are laid and all internal partitions erected, which means one visit only from the electrician and his work is eased by having a good floor to work upon instead of dodging about with boards across joists. In addition to reducing the amount of time spent on the job by the electrician, this arrangement will benefit the building contractor by ensuring better site organization. For "mass production" building, wiring runs can be prefabricated from plan measurements, the wires placed in the conduits and the assemblies taken to the site for installation. Exact measurements are unnecessary, as the flexibility of the conduit permits the taking up of an odd inch or two here and there.

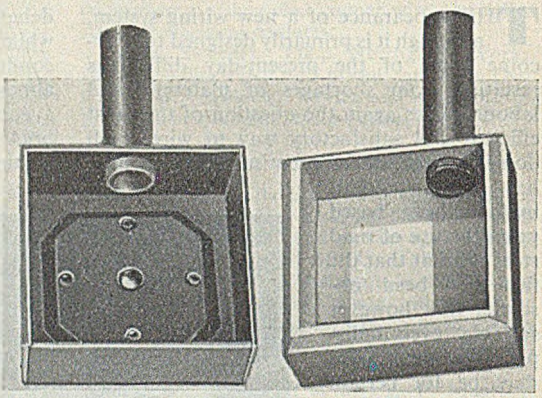


Fig. 3.—Self-threaded entry into screwed metal (left) and wood (right) flush switch boxes

The conduit fittings problem is eliminated by point-to-point wiring, since one universal box serves all purposes for both sizes of conduit, ½ in. and ⅝ in., by the simple expedient of making the smaller fit tightly into the larger. All entries into the conduit and switch boxes are ⅝ in., so that when using ½-in. conduit it is only necessary to bush the entry with a short piece of ⅝-in. conduit to make a tight joint. The addition of a ½-in. extension ring enables the junction box to accommodate a 13-A fused-plug socket. There are no tee or elbow boxes on the runs, merely conduit shaped to the building as required and a moulded bakelite outlet is provided to take all standard switches. The universal conduit box (Fig. 2) need not be used at ceiling points, as continuity does not have to be maintained but it is fitted with two B.A. screws at 2-in. centres to accommodate standard types of accessories if required. When fitted with a cover it can become a junction box and when fitted with an extension ring it will

accommodate the existing domestic standard fused-plug and socket outlet.

Adaptability is the keynote of the system, and it is not necessary to employ the special fittings provided, as all standard types can be used. For instance, the conduit is tough enough to take a thread, although it is not necessary to use stocks and dies for this purpose, as the conduit will self-thread into standard conduit threads. Thus, if any special pattern of flush switch is required, it is immaterial whether it has a wood or iron box; Fig. 3 shows conduit self-threaded into an iron box and simply fitted to a wooden box. In the former case an insulating bush is not required; this is especially useful in the case of all special screwed conduit entries into watertight fittings, water heaters, etc., no less than in the cases of such accessories as switches or socket outlets. At the same time, it is recommended that the essentially non-metallic character of the system should be preserved by using insulated-type accessories and the bakelite boxes and fittings provided, but there is no need to hold up the whole job for one accessory or fitting.

It may be complained that in the new system earthing continuity must be obtained by running a special bare copper wire within the tubes, but this is only necessary in the case of socket outlets, cooker points, etc., whereas with steel conduit systems it is necessary to ensure continuity to each remote lighting point, which can be forgotten with the new system. The provision of a special earthing conductor, at low cost, within the non-metal conduit itself where it is protected against corrosion, rusting and, most important, of unvarying resistance, has several advantages; it eliminates the necessity for resistance tests for continuity and the search for the one grub screw that has remained untightened.

Installation costs to-day are approximately 40 per cent for materials and 60 per cent for labour; although flexible conduit is competitive in price with light-gauge steel conduit, the new system's greatest economy is in respect of labour, which on small housing work has been cut by from 40 to 50 per cent according to length of experience with the system. It is extremely adaptable to all unorthodox methods of building and even concrete or composition joists provide no obstacle to speedy installation.

The trade name of this system is " Gilflex." The tubing is manufactured by the North British Rubber Co., Ltd., Edinburgh, for Flexible Non-Metallic Conduits, Ltd., 208, Tottenham Court Road, London, W.1, of which Mr. T. C. Gilbert is managing director.

Fuel Co-ordination Proposal

ADDRESSING the North-Western Fuel Luncheon Club at Manchester last week Sir Ernest Smith, C.B.E., immediate past-president of the Institute of Fuel, and formerly Director-General of Gas Supplies, Ministry of Fuel and Power, said that he was deeply concerned at the way in which the fuel industries—coal, gas and electricity — were being nationalized, if the functioning of the National Coal Board was anything to go by. These industries were but three units of a single national fuel service and the consumer was of primary importance.

Without a national fuel policy covering coal, gas and electricity, chaos would inevitably occur. Instead of a better service at the lowest cost, the consumer would be in no better position than he was to-day, and conditions might be very much worse. There should be formed at once a National Fuel Board to frame a policy and the ideal would be to nationalize all three industries at the same time. The Fuel Board should not have " functional " personnel, but be composed of proved administrators with a wide knowledge of the fuel industries, and preferably with some technical training.

The gas industry might not be nationalized for some years. When it was, its present set-up demanded that its administration should be very different from that of the Coal Board. The Regions should be as autonomous as possible. The National Fuel Board would prevent everything being done in triplicate in the regions; there should be many common services.

Sir Ernest said he thought the time had come when National Fuel Research, as represented by the Fuel Research Board and the research associations of the fuel industries, should be taken from under the wing of the Lord President of the Council and transferred to the Ministry of Fuel and Power. That, again, would eliminate duplication.

Electronics Exhibition

THE second annual Electronics Exhibition organized by the Institution of Electronics (N.W. Branch) will be held on July 22nd and 23rd at the College of Technology, Manchester. Admission will be by ticket only obtainable from Mr. A. Coates, 16, Didsbury Park, Manchester, 20.

ELECTRICITY SUPPLY

Reductions in Charges. Aswan Bill Approved.

Bedford. — ELECTRICITY DISCOUNT.—It is proposed that because of the inconvenience caused to consumers by the restrictions, shedding of load, and reduction of pressure which were imposed on the instructions of the Minister of Fuel and Power and the Central Electricity Board during the first quarter of the current year, a special discount of 15 per cent should be allowed to consumers on the charges made in respect of electricity consumed during that period.

Belfast.—TARIFF CONCESSIONS.—Small-power users and certain classes of lighting users benefit by £22,750 a year under tariff modifications recommended by the city electrical engineer and general manager (Mr. W. J. McC. Girvan). As a group small-power consumers have improved their load factor and the engineer therefore proposes that as from July 1st the existing flat rate charge of 3d. per kWh shall be reduced to 2½d., based on coal at 21s. 10d. per ton, and subject to a 10 per cent discount. The running charge of the two-part lighting tariff is being reduced from 1d. to ½d., the 10 per cent discount and basic coal cost remaining unaltered. Flat rates for industrial lighting (5½d./3¼d. per kWh) and churches, mission halls and schools (5d. per kWh), based on coal at 21s. 10d. per ton, are to be reduced by ½d., the new rates to be subject to a 10 per cent discount.

Fort William.—TRANSFER OF UNDERTAKING.—Mr. T. Johnston, chairman of the North of Scotland Hydro-Electric Board, at a luncheon held on June 18th to mark the transfer of the electricity undertaking to the Hydro-Electric Board, said that if hydro-electricity, tourism and afforestation were allowed free scope there would be such a recrudescence of life and prosperity in the North of Scotland as would astonish the world, and that would happen within five years. The Hydro-Electric Board was authorized to spend £30 million on developing the water power of the Highlands but when the Electricity Bill became law the amount would be increased to £100 million. Sir Duncan Watson, representative of the Central Electricity Board, said that a scheme was shortly to be put into effect in that district which would bring electricity to 85 per cent of the people in an area covering 250 sq miles. They would enjoy the best scale of tariffs in Britain. At an exhibition of electrical equipment it was stated that its use in agriculture would bring enormous economic benefits to the Highlands.

Lewisham.—PROPOSED LIGHTING CONVERSION.—Replacement of the existing high-pressure gas lighting in the borough by "Osira" electric-discharge lighting is recommended, the estimated cost being £15,000.

Lowestoft.—CHEAPER ELECTRICITY.—The Corporation recommends that the discount allowed for prompt payment shall be fixed at 7½ per cent for the two quarters to September 30th. Consumers with slot meters are to receive a rebate of 5 per cent. From and including the quarter commencing October 1st next it is proposed to discontinue the 7½ per cent war increase.

Notting Hill.—LOWER CHARGES.—In consequence of a decision of the Notting Hill Electric Lighting Co., Ltd., to bring its charges into line with those in Paddington tariffs are to be reduced. The lighting flat rate is to be lowered from 5d. to 4½d. per kWh (prepayment from 6d. to 5½d.) and under the "all-in" rate the fixed charge will be reduced. Business rates are also being modified.

Shoreditch.—HIGH-VOLTAGE CABLE. — The Borough Council has approved the recommendation of the Electricity Committee that the existing e.h.v. cable capacity between Hearn Street and Coronet Street substations be reinforced by running an additional cable, the estimated cost of which, together with its associated switchgear and reactors, is £8,000, and application is to be made to the Electricity Commissioners for sanction to borrow this sum.

Stafford.—TRUNK ROAD LIGHTING.—A scheme, estimated to cost £10,910, for improving the lighting of the entire length of the trunk road passing through Stafford was approved by the Town Council on June 17th; 500-W incandescent lamps are to be used.

Stockton-on-Tees.—SUPPLY TO TRADING ESTATE.—The Town Council has received an application from North-Eastern Trading Estates, Ltd., for a supply of electricity to factories on the North Tees trading estate. The work will cost £7,410, including the erection of an electric substation. It is also proposed to spend £5,900 on a new substation in Oxbridge Lane. Sanction has been received to borrow £1,000 for extending the Station Road substation at Norton and to acquire substation sites at Fairfield and on the Newham Grange estate. Substations are also planned on the Green Lane and Eastbourne estates.

Overseas

Egypt.—ASWAN BILL GOES TO SENATE.—The Chamber of Deputies, after a three-day debate, last week passed by a vote of 114 to 6 a Bill empowering the Government to execute the Aswan Dam Hydro-Electric Scheme recently approved by an international committee of experts. The Bill limits Government expenditure to £E10,500,000. The Bill will now go to the Senate.—*Reuter.*

Work of the N.P.L.

Inspection by the General Board

SO many people have wished to avail themselves of the opportunity presented by the revival of the annual visit to become acquainted with the more recent activities of the National Physical Laboratory, under the directorship of Sir Charles Darwin, that three days were assigned to the function last week in contrast to the single afternoon which was customary before the war.

The inspection by the General Board under the chairmanship of Sir Robert Robinson, president of the Royal Society, took place on Wednesday while members of university staffs and Government Departments were invited on Thursday, and representatives of industrial organizations had an opportunity of attending on Friday.

Speed of Electromagnetic Waves

The work of the laboratory is conducted in ten divisions, each of which had arranged exhibits and demonstrations, 264 in all, particularly numerous in the Radio Division. An endeavour is being made in the Electricity Division to determine more exactly than has been done before the velocity of electromagnetic waves which, by deduction from the Maxwell theory of propagation, should equal that of light. The value of this constant has recently become of greater practical importance in relation to some methods of aerial navigation involving the use of wireless signals. It is now being re-calculated from the known dimensions and measured frequency of electrical cavity resonators of different shapes on the "centimetric" radio principle. The hollow copper cylinder of 8 cm diameter and 8 cm long at present being employed has been made with the greatest care and its dimensions measured to three hundred thousandths of a centimetre, its frequency being measured within a few parts in a million while the cylinder is in an evacuated enclosure. It is estimated that the velocity may be determined by this means within 9 km/s, compared with the previous accuracy of about 30 km/s. The value so far obtained is 17 km/s greater than the accepted value of the velocity of light waves.

From dual-purpose investigations in the high-voltage section of the Electricity Division a meter is being developed to measure high voltage directly without the aid of a potential divider, or ultimate reference to a standard cell. It is of the attracted disc type and will be enclosed in a compressed gas chamber to reduce its size. At the same time it is hoped to learn more about the properties of compressed gases when used as dielectrics at high voltage.

Apparatus provided by the E.R.A. is being used at the N.P.L. to produce impregnated dielectrics for experimental investigation of the surge breakdown voltage of combined substances like pressboard in oil and wrapped wires in varnish.

A chronograph has been made in the Metrology Division for permanently recording highly precise comparisons of clocks. A cathode-ray beam sweeps vertically across an oscillograph screen 100 times per second under the control of a quartz crystal oscillator, the resulting traces being photographed on a horizontally moving 35 mm film. Fixed marks, also derived from the oscillator and occurring at intervals of one-thousandth of a second, are superimposed upon the traces to form a time scale. The Royal Observatory time signals (radiated daily on a frequency of 16 kc/s from the Rugby radio station) and those of the N.P.L. standard clocks are recorded in this way for comparison within one ten-thousandth of a second.

In the Light Division is a photoelectric colorimeter with a spectrum template which will measure colour and brightness in a manner that is superior to the response of a single observer because it conforms to the average. Light received from the colour being determined is spread out by a spectroscope; in the spectrum so formed is placed a template consisting of 40 steel strips, which can be adjusted to form a profile of any prescribed shape. The advantage of adjustability is avoidance of the necessity to measure (in advance, without knowledge of them, which is difficult) the photocell response and absorption in the spectroscope. This type of colorimeter has a wider range of usefulness than a spectrophotometer since, in addition to measuring absorption, it will gauge the brightness of such sources as discharge and arc lamps and determine any colour illuminated by them.

Differential Analyser

In the Control Mechanisms Section of the Metrology Division, in collaboration with the Mathematics Division, a differential analyser is being evolved with mechanical integrators and gear systems interconnected by electrical remote position servo-mechanisms, all controls going to a central switch board. The twenty integrators will ultimately be usable as a single unit, or sub-divisible for simultaneously solving several equations.

In this section, also, the fundamental principles of automatic control are being investigated with the object of gathering data for the design and synthesis of auto-regulators for industrial plant and processes. Pilot plant has been designed to simulate industrial conditions, known time-lags being introduced by electro-mechanical means.

In addition to X-ray and electron-diffraction examinations in the Metallurgical Division,

indirect electron-microscopy by the " replica " method is really revealing the true nature of metal surfaces. Also Geiger-Müller counting (in various kinds of X-ray diffraction work) is being compared with the older photographic procedure. The N.P.L. has encouraged the commercial production in this country of G.M. tubes, argon-alcohol filled, specially for this work while counter equipment of foreign manufacture has also been acquired recently. This method should be applicable to the estimation of very small quantities of industrial dusts as well as to the constituents of mixed powders.

A newly installed motor generator of 30 kVA at 5,000 c/s in the Metallurgy Division will furnish power for two new melting furnaces, which are to be used in studying the effects of alloying elements on pure iron. One of the furnaces has already been installed; the other is being built into a drum which will enable alloy additions to be made to the charge and the molten metal cast into ingots while the enclosing drum is evacuated.

Among general equipment in the Engineering Division is a 70-ton compression test rig for the analysis of stresses in aircraft structural panels by means of electrical resistance strain gauges; also a new phase-sensitive detector for a.c. strain-gauge bridges, while a fatigue testing machine is being constructed for combined axial load and bending at high temperature and high frequency (generated by valves) applied and measured electrically.

Jubilee at Hammersmith

HAMMERSMITH is the latest of the London electricity undertakings to celebrate its jubilee and to mark the occasion a jubilee dinner was held in the Town Hall on Friday last.

In 1895 Mr. A. H. Preece (now Sir Arthur Preece) was asked to design the generating station and work was commenced in the following year, and on June 20th, 1897, the supply was switched on. The station was equipped with hand-fired water tube boilers fitted with superheaters and four condensing engines driving 2,000-V single-phase 50-cycle alternators with a total capacity of 463 kW. The supply was given at 110 V. At the end of the first year there were over 300 consumers and the sales totalled 500,000 kWh.

The interconnection of the Hammersmith, Fulham and Battersea stations was proposed in 1914, but owing to the war it was not carried out until 1920. The last extension to the Hammersmith station was in 1920-22, when two 10,000-kW sets were installed, and in 1930 it was decided to take a bulk supply from the London and Home Counties J.E.A. and to operate the Hammersmith station for the Authority. In the year ended March 31st last the sales totalled 104·7 million kWh.

Presiding at the dinner the Mayor, Alderman R. J. Buckingham, in proposing the toast of the electricity supply industry, welcomed the nationalization of electricity supply, although there would be regrets on sentimental grounds in handing over the electricity undertaking.

Sir Cyril Hurcomb (chairman, Electricity Commission) in reply, said that reforms in the industry were necessary although there was some difference of opinion as to how these were to be accomplished. It was hoped that the report of the committee on tariffs would be available soon. All who had the interest of the industry at heart should now strive to get the best out of the new scheme.

In a typically witty speech, Sir Alan P. Herbert proposed the toast of the Hammersmith undertaking, and Councillor G. Mason (chairman of the Electricity Committee) in responding said that the undertaking had a record second to none in service to consumers. He referred to the excellent work of the previous borough electrical engineers and paid special tribute to Mr. B. L. Wells, the present chief electrical engineer. The toast of the guests was proposed by Mr. W. J. Field, M.P., and Mr. H. E. Goodrich (chairman, London and Home Counties J.E.A.) responded.

Relaying Television

THE manner in which television with sound can be relayed by radio links (see *Electrical Review*, June 13th, p. 984) was demonstrated last week by Marconi's Wireless Telegraph Co., Ltd., utilizing frequency modulated re-transmission and indicating how the band of very short waves employed can be made wide enough to accommodate the whole of the frequency range of a television picture.

The B.B.C. signals radiated from the Alexandra Palace were relayed (60 cm., 510 Mc/s) from Danbury Hill, near Chelmsford (a distance of 31½ miles, within optical range) and a further distance of 24 miles to Great Bromley, six miles east of Colchester. The re-transmitting aerial was horn-shaped and made of metal, mounted on a mast 40 ft above ground; the parabolic receiving aerial was dish-like, on a mast at a height of 200 ft. Sound and vision were relayed in the same way, but on slightly different wavelengths, both less than a metre; first because aerials of moderate size suffice for a thin pencil beam, and secondly because the same beam will transmit a far wider band of frequencies than that of an ordinary broadcasting station. The method of frequency modulation was the subject of a recent Marconi patent, whereby sound voltages are utilized to control a quartz crystal circuit.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Edmundsons Electricity Corporation, Ltd., reports a net profit for the year ended March 31st last of £647,362, as compared with £572,397 for the preceding year, to which is added £201,453 brought in, making £848,815. It is proposed to place £20,000 to general reserve and to pay a final dividend on the ordinary stock of 3 per cent, making 6 per cent for the year (unchanged). The balance carried forward is £304,994.

In his speech for next Thursday's annual meeting, circulated with the report and accounts, Lord Royden (chairman) mentions that this is the fiftieth year of the company. He is critical of the Electricity Bill and quotes figures showing the progress made by the company since 1932. Despite the immense rise in costs, no wartime or post-war increases of tariffs have taken place. In pre-war years 134,000 consumers were given free wiring and only shortages of materials and labour have prevented this service from starting up again. Owing to these shortages the supply companies are now unable to connect more than 200,000 new consumers each year, whereas the pre-war rate for the whole industry was 800,000. The new organization proposed by the Electricity Bill will have to operate under these conditions of shortages and will be just as hard pressed as the industry is to-day. The large measure of dislocation which will follow nationalization is an additional menace to the service which consumers receive to-day.

Referring to the compensation under the Bill, Lord Royden says that the Government's method of valuation is arbitrary and inaccurate. He outlines an alternative to nationalization and suggests that the legislative model should be the Water Act of 1945 with a few added powers to ensure action. The C.E.B. should continue to control, but neither own nor manage, generation. It should continue to own and manage the grid. The Electricity Commission should be strengthened as a body by enabling it to enlist a higher quality of personnel through payment of commercial scale salaries. The Commission should also have wider powers, including powers of compulsory amalgamation. The larger and more efficient municipal and company undertakings should own and manage new consolidated distribution areas designed to promote greater efficiency and procure better balanced loads, and employees should be safeguarded against losses, if any, resulting from the rearrangements.

This year's fuel and power crisis, in Lord Royden's opinion, was due to the wartime Government decision to disregard the Central Board's advice on plant; the industry was not responsible. The severe winter merely underlined the disaster. The crisis will last until 1950. He criticizes the way in which the Government has handled the matter of coal stocks.

In conclusion Lord Royden praises the work of the staff and makes particular mention of Brig. Gen. Wade H. Hayes, the managing director.

Siemens Bros. & Co., Ltd., report a trading profit for the year ended December 31st last, including approximately £110,000 in respect of previous years, income from investments and dividends from subsidiary companies, of £372,679, as compared with £427,183 for 1945. To this is added £410,000 E.P.T. recoverable for the year, less £110,000 liability on profits of previous years, included above, making £782,679 (against £642,183). The net profit is £364,183 (against £290,888), and after providing £140,000 for contingencies, it is proposed to pay again a dividend of 7½ per cent for the year on the ordinary stock. The balance carried forward is £698,279 (against £642,141 brought in). The consolidated profit and loss account shows a trading profit of £533,321, and a net profit of £383,741.

In a statement issued with the report and accounts, Dr. H. R. Wright (chairman and managing director) says that during 1946 a contract was entered into with the North-Eastern Trading Estates, Ltd., to build a factory for them for renting on a long lease at West Hartlepool. The first part is scheduled for completion by September of this year and the remainder by April, 1948. When completed this factory is expected to employ 1,800 operatives. A smaller adjacent factory which is nearly completed should be ready for occupation by July. At Spennymoor the number of employees has increased to 900, and it is expected to raise this to 1,800.

These and other developments will entail heavy capital expenditure, to meet which the directors have created £1,000,000 of 4 per cent cumulative redeemable second preference shares of £1 each for subscription by the stockholders only.

The order sheet for 1946, shows a substantial rise over 1945. It was not possible to fill many demands for their telecommunications products, and they have had to confine their efforts to satisfy as far as possible old established customers, thus precluding their entry into new overseas markets. They have a large volume of telephone work for the British Post Office. Their activities, jointly with the Metropolitan-Vickers Electrical Co., Ltd., in connection with marine radar have made satisfactory progress and they have started at the Woolwich works a marine radar school. The value of power cable

orders is well over three times those placed in 1945. These include the manufacture as well as laying of submarine power cables for 22,000 and 11,000 V.

Their subsidiary, Siemens Electric Lamps & Supplies, Ltd., continues to expand and its sales for 1946 are the highest in its history. When the additional factory is in operation they expect to quadruple their present turnover in fluorescent lamps.

British Electric Traction Co., Ltd.—The chairman (Mr. H. C. Drayton) stated at the annual meeting last week that the company's reserves and undivided profits totalled about £3,000,000. That was the amount which they had ploughed back into the company; it was the property of the stockholders and the logical way to deal with it would be to distribute it in the form of ordinary shares to stockholders. Any such procedure, however, appeared to the Chancellor of the Exchequer to be an almost unpardonable crime. Last year the companies with which they were associated paid out in wages £12,500,000. The car-miles run by the transport companies totalled 321·7 million and the number of passengers carried 1,800 million. Apart from income tax they paid £1,750,000 in fuel tax and vehicle duty.

Broadcast Relay Service, Ltd.—At the company's annual meeting the chairman (Mr. J. S. Wills) said that the past year had been one of active development. As regards the extension of the company's licences beyond December 31st, 1949, while he was confident that they would be extended no decision had yet been reached. Overseas the group was now entering upon a period of rapid expansion and a holding company, Broadcast Relay Service (Overseas), Ltd., had recently been formed. Their first overseas broadcasting station, Radio Trinidad, would be on the air in the next few weeks. The factory at Wandsworth was engaged in developing a valuable export market for radio-heating and communication equipment.

Johnson, Matthey & Co., Ltd.—The accounts for the year to March 31st show a net trading profit, with dividends on investments, of £228,542, compared with £268,970 for 1945-46. Income tax and N.D.C. absorb £135,000 (£160,000), leaving a net profit after providing for debenture interest, etc., of £73,942 (£88,536). A sum of £25,000 (same) is written off goodwill and £3,500 is again allocated to staff fund. The year's distribution is maintained at 12 per cent with a final dividend of 3 per cent and a bonus of 6 per cent, and £391,049 (£384,217) is carried forward.

Ruston & Hornby, Ltd., report combined trading profits of the company and its wholly owned subsidiaries, together with dividends from other subsidiary and associated companies, of £499,717 for the past year, as compared with £351,932 for 1945-46. The balance is £431,946 (against £281,853). Income tax requires £147,297, pensions reserve £15,000, general contingencies reserve £60,000 and general reserve £60,000. The dividend for the year on the ordinary stock is 12½ per cent, less tax (same) and the balance carried forward is £100,324 (against £76,350).

The Mirrlees Watson Co., Ltd., reports a trading profit for the year ended March 31st last of £33,449 (against £46,947), and the balance available after provision for taxation was £25,637 (£30,738). It is proposed to pay a dividend of 8 per cent, the same as last year. Production was affected by the transfer of the Stockport branches to new works in Stockport and Glasgow, and by a five weeks' strike.

Kerry's (Gt. Britain), Ltd., propose to pay a first and final dividend of 15 per cent (same). The net profit for the past year was £239,525, an increase of £81,792. Tax reserve receives £156,000 (£111,000), general reserve £33,600 (£25,000) and staff pensions £7,000 (£6,000), and £64,401 (£46,783) is carried forward.

The Rheostatic Co., Ltd., reports a net profit for the year to September 30th of £13,493, as compared with £9,425 for the preceding year. The ordinary dividend for the year is 14 per cent (against 12 per cent), and £5,128 is carried forward (against £4,999 brought in).

Cable & Wireless (Holding), Ltd., reports a revenue for 1946 of £1,412,266, as compared with £2,145,362 for 1935, and a profit of £1,259,641 (against £1,551,965). The ordinary dividend for the year is 4 per cent (against 4 per cent and a special dividend of 5 per cent). The balance carried forward is £386,678 (£324,523).

The Morgan Crucible Co., Ltd., reports a profit for the year ended March 31st last of £571,365, as compared with £463,556 (before crediting £229,775 E.P.T. recoverable) for the preceding year. The final dividend is 8¾ per cent (against 7½ per cent), making 12½ per cent for the year (against 11¼ per cent).

The Mersey Power Co., Ltd., reports a net revenue for 1946 of £370,506, as compared with £390,348 for the preceding year. Income tax requires £100,000, E.P.T. £20,000, depreciation and renewals £124,755 and employees' bonus account £3,000. The ordinary dividend for the year is maintained at 8 per cent and £189,556 is carried forward (against £106,800 brought in).

The Mid-Cheshire Electricity Supply Co., Ltd., reports a net revenue for 1946 of £86,931, as compared with £78,624 for 1945, and after providing for tax, depreciation, E.P.T., etc., there is a balance of £49,878 (against £55,127). The final ordinary dividend is 4 per cent, again making 8 per cent for the year and £17,391 is carried forward (against £25,594 brought in).

Thos. Bolton & Sons, Ltd., announce a final ordinary dividend of 5 per cent, making 7½ per cent for the year, and a cash bonus of 2½ per cent. The dividend for 1945-46 was also 7½ per cent, but no bonus was paid.

The General Cable Manufacturing Co., Ltd., has declared an interim dividend of 20 per cent (against 8 per cent).

STOCKS AND SHARES

FOREIGN politics are playing an unusually prominent part in Stock Exchange affairs. Their effect is to impose, as already mentioned here, a feeling of caution on the part of investment. This in its turn serves to emphasize the influence of what may be called the automatic selling which goes on day by day on behalf of deceased accounts and other interests that require money for various purposes.

Compared with those of a month ago, prices in the list of Home electricity supply ordinary shares show a score of minor losses, ranging from 6d. to 1s. In the electrical equipment market the comparison gives mixed results. A.E.I., at 90s., stand 2s. higher, and there have been some notable advances, including those in Chloride Electric, now 5⅛, and London Electric Wire, 50s., both ex dividend, Electric Constructions, 70s., Revo 53s. 9d. On the reverse side are declines in telephone issues, with Automatic Telephones down to 75s. and H.T.A. to 20s., ex dividend in both cases. Johnson & Phillips at 80s., Telegraph Construction at 55s. 9d. and Enfield Cables at 46s. 3d. have lost ground. G.E.C. are a trifle below £5 again. Crompton Parkinsons are 1s. 9d. lower at 33s. 6d. Elsewhere, the revival in transport shares, arising from proposed amendments to the Transport Bill, is represented by rises of 8s. 6d. to 66s. 6d. in Tillings; 175 points, to 1410, in B.E.T. deferred; and 6s. 6d. to 59s. in West Ridings.

Further Fluctuations

Marco Refrigerator shares made a dramatic start in their new 5s. form. After opening at 10s. 6d., the price doubled within 48 hours and is now 20s., ex the interim dividend of 7½ per cent. For 1945–46 the total dividend was 10 per cent. In a progress report, issued at the time of this declaration, the company gave particulars of large increases in orders, output and earnings; E.P.T. will also be a much reduced charge this year. Bylock Electric 1s. shares are changing hands at about 1s. below the price of 30s. at which they were recently issued. General Cable Manufacturing shares have risen 16s. 6d. to 52s. 6d., on a remarkable increase in the interim dividend, from 8 per cent a year ago, to 20 per cent now. For last year, the company raised its dividend from 15 per cent to 25 per cent for the full year, and anticipation looks for a bumper distribution in respect of the present twelve-month. Associated British Engineering at 52s. 6d. are 8s. higher since a month ago.

Cable & Wireless

Speculative interest in Cable & Wireless (Holding) stock revived in full vigour with the appearance of the accounts and consolidated balance sheet. With the reduced 1946 profits and smaller ordinary stock distribution satisfactorily accounted for in the report, considerations of current dividend and earnings were quickly dropped in favour of renewed break-up calculations based on the balance sheet. Conclusions in this respect were favourable enough to induce an immediate rise from 155 to 177½ ex dividend, in the price of the ordinary stock. The most sanguine view suggests a value of something over 300 for the ordinary stock. In the continued absence of any indication about the future of the combine, however, it is recognized that the accuracy of these break-up estimates may never be put to the test. The preference stock at 122½ is 5 points higher on the month.

Siemens Capital

Details of Siemens Brothers' proposed issue of preference shares came out with the full annual report. Consolidated accounts and balance-sheets reveal for the first time, the earning capacity and financial strength of the group as a whole. They made a good market impression, assisted by the chairman's report of orders for the first part of this year being double last year's corresponding business: Stockholders are now offered a million 4 per cent redeemable preference shares at 21s., of which 6s. per share is payable on application and the balance in instalments of 5s., on allotment, and 10s. in September. At the offered price the yield works out at £3 16s. 2d. per cent.

Preference Shares

C. A. Parsons 4 per cent redeemable preference shares, issued at 21s. 6d., are in the market now at 23s., free of stamp, to yield just under 3½ per cent. Crompton Parkinson "eights" are on offer at 48s., yielding £3 6s. 9d. per cent; the 6 per cents, at 35s. 6d., yield a fraction more. The 4½ per cent issues of General Electric and Laurence Scott can be bought respectively at 27s. and 25s., the returns being £3 3s. 0d. and £3 8s. 0d. per cent. Plessey 4½ per cents at 24s. 3d. yield nearly 3¾ per cent. Brush 5½ per cent preference are available at 25s. and pay £4 8s. 0d. per cent. A return of 4 per cent is shown by E. K. Cole 5½ per cents at 27s. 6d., and of £5 6s. 8d. per cent on this company's 7 per cent participating preferred shares, at 37s. 6d., which are receiving their maximum 10 per cent. A. C. Cossor 6 per cents at 32s. 6d. pay £3 13s. 9d. per cent on the money.

Ever Ready

The price of Ever Ready ordinary shares, which was 52s. earlier this year, has come back to 40s. 6d., almost the lowest for a couple of years. In explanation of the decline in the price, it may be suggested that this is due to the harmful effects of the fuel and power breakdown in the early part of this year, results which were reflected in the accounts to the end of March last. Moreover, in February a dispersal factory was completely destroyed by fire. In referring

(*Continued on page* 1083)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Est. Comp.*	Last Div.	Middle Month's Price June 20	Rise or Fall	Yield p.c.
Home Electricity Ordinary					£ s. d.
Bournemouth and Poole	66/8	12½	63/-	−1/-	3 19 2
British Power and Light	37/10	8	35/6	−6d.	4 10 0
City of London ..	34/4	7	32/6	−6d.	4 6 2
Clyde Valley ..	46/5	8	43/6	−1/-	3 13 6
County of London	49/5	10	46/6	−1/-	4 6 0
Edmundsons ..	31/6	6	29/6	−6d.	4 1 4
Elec. Dis. Yorkshire	51/-	9	48/-	−1/-	3 15 0
Elec. Fin. and Securities ..	67/-	15	63/6	..	4 14 3
Elec. Supply Corporation ..	50/8	10	48/-	−6d.	4 3 4
Lancs. Light and Power.. ..	37/7	7½	35/6	−1/-	4 4 6
Llanelly Elec. ..	29/1	6	27/-	−1/-	4 9 0
Lond. Assoc. Electric	29/6	6	28/-	−6d.	4 5 9
London Electric .	31/4	6	29/6	−6d.	4 1 4
Metropolitan E.S.	48/-	9	45/-	−½	4 0 0
Midland Counties	51/5	8	48/6	−1/-	3 6 0
Mid. Elec. Power	47/-	9	44/6	−6d.	4 1 0
Newcastle Elec...	32/7	7	30/6	..	4 11 10
North Eastern Elec.	36/6	7	34/-	−1/-	4 2 4
Northampton ..	50/11	10	48/9	..	4 2 0
Northmet Power.	48/2	9	45/6	−6d.	3 19 3
Scottish Power ..	46/1	9	45/-	..	4 0 0
Southern Areas ..	24/-	5½	23/-	−6d.	4 15 7
South London ..	33/-	7	31/6	..	4 9 0
Yorkshire Elec...	50/10	9	48/-	+1/	3 15 0

Company	Dividend Previous	Dividend Last	Middle Month's Price June 20	Rise or Fall	Yield p.c.
Public Boards					
Central Electricity:					
1963–93 ..	3½	3½	109½	..	3 4 0
1974–94 ..	3½	3½	107½	..	3 0 6
London Elec. Trans.	2½	2½	101½	..	2 9 3
Lond. Pass. Trans. Bd.					
A	4½	4½	125½	−2	3 11 9
B	5	5	120½xd	−2	4 3 0
O	3	3	62½	..	4 16 0
Overseas Electricity Companies					
Atlas Elec. ..	Nil	Nil	14/3	+6d.	—
Calcutta Elec. ..	6†	6†	48/9	−⅛	2 9 0
Cawnpore Elec. ..	13	13	65/6xd	+1/6	3 19 3
East African Power	7	7	48/-	..	2 18 3
Jerusalem Elec...	5	6	24/6	..	4 18 0
Madras Elec. ..	6	8	46/-	+6d.	3 9 7
Nigerian Elec. ..	10	12½	52/6	..	4 15 3
Palestine Elec. "A"	5†	6†	36/-	−1/-	3 6 8
Perak Hydro-elec.	6	7	15/6	−1/-	—
Tokyo Elec. 6% .	–	–	57½	−5	—
Victoria Falls Power	15	19	6	−½	3 3 4
Whitehall Inv. Pref.	—	6	27/6	..	4 7 3
Equipment and Manufacturing					
Aron Elec. Ord...	15	10	55/-	..	3 12 9
Assoc. Brit. Eng.	8	12	52/6	+8/-	4 11 5

Company	Dividend Previous	Dividend Last	Middle Month's Price June 20	Rise or Fall	Yield p.c.
Equipment and Manufacturing (*Continued*)					£ s. d.
Assoc. Elec. :					
Ord.	10	15	90/-	+2/-	3 7 6
Pref.	8	8	46/3	..	3 9 3
Automatic Tel. & El.	12½	12½	75/-xd	−7/6	3 6 8
Babcock & Wilcox	12½	15	79/-	+2/6	3 16 2
Baldwin, H.J. (2/-)	10	20	13/6	..	5 18 4
British Aluminium	8	10	50/6	..	3 19 4
B.I. Callender's ..	6⅝		46/-	−6d.	2 18 4
British Rola (2/-)	15	15	6/3	..	4 16 2
British Thermostat (5/-)	18½	23½	26/-	+6d.	4 10 3
British Vac. Cleaner (5/-)	30	20	23/9	+⅝	4 4 3
Brush Ord. (5/-) ..	10	4	8/6	−1/-	2 7 1
Burco (5/-) ..	20	35	28/3	−6d.	6 4 0
Chloride El. Storage	20	20	5½xd	+⅜	3 19 0
Christy Bros. ..	17½	17½	81/3	..	4 6 2
Cole, E. K. (5/-) .	20	20	25/6	+6d.	3 18 6
Cossor, A. C. (5/-)	10†	12½†	28/-	−1/-	2 4 8
Crabtree (10/-) ..	17½	17½	46/-	−6d.	3 16 3
Crompton Parkinson Ord. (5/-) ..	22½	33/6xd	35/9	−1/9	3 7 2
De La Rue (5/-)	40	45	70/-	−½	3 4 3
Decca (1/-) ..	100	112½	58/9	−½	1 18 6
E.M.I. (10/-) ..	8	8	26/3	+2/3	3 1 0
Elec. Construction	12½	12½	70/-	+3/9	3 11 4
Enfield Cable Ord.	12½	7½	46/3	−½	3 4 10
English Electric .	10	10	67/6	−½	2 19 6
Ericsson Tel. (5/-)	20†	20†	47/-	−6d.	2 2 6
Ever Ready (5/-)	40	40	40/6	−4/-	4 13 0
Falk Stadelmann	7½	10	46/3	+½	4 6 7
Ferranti Pref. ..	7	7	37/-	..	3 15 8
G.E.C. Pref.	6½	6½	38/3	+9d.	3 8 4
Ord.	17½	17½	99/6	−½	3 10 5
General Cable (5/-)	15	25	52/6	+16/6	—
Greenwood & Batley	15	15	57/6	..	5 4 5
H.T.A. (10/-) ..	10	10	20/-xd	−1/-	5 0 0
Heatrae (3/-) ..	12½	12½	7/6	..	5 0 0
Henley's (5/-) ..	20	20	27/-xd	−1/-	3 14 1
4½% Pref. ..	4½	4½	26/6	..	3 4 4
Hopkinsons ..	20	22½	5¾	+⅜	3 18 2
Intl. Combustion (5/-)	32½	37½	64/3	+1/-	2 18 6
Johnson & Phillips	15	15	80/-	−3/9	3 15 0
Lancashire Dynamo	22½	22½	6¼	..	3 12 0
Laurence, Scott (5/-)	12½	12½	13/9	..	4 11 0
London Elec. Wire	7½	10	50/-xd	+3/-	4 0 0
Mather & Platt ..	10	11	58/9	−9d.	3 14 10
Metal Industries (B)	9	10	59/6	+9d.	3 7 3
Mid. Elec. Mfg. ..	30	35	9½	..	3 16 9
Murex	20	20	100/-	+½	4 0 0
Newman Ind. (2/-)	22½	22½	8/3	−3d.	5 9 1
Plessey (5/-) ..	20	30	31/9	−2/9	—
Power Securities.	6	6	32/-	..	3 15 0
Pye Deferred (5/-)	25	25	32/6	+⅛	—
Radio & Tel. (2/-)	25	40	7/-	..	—
Revo (10/-) ..	17½	20	53/9	+½	3 14 6
Reyrolle ..	12½	12½	86/3	+⅛	2 18 4
Scophony (5/-) ..	—	—	5/6	−1/6	—

(*Continued on page* 1083)

* Proposed amount of British Electricity Stock to be allotted.
† Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Month's Price June 20	Middle Month's Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing (*Continued*)					
Siemens Ord. ..	7½	7½	37/-xd	—3/-	4 1 1
Strand Elec. (5/-)	12½	12½	13/-	—3d.	4 16 4
Switchgear & Cowans (5/-) ..	25	10	19/-	—6d.	2 12 8
T.C.C. (10/-) ..	12½	15	36/3	..	4 2 6
T.C. & M. ..	10	10	55/9	—1/9	3 1 6
TelephoneMfg.(5/-)	9	9	14/6	—1/-	3 2 1
Thorn Elec. (5/-)	20	20	26/3	..	3 16 4
Tube Investments	22½	22½	7	—½	3 4 3
Vactric (5/-) ..	Nil	Nil	17/6	—9d.	—
Veritys (5/-) ..	7½	7½	9/3	—3d.	4 1 1
WalsallConduits(4/-)	55	55	57/-	+1/-	3 18 7
Ward & Goldstone (5/-)	25	35	60/-	+1/3	2 18 4
Watford (2/-) ..	15	15	7/3	—3d.	4 2 10
WestinghouseBrake	14	14	71/3	..	3 18 8
West, Allen (5/-)	7½	10	10/9 xd	+9d.	4 13 5
Traction and Transport					
Brit.Elec.Traction:					
Def. Ord. ..	45	50	1410	+175	3 10 5
Pref. Ord. ..	8	8	190	..	4 9 0
Calcutta Trams..	6½	7½	50/-	—6d.	3 0 0
Cape Elec. Trams	5	6	35/-xr	..	3 8 7
Traction and Transport (*Continued*)					
Southern Rly.:					
5% Prefd. ..	5	5	72	—½	6 19 0
5% Pref. ..	5	5	117½	—1	4 5 1
T. Tilling ..	10	10	66/6	+8/6	2 18 6
West Riding ..	10	15	59/-	+6/6	5 11 8
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	143½	—1	4 3 8
Def.	1½	1½	35	..	4 5 9
Anglo-Portuguese	8	8	34/3	+½	4 13 5
Cable & Wireless:					
5½ Pref. ..	5½	5½	122½	+5	4 9 9
Ord.	4	4	177½	+7	2 5 0
CanadianMarconi	$1 Nil	4 cts.	12/6	—⅛	—
Globe Tel. & Tel.:					
Ord.	8½†	5†	50/-	..	2 0 0
Pref.	6	6	34/6	+9d.	3 9 7
GreatNorthernTel. (£10)	18	15	34½	..	4 7 0
Inter. Tel. & Tel.	Nil	Nil	13	..	—
Marconi-Marine..	7½	7½	33/9	..	4 8 9
Oriental Tel. Ord.	4	4	55/9	—1/6	—
Telephone Props.	6	6	21/6	..	5 11 7
Tele. Rentals(5/-)	10	10	15/-	—6d.	3 6 8

† Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from p.* 1081)

to this, the chairman's statement pointed out that matters would have been worse were it not for the fact that two large factories had been purchased, and were being equipped in a manner which should improve the production position in the near future.

The latest Ever Ready dividend of 40 per cent was paid out of slightly less net earnings, but the company's balance-sheet showed, amongst current assets, £490,000 in Government securities and £300,000 cash. The company had a general reserve of £840,000 and a dividend equalization account of £400,000. At the level £2, the shares give a return of 5 per cent on the current dividend rate of 40 per cent.

Stamp Duties

From August 1st, buyers of securities will have to pay double the present transfer stamp duty of £1 per cent. This prospect is not without influence on markets, particularly those dealing in stocks to be nationalized. Holders of such stocks, who do not intend ultimately to accept the presumably much lower income from a Government compensation stock, have an inducement to reinvest elsewhere before the date when they will have to pay an extra £1 per cent in expenses. On the other hand, current buyers of railway and electricity issues still consist mainly of institutional investors who see the opportunity of acquiring, at first remove, a Government security at a discount through the purchase of stock quoted below the full compensation value. After July, their attraction will diminish unless the discount is maintained by a reduction of share prices in proportion to the extra transfer charge. These considerations help to explain the recent tendency for Home electricity shares to fall further from their estimated take-over prices.

Electricity in Birmingham Gasworks

IN his presidential address to the Institution of Gas Engineers, Mr. G. C. Pearson, chief engineer of the City of Birmingham Gas Department, referred to the generation and use of electricity in gasworks. He said that his Department was laying out a new works at Swan Village and had decided to take the whole of the steam produced from the waste-heat boilers, without exception, direct to electricity generating sets and to use electric power exclusively. This scheme had the advantage that all steam would be used in economical large turbines for power generation instead of being dissipated in inefficient, scattered, small power units. In Birmingham their generating sets were synchronized with the electric grid and they received payment for any electricity exported, which was set against the cost of any imported. At the old Swan Village works the electric generator would be synchronized with the one at the new works as well as the C.E.B. grid; such a scheme would result in the elimination of fuel-raised steam at both works and provide a substantial quantity of electricity for sale to the grid. All the scattered and more or less inefficient steam drives would be replaced by electric motor drives.

NEW BOOKS

Progress in Electronics. Locating Cable Faults.

Electronic Developments. By K. G. Britton. Pp. 208; figs. 74; index. George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Price 7s. 6d.

The subject of electronics has grown so extensively within the last twenty years that a brief review of the many fields which it affects is opportune. The present book attempts to survey the whole field as it is known to-day. It treats not only of the historical development, but also of the basic principles underlying the successful applications which have been made. Though a formidable task, Dr. Britton has written a clear account with the correct amount of emphasis at each stage: the picture of progress is thus presented as a coherent whole, and with a definite logical sequence. For example, the thermionic valve follows on the description of the electron. These, in turn, are followed by the cathode ray tube, klystron and magnetron. The introduction of a chapter on the cyclotron and an elementary exposition of nuclear reactions and induced radio-activity is a specially valuable feature. Other chapters deal with X-rays, photocells, television applications, the electron microscope and the mass spectrograph.

The author has an easy style and writes with an enthusiasm for his subject. His explanations are for the most part clear and his theoretical arguments are sound. He has succeeded in describing, without the use of mathematical language, perhaps the most fascinating branch of the whole field of "light" engineering, in such a way as to broaden the outlook of anyone interested in the subject.—L.J.

Fault Localizing and Testing on Electric Mains. By F. Charles Raphael and Charles A. Grover. Pp. 364; figs. 149; index. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, Kingsway, W.C.2. Price 20s.

Although a very high degree of reliability in service has been achieved by modern cable design and manufacturing technique, breakdowns, sometimes due to external causes, still occur so that the accurate and speedy location of faults is as important as ever. The late Mr. Raphael's "Localization of Faults in Electric Light and Power Mains" has been out of print for a number of years and the book under review is intended to fulfil the need for a complete and practical textbook on this subject.

The introductory chapters describe the measurement of insulation resistance, capacitance and conductor resistance; high-voltage tests; testing live networks (mainly low and medium voltage); and methods of breaking down faults. Subsequent chapters give very detailed and practical accounts of the Murray and Varley loop tests. Fall of potential methods and induction methods of using a search coil are also described, while a chapter is devoted to various discontinuity and short-circuit conditions which require special location techniques. The final chapter describes spark testing apparatus for finding faults in cable in the manufacturing stage. The appendix contains useful tables and network calculations.

The book fully justifies its claim to be an essentially practical textbook and the authors make available a wealth of experience accumulated over many years. Although they rightly stress the importance of using high-grade testing equipment, they describe various useful expedients which may be employed in the absence of adequate apparatus. It is unfortunate that the authors have not taken the opportunity of bringing the book really up-to-date. For example, there is no mention of insulation resistance testing sets of the electronic type, which are robust enough for field use and are capable of measuring up to 100,000 megohms at from 1 to 5 kV. In addition, the "echo" and "impedance-frequency" methods of fault location are not mentioned; the echo method has the unique advantage that the position of the fault relative to the adjacent joints is shown. The text would have been improved by careful technical editing as it contains a number of misprints and inaccuracies. In spite of these blemishes, however, the book should prove of great assistance to the mains engineer who requires information on well-tried methods of fault location.—J.S.F.

Electrical Testing for Practical Engineers. By G. W. Stubbings. Pp. 261; figs. 114; index. E. & F. N. Spon, Ltd., 57, Haymarket, London, S.W.1. Price 12s. 6d.

The second edition of this pocket-size book of reference is four shillings dearer and contains nine more pages than the original, which was reviewed favourably in 1939. Revision has enabled additional information to be inserted on the localizing of cable faults and on three-phase testing, with directions for simple field measurements of power factor. A wide range of tests is fully explained in plain language, mathematics being entirely avoided. The section concerned with installation testing, including the determination of earth resistance, is especially useful.—W.O.F.

The Cathode-ray Tube Handbook. By S. K. Lewer. Pp. 103; figs. 36; index. Sir Isaac Pitman & Sons, Ltd. Price 6s.

The text and illustrations of the second edition of this little book, which first appeared in 1945, have not been changed. It surveys basic principles, leading up to the complete oscillograph, the six concluding pages referring to television and radar uses.

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 (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings*, *London*, *W.C.*2.

1938

ALBISWERK Zurich Akt.-Ges.—" Recording indicator mechanisms particularly for telephone installations." 13860. May 7th, 1937. (588967.)

1941

J. Sayers and C. S. Wright.—" High-frequency electrical oscillators." 12853. October 3rd, 1941. (588916.)

Standard Telephones & Cables, Ltd., J. H. Fremlin and R. N. Hall.—" Electronic oscillation generators." 16091. December 12th, 1941. (588813.)

C. S. Wright, J. T. Randall, J. Sayers, H. A. H. Boot and R. H. V. M. Dawton.—" High-frequency electrical oscillators." 16317. December 17th, 1941. (588917.)

1942

General Electric Co., Ltd., C. E. Ransley and S. V. Williams.—" Heat-resistant alloys." 4846. April 13th, 1942. (588814.)

1943

British Thomson-Houston Co., Ltd.—" Electric discharge devices." 6762. May 7th, 1942. (588969.)

Telefonaktiebolaget L. M. Ericsson.—" Mercury and like conducting-material switchers." 16273. October 5th, 1942. (588816.)

Standard Telephones & Cables, Ltd., and J. H. Fremlin.—" Ultra short wave oscillators." 19416. November 19th, 1943. (588817.)

Okonite-Callender Cable Co., Inc.—" Buoyant electric cables." 21568. February 6th, 1943. (588819.)

1944

Freyn Engineering Co.—" Cyclical control system for direct current motors operating double skip hoists." 3541. December 11th, 1942. (588973.)

Allmanna Svenska Elektriska Aktiebolaget.—" Voltage regulators." 3730. February 6th, 1943. (588822.)

Patelhold, Patentverwertungs- & Elektro-Holding Akt.-Ges.—" Method and means for scrambling spoken messages." 9468. June 23rd, 1943. (588825.)

O. H. Bohm and C. S. Wright.—" Object-locating and detecting systems." 11250. June 12th, 1944. (588763.)

Hazeltine Corporation.—" Signal-translating system." 12341. September 20th, 1943. (588974.)

Farnsworth Television & Radio Corporation.—" Apparatus for indicating transient voltages." 12722. March 18th, 1943. (588923.)

L. Satchwell, W. H. Wilson and A. J. Chinn.—" Thermal regulators for electrical heating apparatus." 14040. July 22nd, 1944. (588829.)

P. L. Roberts.—" Electric heating and welding appliance." 17753. September 16th, 1944. (588837.)

G. H. Wilkinson.—" Means for supporting electric heating elements and electric fires." 20098. October 17th, 1944. (588839.)

L. P. C. J. Dudley.—" Methods of and means for making stereoscopic X-ray photographs." 22260. November 11th, 1944. (588843.)

Metropolitan-Vickers Electrical Co., Ltd., J. M. Meek and J. D. Craggs.—" Spectrographic light sources." 22394. November 13th, 1944. (588844.)

Metropolitan-Vickers Electrical Co., Ltd., and W. H. Darlington.—"Combustion chambers for internal-combustion turbines." 23752. November 28th, 1944. (588847.)

Linde Air Products Co.—" Electric welding arrangements." 24964. January 27th, 1944. (588978.)

Standard Telephones & Cables, Ltd., and E. A. Richards.—" Application of rectifiers to dynamo electric generating machines." 25755. December 22nd, 1944. (588979.)

J. F. O'Brien.—" Adapter unit for electric wiring systems." 26073. December 31st, 1943. (588980.)

1945

Standard Telephones & Cables, Ltd.—" Electric carrier current communication systems." 558. February 21st, 1944. (588937.)

D. S. Watson and C. S. Wright.—" Object-locating and detecting systems." 969. January 11th, 1945. (588851.)

A. West & Co., Ltd., and H. H. Matthews.—" Electric motor controllers." 1163. January 15th, 1945. (588769.)

G. R. Shepherd (Westinghouse Electric International Co.).—" Apparatus for indicating the torque of a shaft." 2133. January 26th, 1945. (588770.)

Lumalampan Aktiebolag.—" Electric discharge tubes." 2235. February 18th, 1944. (588942.)

A. E. Morrison and A. C. Morrison.—" Electrical means for controlling and indicating the speed of engines, motors and machinery." 5136. February 1st, 1944. (Divided out of 588821.) (588859.)

Plessey Co., Ltd.—" Electromagnetic vibratory interrupters." 5344. March 18th, 1944. (588869.)

Standard Telephones & Cables, Ltd.—"Apparatus for responding to radio interrogation signals." 5513. October 26th, 1943. (588777.)

T. Latham.—"Locking device for electric lampholders." 5638. March 7th, 1945. (588786.)

Automatic Telephone & Electric Co., Ltd., R. Taylor and G. T. Baker.—"Automatic switches for use in telephone or like systems." 5659. March 7th, 1945. (588790.)

Z. Deshaw.—"Electric lighting unit." 5715. March 7th, 1945. (588801.)

Submarine Signal Co. (London), Ltd., and W. G. Bird.—"Voltage doubler circuits." 5803. March 8th, 1945. (588872.)

E. Stock and P. Skipworth.—"Adaptor plug for an electric lampholder or socket." 5816. March 8th, 1945. (588877.)

R. Bergmann.—"Desk lamps." 5850. March 8th, 1945. (588881.)

R. F. Oxley.—"Variable electrical condensers." 5938. March 9th, 1945. (588893.)

R. C. Robbins.—"High-frequency power measuring systems." 6003. March 9th, 1945. (588903.)

E. R. Booth.—"Assemblages of pushbutton switches for radio apparatus." 6032. March 10th, 1945. Cognate application 7982/45. (588906.)

Allmanna Svenska Elektriska Aktiebolaget.—"Means for charging storage batteries." 6091. March 23rd, 1944. (588952.) "Differential protection devices for three-phase networks." 6228. April 19th, 1944. (588985.)

Automatic Telephone & Electric Co., Ltd., and G. A. Burns.—"Remote supervision systems." 6216. March 13th, 1945. (588984.)

Ford Motor Co., Ltd.—"Voltage regulators." 6288. January 14th, 1944. (588996.)

Marconi's Wireless Telegraph Co., Ltd., and R. A. Nightingale.—"Method of coupling instrument shafts." 6300. March 13th, 1945. (588997.)

Pullars Electric Co. (Brighton), Ltd., J. E. Brown and T. Bowen.—"Setting pointers for measuring instruments." 6403. March 14th, 1945. (589005.)

E. R. Booth.—"Change-over switches for radio receiving and like apparatus." 6549. March 15th, 1945. (589017.)

Secret Patent Re-assigned

1932

J. Bell and C. V. Drysdale.—"Electromagnetic instrument for effecting synchronous movements." 18404. June 29th, 1932. (Complete specification accepted March 22nd, 1934) (Patent sealed March 22nd, 1934.) (588915.)

Consulting Engineers

Link with Dominions and Colonies

PROPOSING the toast of "The Association of Consulting Engineers" at a luncheon held on June 18th, Mr. A. Barnes, Minister of Transport, said that at no period since its formation in 1909 had the skill and enterprise of its members been more necessary than now. Their aid would be required in creating industries to solve the problem of reconciling aspirations after higher standards of living with material scarcity, both consequences of the war. The economic and financial position of Britain was not commensurate with its prestige, which was as high as ever and would, he believed, increase. Consulting engineers could provide an important link with the Dominions and colonies, where their experience and traditions would assist in developing new resources.

Responding, Mr. G. Howard Humphreys (chairman, A.C.E.) referred to the fruitful co-operation between engineers and scientists with the Government during the war. While British engineers were not minded to undertake propaganda on their own behalf, their work in developing the colonies, for instance, should be insisted upon before the world. Their activities would also expand trade. The Association's duty was to provide a connection between engineers and the outside world and to ensure adherence to an ethical code. There was some risk lest the engineering profession should not offer sufficient inducements to young men.

The health of the guests was proposed by Mr. J. F. Crowley, who referred especially to the presence of High Commissioners for the Dominions and to representatives of the Export Promotion Department of the Board of Trade. Engineers, as compared with scientists, had, he said, received too little credit and British designers were second to none. The experience of engineers in this country should be made available to the Dominions and colonies, which ought not to have to go over the same ground again.

In reply Mr. J. A. Beasley (High Commissioner for Australia) stated that out of an expenditure scheduled for 1946 and 1947 of £91 million for public works, £11 million was to be spent on generating plant. There were in 1945 eighty-six main power stations with an aggregate capacity of 1,946,000 kW. The biggest was Bunnerong, near Sydney, with 325,000 kW installed. New South Wales would add 300,000 kW to its present 355,000 kW and Victoria 439,000 kW to its 710,000 kW in a ten-year plan. He agreed with the view that experience should be shared among British and Dominion engineers, and the latter would benefit by the research carried out in Britain. At the conclusion a tribute to the chairman was paid by Mr. W. J. Binnie.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

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

Burnley.—July 14th. Electricity Department. E.h.v. cable. (See this issue.)

Ceiriog.—July 1st. R.D.C. Electrical installations in 64 houses and flats, Hand Hotel site, Chirk; 20 houses, Glynceiriog, Wrexham; and 12 houses, Llansilin, Oswestry. R. W. Aubrey, surveyor, The Mount, Chirk.

Chesterfield.—July 11th. Electricity Department. One 75-kW glass bulb mercury arc rectifier. (June 13th.)

Dorset.—The County Council invites contractors and manufacturers to apply for consideration in respect of work and materials for its building and maintenance works. Applications are to be submitted by July 31st. (See this issue.)

Dundee.—July 21st. City Electricity Department. Automatic CO_2 fire extinguishing equipment for a 33-kV substation. (See this issue.)

Edinburgh.—July 2nd. North of Scotland Hydro-Electric Board. Transformers for distribution schemes. (June 13th.)

July 5th. City Council. 3,300-V and 415-V switchgear and motor control gear; and transformers for power station auxiliary services. (June 13th.)

Haslingden.—July 7th. Corporation. Electrical work in connection with 46 houses to be erected on Longshoot estate.—R. Taylor, borough engineer, Municipal Offices, Bury Road.

Heston & Isleworth.—July 7th. Electricity Department. Change-over of wireless equipment. (June 20th.)

Iraq.—Crown Agents for the Colonies. Diesel-driven generator sets. (See this issue.)

Manchester.—June 30th. Electricity Committee. 100 single-pole and 100 double-pole contactors. (June 20th.)

July 7th. 660-V d.c. traction switchgear and batteries and charging equipments for substations. (See this issue.)

Newport (Mon.).—July 31st. Corporation. 33-kV main and pilot cables. (See this issue.)

New Zealand.—Hydro-Electric Department. August 26th. 110-kV outdoor switchgear and steelwork for Waverley substation (Contract 29).

September 16th. 50-kV outdoor switchgear and steelwork for Awamutu substation (Contract 30) and Litchfield substation (Contract 31).

September 30th. 750-kVA earthing transformers for Stratford substation (Contract 32). 5,000-kVA, 110/11-kV transformer bank and spare unit for Ongarue substation (Contract 33) and similar equipment for Studholme substation (Contract 34).

Reigate.—August 22nd. Electricity Department. Substation e.h.v. and l.v. equipment, and transformers. (June 20th.)

Sunderland.—July 3rd. Town Council. Electrical installations in 560 houses, Thorney Close estate, and in shops and garages, Springwell Farm estate. Specifications, etc., from the borough engineer, Athenæum Buildings, Fawcett Street.

Tredegar.—June 30th. U.D.C. Materials for e.h.v. and l.v. schemes. (June 20th.)

Orders Placed

Bradford.—Corporation. Accepted. Transformers.—Hackbridge & Hewittic Electric Co.; Yorkshire Electric Transformer Co.; English Electric Co.

Fulham.—Electricity and Lighting Committee. Recommended. Transfer of automatic telephone exchange from power station to showrooms and installation of new exchange at power station (£6,894).—Standard Telephones & Cables.

South Shields.—Town Council. Accepted. Equipment for a new substation at Horsley Hill for the Transport Department.—Hackbridge & Hewittic Electric Co. 11-kV switchgear.—A. Reyrolle & Co. Cable.—B.I. Callender's Cables.

Stockton-on-Tees.—Town Council. Accepted. Additional cables at Oxbridge Lane substation (£913).—Edison Swan Cables.

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.

Barrow-in-Furness. — Assembly and frame sheds, Bridge Road; Vickers-Armstrongs, Ltd.

Bath.—Infants' School, Moorlands estate; Pictor, Snailum & Huggins, Abbey Chambers.

Bideford.—Extensions to Bideford and District Hospital; Orphoot, Whiting & Lindsay, High Street.

Border (Cumberland).—"Airey" type houses (52), various sites; R.D.C. housing officer, Victoria Place, Carlisle.

Bournemouth.—Block of flats, King's Park Road; Stewart & Sutcliffe, 5, Hinton Road.

Brentwood. — New works, North Road; Brentwood Engineering Co.

Brighton. — Factory at trading estate; Newton Products, 7, Type Street, Bethnal Green, E.2.

Cardiff.—Extensions to Ely Paper Mills; Thomas Owen & Co., Ltd., Ely, Cardiff.

Chichester.—Workshops, stores and offices, Chapel Street; Stringers, Ltd., tent manufacturers, Chapel Street.

Crook and Willington.—Aluminium houses (70) at Brancepeth Colliery for the U.D.C.; surveyor, Council Offices, Willington.

Droitwich.—Factory premises; Weldall & Assembly, Ltd., Mitre Works, Eyre Street, Birmingham, 18.

Durham.—Additions to carpet factory for H. Mackay & Co., Ltd.; Gradon & Sons, builders.

Enfield.—Factory in Southbury Road; Commercial Structures, Ltd., Staffa Road, Leyton, E.10.

Workshops, stores and offices, Chase Side; C. Hunt & Sons, 22, Rosemary Avenue.

Felling (Co. Durham).—Mill, Sunderland Road, for the Tyneside Flock Mill Co., Ltd.; Matkin & Hawkins, architects, Fawcett Street, Sunderland.

Glasgow.—Additions to works; Kennedy MacLeod & Co., Ltd., St. Vincent Crescent.

Houses (116), Barrhead Road; housing architect, 129, Trongate.

Factory at Gullane Street, Partick; M. Morris & Sons, Ltd., 207, William Street.

Goole.—Garage for Enterprise & Silver Dawn Motors, Ltd.; Platt & Featherstone, Ltd., Boothferry Road.

Hastings.—Factory and offices, Fellows Road; Regal Oil Reclaimers, Ltd., Fellows Road.

Hebburn-on-Tyne.—Premises in Victoria Road for the Jarrow and Hebburn Co-operative Society; C.W.S. Architects' Department, 90, Westmoreland Road, Newcastle-on-Tyne.

Hereford.—Additional wards at Herefordshire Hospital; Cecil Corey, 40, Cotterell Street.

Highbridge.—Factory for Clark, Son & Morland, Ltd., Glastonbury; Staverton Builders, Ltd., Totnes.

Jarrow.—Houses (200) to accommodate families displaced by the Tyne tunnel scheme; H. W. T. Perkins, borough engineer.

Laindon.—Factory at Dovercourt Avenue; Holborn Wholesale Optical Co., Ltd., 6, Holborn Viaduct, London, E.C.1.

Lewisham.—Additions to works, Hither Green Lane; S. W. Farmer & Sons, Courthill Road.

Lichfield.—Power house for Chamberlain & Hill, Ltd., Beacon Street.

Manchester.—Works at Ancoats for Val de Travers Asphalte Co., York Street.

Research Laboratory and offices, works, Slacks Road, I.C.I., Ltd.; Russell Building & Contracting Co., Ltd., 165, Plymouth Grove.

Mortlake.—Blocks of flats, Cromwell House site; Watney, Combe, Reid & Co., Ltd., Stag Brewery, Westminster, S.W.1.

Muswell Hill.—Light engineering workshop, Hampden Road; Scientific Engineering Co., 18, Haslemere Avenue, Barnet.

Newburn-on-Tyne.—Aluminium houses (100) at West Denton, for U.D.C.

Newcastle-on-Tyne.—Prefabricated extensions to St. Dominic's R.C. School; J. Jackson & Sons, Corporation Street.

Newport (Isle of Wight).—Additions to County Technical College (£120,000); S. Gregson, county architect, County Hall.

Paisley.—Additions (£80,000) at factory, for George Dobie & Co., tobacco manufacturers; the manager.

Rotherhithe.—Factory building; Liverpool Artificial Stone Co., Ltd., Silwood Street.

Sheffield.—Factory at Carlisle Street; Ellis & Co. (Cutlery), Ltd., 91, Broomhall Street.

Sleaford. — Workshops, etc.; Fenton & Townsend, Ltd., North Road.

Smethwick.—Canteen and garage; J. A. Phillips & Co., Ltd., Bridge Street.

South Shields.—Four British Restaurants for the Town Council; borough surveyor, Town Hall.

Steyning.—New works for British Portland Cement Manufacturers, Ltd., Portland House, Tothill Street, Westminster.

Sunderland.—Factory, Leopold Street, for J. A. Jobling & Co., Wear Glass Works.

Trade Marks

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from June 18th.

TELAGUARD. No. 643,859, Class 9. Electrical apparatus and instruments included in Class 9; scientific, nautical, cinematographic, signalling, radio and teaching apparatus and instruments; and talking machines.—Mark Slaffer, trading as Telegard Radio Equipments, 37, Hatchetts Drive, Haslemere, Surrey.

ENSEF. No. 647,245, Class 9. Bells and electrical apparatus and instruments, all included in Class 9. No. 647,246, Class 11. Appliances for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating and water supply, all being electrical goods for domestic purposes.—British N.S.F. Co., Ltd., Keighley, Yorks.

TRILMONT. No. 643,818, Class 11. Electric heating apparatus and appliances, and parts thereof not included in other classes.—D. M. Trilling and H. Montague, trading as Trilling & Montague, 2407, Walnut Street, Philadelphia, U.S.A. Address for service: Frank B. Dehn & Co., 103, Kingsway, London, W.C.2.

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday,** and should be addressed to Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.

THE CHARGE for advertisements in this section is 2/6 per line (approx. 7 words) per insertion; ***ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED:*** — 35/- 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.

REPLIES TO advertisements published under a Box Number if not to be delivered to any particular firm or individual should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Letters of applicants in such cases cannot be returned to them. The name of an advertiser using a Box Number will not be disclosed. All replies to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1. Cheques and Postal Orders should be made payable to ELECTRICAL REVIEW LTD. and crossed.

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

DORSET COUNTY COUNCIL

Selected Contractors

A List of Contractors is now being prepared for the Council's Building and Maintenance Works. Contractors and manufacturers are therefore invited to make application for consideration in respect of one or more of the following classes of work or materials:—

1. General Building.
2. Maintenance and Repairs.
3. Central Heating and Domestic Hot Water Installations.
4. Electrical Installations.
5. Structural Steel.
6. Reinforced Concrete.
7. Masonry (Natural and Artificial).
8. Ironmongery.
9. Sanitary Fittings.
10. Roof Tiling and Slating.
11. Joinery.
12. Asphalt, etc., Waterproofings.
13. Floor Finishings (all types).
14. Patent Roof Coverings.
15. Metal Windows.
16. Plumbing Installations.
17. Decorations.
18. Tarmacadam and other Pavings.
19. Refrigeration and Cold Storage.
20. X-ray Apparatus and Hospital Equipment.
21. Cooking Equipment.

Contractors applying in connection with items 1, 2, 3, 4, 16 and 17 will be asked to state the limit of cost (maximum and/or minimum) of work for which they are prepared to tender, and to give an indication of the labour force normally employed.

Applications, on forms to be obtained from the undersigned, should be received by me not later than Thursday, 31st July, 1947.

C. P. BRUTTON,
County Hall, Clerk of the County Council.
Dorchester.
17th June, 1947. 2345

COUNTY BOROUGH OF BURNLEY ELECTRICITY DEPARTMENT

TENDERS are invited for the supply and delivery of Extra High Tension Cable. Copies of the specification, conditions and form of tender may be obtained on application to the Borough Electrical Engineer, 43, Grimshaw Street, Burnley.

Tenders, in plain sealed envelopes, endorsed "E.H.T. Cable," are to be delivered to the undersigned not later than the first post on Monday, the 14th July, 1947. The Council does not bind itself to accept the lowest or any tender.

C. V. THORNLEY,
Town Hall, Burnley. Town Clerk.
June, 1947. 2347

CROWN AGENTS FOR THE COLONIES

TENDERS are invited on behalf of the Government of Iraq for the supply of one hundred (100) Diesel-driven Generator Sets, 400/230 volts, 3-phase, 50 cycles, output between 50 kVA and 75 kVA at .8 power factor as may suit engine builders' standard design.

Forms of tender and specification can be obtained on application in writing to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting reference W/Iraq 7705. 2348

COUNTY BOROUGH OF NEWPORT

Tenders for 33-kV Main and Pilot Cables

THE Newport Corporation invite tenders for the manufacture, supply and installation of 33-kV Main and Pilot Cables from companies fully experienced in the laying of submarine cables.

Copies of the specification and drawings giving particulars of the work to be done, and all further information on the matter, can be obtained on application to Mr. T. H. Wood, M.I.Mech.E., A.M.I.E.E., Borough Electrical Engineer and Manager, Electric House, 191-192, Dock Street, Newport, Mon.

A deposit of £1 1s. is payable for one copy of the specification with drawings, and, provided a bona fide tender has been submitted, this deposit will be returned after the contract has been placed. Additional copies of the specification, but not the drawings, will be supplied on receipt of a further payment of 5s. per copy, which payment is not returnable. Cheques should be made payable to "The Borough Treasurer and Comptroller, Newport (Mon.) Corporation," and should be crossed.

Tenders and accompanying documents must be enclosed in a sealed cover, which must not bear any name or mark indicating the sender. This cover must be addressed to the undersigned, endorsed in the top left-hand corner "Tender for 33-kV Main and Pilot Cables," and sent through the post so as to be delivered not later than 10 a.m. on Thursday, 31st July, 1947. No tender received after that date will be considered, and the Corporation do not bind themselves to accept the lowest or any tender.

T. MERVYN JONES,
Town Hall, Newport, Mon. Town Clerk.
26th June, 1947. 2346

CITY AND ROYAL BURGH OF DUNDEE ELECTRICITY DEPARTMENT

Contract No. N.S.512

TENDERS are invited for the supply, delivery and erection of Automatic CO_2 Fire Extinguishing Equipment for a 33-kV substation at Clepington.

Specifications, with forms of tender, may be obtained on application to the City Electrical Engineer, and must be returned, sealed in the envelope provided, to the Town Clerk, City Chambers, Dundee, not later than 21st July, 1947. The lowest or any tender may not be accepted.

P. PHILIP, M.I.Mech.E., M.I.E.E.,
Dudhope Crescent Road, City Electrical Engineer.
Dundee.
18th June, 1947. 2327

BOROUGH OF REIGATE ELECTRICITY DEPT.

Substation E.H.T. and L.T. Equipment

TENDERS are invited for the supply of Six Units, each comprising three oil-immersed, 11-kV, 300-ampere Switches and six eight-way Isolator and Fuse Units.

Form of tender, specification and general conditions of contract may be obtained upon application to Mr. C. Rowbotham, M.I.E.E., Engineer and Manager, Electric House, Linkfield Corner, Redhill, Surrey.

Tenders, for the whole or part, must be delivered in plain sealed envelopes not bearing any mark indicating the sender, and must be received by me not later than Friday, 22nd August, 1947. The Council does not bind itself to accept the lowest or any tender.

HEBER DAVIES,
Town Hall, Reigate. Town Clerk.
14th June, 1947. 2237

CITY OF MANCHESTER

THE Electricity Committee invites tenders for the following:

660-volt D.C. Traction Switchgear for Mount Road and Gorton Substations (Specification No. 907).

Batteries and Charging Equipments for Mount Road, Gorton, and Broadhurst Park Substations (Specification No. 908).

Specifications, etc., may be obtained from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a bona fide tender.

Tenders, addressed to the Chairman of the Electricity Committee, to be delivered not later than 10 o'clock a.m. on Monday, 7th July, 1947. The Committee does not bind itself to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
Manchester, 2.
20th June, 1947. 2380

BOROUGH OF REIGATE ELECTRICITY DEPT.

Transformers

TENDERS are invited for Six 500-kVA, 3-phase, 50-cycle Oil-immersed Transformers.

Form of tender, specification and general conditions of contract may be obtained upon application to Mr. C. Rowbotham, M.I.E.E., Engineer and Manager, Electric House, Linkfield Corner, Redhill, Surrey.

Tenders must be in plain sealed envelopes not bearing any mark indicating the sender, and must be received by me not later than Friday, 22nd August, 1947. The Council does not bind itself to accept the lowest or any tender.

HEBER DAVIES,
Town Clerk.

Town Hall, Reigate.
14th June, 1947. 2238

SITUATIONS VACANT

COUNTY BOROUGH OF TYNEMOUTH ELECTRICITY DEPARTMENT

Appointment of Assistant Mains Engineer

APPLICATIONS are invited for the above appointment. Candidates must have passed the Graduateship examination of the I.E.E. or hold equivalent qualifications, and must have had sound practical experience in the construction, operation and maintenance of E.H.T. 3-phase and L.T. 3-phase, single-phase, and D.C. Distribution Systems, including Transformers, Switchgear and Substations.

The salary and conditions of employment will be in accordance with the N.J.B. Schedule, Class E, Grade 8, at present £413 per annum. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications stating age, qualifications and experience, together with copies of not more than three recent testimonials and endorsed "Assistant Engineer," should be forwarded to H. Harrison, A.M.I.E.E., Electrical Engineer and Manager, Electricity Works, Tanners Bank, North Shields, to be received not later than the 17th July, 1947. Canvassing directly or indirectly will be a disqualification, and applicants must state whether or not to their knowledge they are related to any member of the Council or to a holder of any senior office under the Council.

FRED G. EGNER,
Town Clerk.

14, Northumberland Square,
North Shields. 2373

THE NORTHAMPTON ELECTRIC LIGHT & POWER CO. LTD.

Control (Shift) Engineer

APPLICATIONS are invited for the above position from qualified engineers experienced in power station switchroom control duties. Salary in accordance with the N.J.B. Schedule, Class H, Grade 9.

25, Bridge Street, Northampton. 2344

WOLVERHAMPTON AND STAFFORDSHIRE TECHNICAL COLLEGE

ASSISTANT (Mechanical) and Senior Assistant (Electrical) required in the Engineering Department of the above. Salaries on the appropriate Burnham Technical Scale. Particulars, etc., on application to F. Lonsdale Mills, Clerk to the Governors, Education Offices, North Street, Wolverhampton. 2317

CITY OF COVENTRY ELECTRICITY DEPT.

APPLICATIONS are invited for the following appointments:—

(1) JUNIOR SHIFT ENGINEER, at a salary in accordance with Class J, Grade 8a, of the National Joint Board Schedule, at present £487 per annum, rising to £510 per annum. Candidates should have a sound technical and practical training in electrical and mechanical engineering, and experience in a modern generating station.

(2) ONE CONSTRUCTIONAL ASSISTANT, at a salary in accordance with Class J, Grade 8, of the National Joint Board Schedule, at present £521 per annum, rising to £544 per annum. Candidates should have had a sound engineering training and possess the Higher National Certificate in Mechanical Engineering, or an equivalent qualification. Experience in steam pipework and plant layout, together with structural steelwork and building work in connection with generating station extensions is essential. The selected candidate will be required to take complete control of the Constructional Drawing Office and experience in the control of direct labour would be an advantage.

The above appointments will be subject to the provision of the Local Government Superannuation Act, 1939, and the successful candidate will be required to pass a medical examination. The persons appointed will be required to contribute to the Coventry Municipal Officers' Widow and Orphans Pension Fund.

Applications, stating particulars of age, training, qualifications, experience, etc., and accompanied by copies of recent testimonials, should be forwarded to the undersigned, not later than first post on Monday, 7th July, 1947.

Envelopes should be endorsed with the designation of the post for which application is being made.

F. W. GODDEN, M.I.E.E.
Electrical Engineer and Manager.

The Council House,
Coventry.
13th July, 1947. 2246

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPT.

Engineering Draughtsmen

APPLICATIONS are invited for two Engineering Draughtsmen in the Undertaking's Constructional Department. Applicants should be suitably qualified and experienced in either (a) the design of structural steelwork as applied to industrial buildings and modern power stations, etc., or (b) power station plant layout, including either turbo-alternators, boilers, or H.P. steam and water pipework, etc.

The salary will be in accordance with the N.J.B. Schedule, commencing according to experience between the range of Grade N.10b (£408 per annum) and Grade N.9a (£510 per annum).

The appointment will be subject to the Local Government Superannuation Act, 1937, and to the passing of a medical examination.

Applications, stating age, and giving full particulars of training, qualifications and experience, must be delivered to the undersigned in an envelope endorsed "Draughtsman."

F. W. LAWTON, M.I.Mech.E., M.I.E.E.,
Chief Engineer and Manager.

14, Dale End,
Birmingham, 4. 2275

BOROUGH OF WILLESDEN ELECTRICITY DEPT.

Installation Inspector

APPLICATIONS are invited for the above position from men who have had experience in testing installation work upon consumers' premises in accordance with the latest Wiring Regulations of the Institution of Electrical Engineers, the Factory Acts, 1937, and the Electricity Supply Regulations, 1937.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, after a period of six months, and the selected applicant will be required to pass a medical examination.

The conditions of service, working conditions and rate of pay will be in accordance with District Council (No. 10) London Area, Electricity Supply Industry, present rate 2s. 10½d. per hour = £6 15s. 1½d. per week.

Applications, with copies of testimonials, should be sent to the Borough Electrical Engineer and Manager, Electric House, 296, Willesden Lane, N.W.2, not later than Monday, 7th July, 1947, endorsed "Installation Inspector."

R. S. FORSTER,
Town Clerk.

Town Hall, Dyne Road,
Kilburn, N.W.6.
10th June, 1947. 2214

WALTHAMSTOW CORPORATION ELECTRICITY UNDERTAKING

Consumers' Engineer

APPLICATIONS are invited for the position of Consumers' Engineer at a salary in accordance with Grade 3, Class H, of the National Joint Board Schedule, at present £761 rising to £803 per annum.

Candidates must be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications and must be thoroughly conversant with the organization and control of staff engaged on the maintenance of hire apparatus, showroom sales, records, tariffs, and the preparation of specifications and estimates for electrical installation work carried out by direct labour. They must have had good experience in the development of load for domestic, commercial and industrial purposes, be able to advise consumers, and conduct correspondence.

The appointment will be subject to the Local Government Superannuation Act, 1937, to the National Joint Board's Conditions of Service, to the successful candidate passing a medical examination, and to termination by one month's notice on either side.

Forms of application obtainable from the Borough Electrical Engineer and Manager, Electric House, Church Hill, London, E.17, should be completed and returned accompanied by copies of not more than three recent testimonials to reach the undersigned endorsed "Consumers' Engineer" not later than Monday, the 14th July, 1947. Canvassing in any form will be deemed a disqualification and applicants must disclose any relationship to any member of the Council or holder of any senior office under the Council.

G. A. BLAKELEY,
Town Hall, Walthamstow, E.17. Town Clerk.
21st June, 1947. 2382

BOROUGH OF TORQUAY ELECTRICITY UNDERTAKING

Appointment of Assistant District Engineer (Amended Advertisement)

APPLICATIONS are invited for the above position in the Newton Abbot district of the Undertaking. Candidates must have received a sound technical training and have had recent experience of the construction and operation of H.V. and L.V. underground and overhead systems.

Salary and conditions of service will be in accordance with Grade 9, Class G of the N.J.B. Schedule, at present £380 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. He must also own a car approved by the Corporation, who will make him an allowance for it in accordance with their scale.

Applications, endorsed "Assistant District Engineer," stating age, qualifications and details of experience, together with supporting testimonials or references, should be submitted to the Borough Electrical Engineer and Manager, Electric House, Torquay, and received by him on or before the 14th July, 1947. Canvassing would disqualify.

HERBERT A. HIELD,
Town Hall, Town Clerk.
Torquay. 2362

BOROUGH OF RADCLIFFE ELECTRICITY DEPT.

Class I Plumber-Jointer

APPLICATIONS are invited for the above position. The rate of pay and working conditions will be those of the National Joint Industrial Council, at present 2s. 6d. per hour for a 47-hour week. Applicants must be fully experienced in high tension and low tension jointing work, network boxes, and substation H.T. and L.T. boards.

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. Canvassing will disqualify, and candidates must disclose in their applications any relationship to any member or officer of the Council.

Applications, stating age, and details of practical experience, together with copies of not more than three recent testimonials, must reach the undersigned, endorsed "Plumber Jointer," not later than Tuesday, 15th July, 1947.

H. A. FOX,
Town Hall, Town Clerk.
Radcliffe, Lancs.
20th June, 1947. 2386

COUNTY BOROUGH OF BURTON-UPON-TRENT

Appointment of Borough Electrical Engineer

THE Council of the County Borough of Burton-upon-Trent invite applications for the appointment of Borough Electrical Engineer from persons having wide experience in the management and administration of an electricity supply undertaking owning and operating a generating station.

The salary will be in accordance with the scale set out in the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941. In accordance with Clause 10 of that agreement the salary for the first year will be 85% of the full salary, and for the second year 92½% thereof, the full salary being payable as from the commencement of the third year of the appointment. The salary for the first year, based on the present number of units, would be approximately £1,574.

The appointment (which will be determinable by three months' written notice on either side) will be subject to the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination by a medical officer of the Corporation.

A statement of the terms and conditions of the appointment and the duties of the post may be obtained from the undersigned, and applications, endorsed "Borough Electrical Engineer," giving particulars of age, qualifications and experience, together with copies of three recent testimonials, should be received by the undersigned not later than 23rd July, 1947. Canvassing in any form will disqualify.

H. BAILEY CHAPMAN,
Town Hall, Burton-upon-Trent. Town Clerk.
10th June, 1947. 2190

COUNTY BOROUGH OF BLACKPOOL

Blackpool Technical College and School of Art
(Principal: M. W. Garside, B.A., F.R.S.A.)

Engineering and Science Department

APPLICATIONS are invited to fill the following full-time vacancies arising in September, due to promotion or to expansion of the Department:—

(1) LECTURER IN ELECTRICAL ENGINEERING. (a) Day-time lectures and laboratory work to Higher National Certificate standard in Electrical Engineering, together with Electrical Science to part-time apprentice classes and to the Junior Technical School; and (b) Evening work to S.2 and S.3 standard and Ordinary National Certificate. This post will probably be designated a Senior Assistantship (£600-£750).

(2) LECTURER IN AUTOMOBILE ENGINEERING. A new post created by considerable response to the part-time day N.J.I.C. apprenticeship scheme which forms the bulk of the work; together with some lecture work in Heat Engines to a senior full-time day engineering course, and a small amount of Junior Technical School work.

In both cases both teaching and industrial (or research) experience is desirable. Salary will be in accordance with the Burnham award, with the appropriate allowances for training and experience.

Application forms, obtainable from the Chief Education Officer, Education Offices, 3, Caunce Street, Blackpool, should be returned within 14 days of the appearance of this advertisement.

TREVOR T. JONES, Town Clerk.
2284

COUNTY BOROUGH OF WARRINGTON ELECTRICITY DEPARTMENT

Switchboard Attendant

APPLICATIONS are invited for the appointment of Switchboard Attendant for shift duties at the Corporation's Selected Generating Station. Applicants must have had experience in the operation of high tension and low tension switchgear in a modern generating station.

The appointment is a permanent one, will be subject to the Local Government Superannuation Act, 1937, and to the provisions of the agreement of the National Joint Industrial Council for the Electricity Supply Industry, the present rate of pay being "A" Zone rate of 2s. 10d. per hour.

Applications, on forms to be obtained from the undersigned, must be accompanied by copies of not more than two recent testimonials, and returned in sealed envelopes endorsed "Application for Switchboard Attendant" not later than first post on Monday, 7th July, 1947.

N. T. SMITH, M.I.E.E., A.M.I.Mech.E.,
Electricity Works. Borough Electrical Engineer.
Howley, Warrington. 2306

COUNTY BOROUGH OF OLDHAM ELECTRICITY DEPARTMENT

Appointment of Assistant Mains Engineer

APPLICATIONS are invited for the above position. Applicants must have had sound practical experience in the installation and maintenance of high and low voltage underground and overhead mains, substation plant and distribution equipment and possess suitable technical qualifications. Salary in accordance with the National Joint Board Schedule, Grade 8, Class H.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937. The successful applicant will be required to pass a medical examination and to comply with the condition as to residence, to which appointments under the Corporation are subject. Canvassing will be a disqualification.

The age limit for new entrants to the Local Government Service is 45 years, unless a transfer value in respect of superannuation is payable. For the purpose of this application the age of applicants who are serving or have served in H.M. Forces will be regarded as being reduced by the number of years of their war service. Applications, endorsed "Assistant Mains Engineer," stating age, full details of education, training and experience, with copies of not more than three testimonials, to be forwarded to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, not later than the 7th July, 1947.

THOMAS ALKER,
Town Clerk.

Town Hall,
Oldham.
20th June, 1947. 2376

HAZEL GROVE AND BRAMHALL U.D.C. ELECTRICITY DEPARTMENT

Appointment of Mains Assistant

APPLICATIONS are invited for the above position from candidates having a good technical knowledge in electrical engineering and with practical experience in the laying, erection and maintenance of 6.6-kV and low-voltage underground distribution and associated substation equipment. Graduateship of the Institution of Electrical Engineers is essential.

The salary and conditions of employment will be in accordance with the National Joint Board Agreement, Class E, Grade 8a (at present £387 rising to £404 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, containing full details of age, qualifications and experience, accompanied by copies of two testimonials, and endorsed "Mains Assistant," should be forwarded to the Chief Electrical Engineer and Manager, Electricity Offices, Chapel Street, Hazel Grove, Cheshire, not later than Monday, 30th June, 1947. Canvassing will be a disqualification.

F. E. CAPPER,
Clerk of the Council.

The Council House,
Hazel Grove, Cheshire.
10th June, 1947. 2199

BRIERFIELD URBAN DISTRICT COUNCIL

Appointment of Electrical Engineer

APPLICATIONS are invited for the above position at an inclusive salary in accordance with Clause 10 of the Agreement dated the 9th of July, 1941, made between the National Joint Committee of Local Authorities and Chief Electrical Engineers, and will commence at £523 12s. per annum, rising at the beginning of the third year of service to the full scale.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination, and subject to three months' notice on either side.

Candidates must be Corporate Members of the Institution of Electrical Engineers, and have had experience in a responsible position in the administration, management and development of an electricity undertaking. Applications, stating age, experience and qualifications, and accompanied by not more than three recent testimonials, must be delivered to the undersigned not later than the 21st July, 1947. Canvassing, directly or indirectly, will be a disqualification.

H. L. SMITH,
Clerk to the Council.

Town Hall,
Brierfield, Lancs.
18th June, 1947. 2378

COUNTY BOROUGH OF NEWPORT ELECTRICITY DEPARTMENT

Mains Assistant Engineer (Junior)

THE Newport Corporation Electricity Department invite applications for the position of Mains Assistant Engineer (Junior). Applicants should hold the Higher National Certificate or its equivalent, and have had experience in the construction, maintenance and operation of 3-phase high-tension and low-tension overhead and underground transmission and distribution systems, including experience of direct current distribution systems.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate before appointment will be required to pass a medical examination by the Newport Medical Officer of Health.

The conditions of employment will be in accordance with the agreement of the National Joint Board of Employers and Members of Staff for the Electricity Supply Industry, and the salary will be that attaching to Class H, Grade 9a (commencing at £365 per annum).

Applications, stating the applicant's age, whether married or single, and giving details of qualifications, previous appointments and experience, together with copies of not more than three testimonials, should be addressed to the undersigned, marked "Mains Assistant Engineer (Junior)," and delivered not later than Monday, 14th July, 1947.

T. H. WOOD,
Borough Electrical Engineer and Manager.

Electric House,
Dock St., Newport, Mon. 2313

NORWICH CORPORATION ELECTRICITY DEPT.

Senior Development Assistant

APPLICATIONS are invited for the appointment on the permanent establishment of Senior Development Assistant at a salary in accordance with Class H, Grade 5 (present scale £620-£641), of the N.J.B. Schedule. The successful applicant will be required to act as the Personal Assistant to the Planning and Development Superintendent.

Applicants must be of good address and education, with a thorough knowledge of electrical engineering. They must also have had commercial experience, a knowledge of installation work and tendering and a practical knowledge of the application of electricity to domestic and industrial purposes.

The post is subject to the conditions of service as set out in the N.J.B. Schedule, and is also subject to the provisions of the Local Government Superannuation Act, 1937. It will be necessary for the successful applicant to pass a medical examination.

Applications by letter, stating age, qualifications, experience and present appointment, with copies of two recent testimonials, to be sent to me not later than 5th July, 1947. Any relationship to members of the Norwich City Council or its staff must be disclosed in the application. Failure to do so will be a disqualification.

JOHN A. SUMNER,
M.I.E.E., M.I.Mech.E., F.I.I.A.,
City Electrical Engineer.

4, Duke Street,
Norwich.
7th June, 1947. 2161

COUNTY BOROUGH OF HALIFAX ELECTRICITY DEPARTMENT

Light, Heat and Power Committee

Appointment of Relief Charge Engineer

APPLICATIONS are invited for the position of Relief Charge Engineer at the Foundry Street Power Station of the above Authority.

The conditions of employment are in accordance with the National Joint Board Agreement, Class H, Grade 8a, at present £455 rising to £476 per annum. Candidates must be experienced in the operation of steam turbo-alternators, high pressure boilers and auxiliary plant in a modern Selected Power Station.

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

Applications, endorsed "Relief Charge Engineer," stating age, training and experience, accompanied by copies of not more than three recent testimonials, should reach the undersigned not later than 12 noon, Monday, 14th July, 1947. Canvassing, either directly or indirectly, will disqualify.

A. G. CONNELL, M.I.E.E., M.I.Mech.E., F.Inst.F.,
Borough Electrical Engineer and Manager.

19/23, Northgate,
Halifax. 2328

BOROUGH OF ASHTON-UNDER-LYNE ELECTRICITY DEPARTMENT

Appointment of Demonstrator (Female)

APPLICATIONS are invited for the above appointment. Salary in accordance with the General Division (Female) of the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services, commencing at £176 2s. per annum, inclusive of bonus, at the age of 21 and rising to £288 2s. per annum, inclusive of bonus, at the age of 30. The commencing salary will be dependent upon the age of the successful applicant.

Candidates must have had a good general education and hold a recognised diploma. They should be capable of arranging and conducting demonstrations of electric cooking both in the showrooms and in consumers' homes, and also be able to advise consumers on the selection and use of domestic electrical apparatus.

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 full details of training and experience, and accompanied by copies of not more than three testimonials, should be submitted to Mr. N. Jones, Borough Electrical Engineer, Electricity Works, Wellington Road, Ashton-under-Lyne, not later than Monday, 21st July, 1947.

G. A. MALONE,
Town Hall, Ashton-under-Lyne. Town Clerk.
18th June, 1947. 2302

STOKE-ON-TRENT CORPORATION ELECTRICITY DEPARTMENT

Assistant Meter Engineer

APPLICATIONS are invited from suitably qualified persons under the age of 45 for the appointment of Assistant Meter Engineer in this Department's Class A Polyphase Meter Testing Station.

Applicants must have had a sound technical and general education and a wide experience of meter work. They should be capable of organising and supervising the testing and repair of all classes of electricity supply meters. The person appointed will be required to carry out all substandard instrument tests and to maintain all records in accordance with the Electricity Supply (Meters) Act, 1936.

The conditions of employment will be those of the National Joint Board Agreement, and the salary will be in accordance with Class H, Grade 8a of the Schedule to this Agreement, at present £155 p.a. gross.

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

Application forms and further particulars may be obtained from the General Manager, Electricity Department, 31, Kingsway, Stoke-on-Trent. Applications must be completed and returned in the envelope provided, to reach the General Manager not later than the first post on Wednesday, 16th July, 1947.

HARRY TAYLOR, Town Clerk.
2285

CITY OF PETERBOROUGH ELECTRICITY DEPT.

APPLICATIONS are invited from suitable qualified persons, for the following appointments:—

(a) ENGINEERING ASSISTANT (MECHANICAL).
(b) ENGINEERING ASSISTANT (ELECTRICAL).

Candidates must be skilled engineering draughtsmen and have experience in the preparation of drawings and specifications, etc., associated with the design and construction of a new power station. Membership of an appropriate Professional Institution or exempting qualifications will be an advantage.

Salary and conditions of employment will be in accordance with the N.J.B. Schedule, Class G, Grade 7, at present £494 to £524 per annum.

The selected candidate for each appointment will be required to pass a medical examination and to contribute to the Corporation's Superannuation Scheme under the Local Government Superannuation Act, 1937.

Applications, stating age, qualifications and previous experience, together with copies of three recent testimonials and endorsed (a) "Engineering Assistant (Mechanical)," (b) "Engineering Assistant (Electrical)," should be forwarded to the City Electrical Engineer and Manager, Albert Meadow, Peterborough, not later than the 10th July, 1947.

ARTHUR J. REEVES.
Town Hall, Peterborough. Town Clerk.
12th June, 1947. 2245

ELECTRICITY SUPPLY BOARD (EIRE)

THE Electricity Supply Board invites applications from suitable candidates for:

A. Positions on its Engineering staff.
B. Traineeships in a two-year Training Course.

A. Applicants for Engineering posts must have a University degree in Electrical or Mechanical Engineering, or its equivalent. The posts carry a salary scale of £350 × £20-£630 × £30-£660 and in addition an Emergency Bonus at the rate of 16s. per week is also payable. Appointments will be on a probationary basis for a period of six months, and the starting salary in each case will depend on the qualifications and experience of the successful candidate.

B. Applicants for Traineeships should be under 26 years on the 1st October, 1947. The Training Course, which will commence in Autumn, is open only to graduates in Electrical or Mechanical Engineering of Universities or recognised Institutions. The course provides experience in the Board's generating stations and technical departments. Trainees are paid £5 per week as well as certain travelling and subsistence allowances.

Applications, which must state date of birth, technical qualifications and experience, if any, of the applicant, should reach the undersigned not later than the 5th July next.

PATRICK J. DEMPSEY,
60-62, Upper Mount Street, Secretary
Dublin, Eire.
9th June, 1947. 2263

CITY OF CANTERBURY ELECTRICITY DEPT.

Appointment of Senior Draughtsman

APPLICATIONS are invited for the position of Senior Draughtsman. Applicants should be experienced in the design and construction of substations, the keeping of mains records, and drawing office practice usual in an electricity undertaking. Preference will be given to candidates who possess technical qualifications equivalent to Higher National Certificate standard.

Salary and conditions will be in accordance with the National Joint Board for the Electricity Supply Industry, Class D, Grade 8b, at present £340 per annum inclusive. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and to the passing of a medical examination.

Applications, endorsed "Draughtsman," stating age and giving full particulars of training, qualifications, and experience and accompanied by copies of not more than three recent testimonials, should be received by S. J. C. Ellis, Esq., City Electrical Engineer, Electricity Works, Canterbury, not later than 14th July, 1947. Canvassing will disqualify.

J. BOYLE,
Municipal Buildings, Town Clerk.
Dane John,
Canterbury.
21st June, 1947. 2383

STRETFORD & DISTRICT ELECTRICITY BOARD

Chief Assistant to Mains Superintendent

A Chief Assistant is required for the Mains Superintendent on the above undertaking which operates an extensive distribution network, operating at voltages up to 33 kV. Applicants should preferably have had experience of D.C./A.C. change-over. The position is graded H.7 on the N.J.B. Schedule.

The appointment will be subject to the Board's Superannuation Scheme, and a medical examination will be required. Applications, with copies of testimonials, should be received by the undersigned not later than Monday, 14th July, 1947.

H. G. BELL.
Trafford Power Station,
Trafford Park,
Manchester, 17. 2381

SPALDING U.D.C. ELECTRICITY DEPARTMENT

Electrical Demonstrator

ELECTRICAL Demonstrator required to give demonstrations in homes and showrooms and perform general showroom duties. Salary in accordance with recommended E.D.A. scales, viz., £304.

Applications to be in by 26th July, 1947, giving details of experience, etc.

FRANK R. C. ROBERTS,
9, Winsover Road, Engineer and Manager.
Spalding. 2340

BOROUGH OF RADCLIFFE ELECTRICITY DEPT.

Mains Assistant

APPLICATIONS are invited for the above position at a salary in accordance with Class E, Grade 8, of the N.J.B. Schedule, at present £413 per annum.

Applicants must possess technical qualifications not less than Higher National Certificate and have had experience in the construction, maintenance and operation of E.H.T. and L.T. 3-phase A.C. and 3-wire D.C. Distribution Systems, and with A.C. static substations and equipment. Some experience in D.C./A.C. change-over and fault localisation is desirable.

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. Canvassing will disqualify, and candidates must disclose in their applications any relationship to any member or officer of the Council.

Applications, stating age, qualifications and experience, together with copies of not more than three recent testimonials, must reach the undersigned, endorsed "Mains Assistant," not later than Tuesday, 15th July, 1947.

H. A. FOX,
Town Clerk.

Town Hall,
Radcliffe, Lancs.
20th June, 1947. 2385

CITY OF OXFORD ELECTRICITY SUPPLY DEPT.

Appointment of Technical Assistant

APPLICATIONS are invited for the position of Technical Assistant (Mains Dept). Applicants must have a sound knowledge of H.T. substation practice and be conversant with application, testing and maintenance of switchgear and protection systems. Preference will be given to applicants who are graduate or corporate members of the I.E.E.

Salary and conditions of employment will be in accordance with National Joint Board Agreement, Class G, Grade 8a (at present £437/443/449).

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

Applications endorsed "Technical Assistant" addressed to the City Electrical Engineer and Manager, 37 George Street, Oxford, must be received at the latest by first post on Monday the 14th July, 1947.

HARRY PLOWMAN,
Town Clerk.

Town Hall,
Oxford. 2377

BOROUGH OF ACCRINGTON ELECTRICITY DEPT.

Appointment of Installation Inspector

APPLICATIONS are invited for the above appointment. Candidates must have had experience in a similar position, must possess the Higher National Certificate in Electrical Engineering, and be fully acquainted with the regulations governing all types of electrical installations.

The salary and conditions of employment will be in accordance with the N.J.B. Schedule, Class F, Grade 8a, at present £413 per annum (inclusive of bonus). The appointment is subject to the Local Government Superannuation Act, 1937, and to a medical examination.

Applications, stating age, qualifications and experience, together with copies of three recent testimonials, should be forwarded to me not later than Tuesday, the 8th July, 1947. Canvassing will be a disqualification.

P. D. WADSWORTH,
Town Clerk.

Town Hall, Accrington.
June, 1947. 2230

BOROUGH OF HOVE ELECTRICITY DEPARTMENT

APPLICATIONS are invited for the position of Electrical Fitter for maintenance and construction of Rotary and Static Substations.

Applicants should have had experience in the erection and maintenance of E.H.T. and L.T. switchgear and transformers.

Conditions of service and pay will be in accordance with the District Joint Industrial Council Schedule No. 11 (South Coast) Area. Present rate 2s. 6d. per hour for 47-hour week.

Applications, stating age and experience, together with copies of testimonials to be sent to the undersigned not later than Monday, the 7th July, 1947.

F. SWARBRICK,
Engineer and Manager.

Electricity Department,
Hove Street, Hove, Sussex. 2384

COUNTY BOROUGH OF PRESTON ELECTRICITY UNDERTAKING

Appointment of Control Engineer

APPLICATIONS are invited for the position of Control Engineer (Shift Duties) at the Ribble Generating Station. Applicants must have had previous experience of the duties appertaining to the operation of an E.H.T. Control Room in a modern power station and possess suitable technical qualifications.

Salary and conditions of employment in accordance with the National Joint Board Schedule, Class J, Grade 9 (at present £425 rising to £445 per annum).

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

Applications, stating age and giving full particulars of technical qualifications, training and experience, accompanied by not more than two testimonials and endorsed "Control Engineer," must be received by the undersigned not later than Saturday, the 5th July, 1947.

G. A. ROBERTSON,
M.Sc.Tech., M.I.E.E., M.I.Mech.E.
Borough Electrical Engineer.

40 & 41, Lune Street,
Preston.
19th June, 1947. 2375

COUNTY BOROUGH OF WEST BROMWICH

Appointment of Mains Engineer

APPLICATIONS are invited for the above appointment at a salary in accordance with Class H, Grade 4, of the N.J.B. Schedule, at present £666-£698 per annum. Applicants must have had a sound technical training and extensive practical experience in H.T. and L.T. distribution systems, be competent to assist with the preparation and layout of new distribution schemes and in preparing estimates for new development and rechargeable works, including change-over from D.C. to A.C. supplies.

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, details of training and experience, together with copies of three recent testimonials, to be received by the undersigned not later than Saturday, 12th July, 1947.

G. O. EDWARDS,
Borough Electrical Engineer and Manager.

Electric House,
206/298, High Street,
West Bromwich. 2341

COUNTY BOROUGH OF SOUTHPORT

Appointment of Shift Charge Engineer

APPLICATIONS are invited for the position of Shift Charge Engineer at the Corporation's "Selected" Generating Station. Candidates must have received a good technical training and have had experience in the operation of central station plant, including turbo-alternators, water tube boilers and E.H.T. switchgear.

Salary will be in accordance with the N.J.B. Schedule, Class F, Grade 8. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937; medical examination necessary. Candidates should give particulars of their qualifications, experience and age, together with copies of two recent testimonials.

Applications, endorsed "Shift Charge Engineer," should be addressed to the Borough Electrical Engineer, 188, Lord Street, Southport, and must be received by Monday, 30th June, 1947.

R. EDGAR PERRINS,
Town Clerk.

Southport.
12th June, 1947. 2343

SURREY COUNTY COUNCIL EDUCATION COMMITTEE

Kingston-upon-Thames Technical College
(Kingston Hall Road, Kingston-upon-Thames, Surrey)

ENGINEERING Department. Required for 1st September, 1947: Graduate Lecturer in Electrical Engineering, to teach the Principles of Electricity up to the standard of Section A of the Associate Membership of the Institution of Electrical Engineers.

Salary £315 × £15 to £555, with placing for teaching and industrial experience.

No forms are being issued. Applications to be addressed to the undersigned as soon as possible.

J. W. ARCHER, B.Sc.
2349

THE YORKSHIRE ELECTRIC POWER COMPANY

Charge Engineer and Switchboard Attendants

APPLICATIONS are invited for the position of Assistant Charge Engineer at Ferrybridge Generating Station (125 MW and scheduled for extension). Applications will be considered from persons who (a) have had a sound technical education and training; (b) have had operating experience with E.H.T. switchgear; (c) are members of the Institution of Mechanical Engineers.

Applications are invited for the position of Switchboard Attendant at Ferrybridge Generating Station (125 MW). Candidates should have had a regular training and experience in similar duties.

Apply, stating age, training, experience and present position to GM/GH, The Yorkshire Electric Power Company, Bramhope, Nr. Leeds. 2379

WEST GLOUCESTERSHIRE POWER CO. LTD.

APPLICATIONS are invited for the position of Shift Charge Engineer for the Company's Power Station at Lydney, Glos. Salary in accordance with the N.J.B. Salary Schedule, Class F, Grade 8.

The appointment is subject to the company's conditions of service, which includes membership of a superannuation scheme. Application must be made on the prescribed form, which can be obtained from: Establishment Officer, 126, London Road, Gloucester. 2164

A Qualified Electrical Engineer with good commercial knowledge, age 30-40, to manage electrical contracting firm in Southern Ireland. State full particulars of education, training and experience.—Box 2102, c/o The Electrical Review.

A vacancy affording excellent opportunities for advancement needs first-class man as Assistant to the Manager of the Electrical Department. Sound knowledge of the electrical trade, i.e., cables, accessories, appliances, etc., and of general office routine, essential. Send full details of experience, age, salary required to—Staff Manager, W. N. Froy & Son Ltd., Brunswick Wks., Hammersmith, W.6. 141

AN electrical engineering firm in the Midlands require Senior Draughtsman experienced in the mechanical design and construction of turbo and engine-driven alternators. Good salary and prospects to suitable men. Please give full particulars of training and experience. Housing accommodation provided. Write—Box No. 354, 8, Serle Street, London, W.C.2. 137

ARMATURE Winders and Improvers urgently required. Top rates and good conditions.—Box 113, c/o The Electrical Review

ARMATURE Winders and Improvers urgently required. Top rates and good conditions.—Collins Electrical Ltd., 22, St. Alban's Place, London, N.1. 85

ARMATURE Winders and Improvers urgently required. Top rates paid.—White, Jacoby & Co. Ltd., Bayham Place, Camden Town, N.W.1. 6011

ARMATURE Winders and Improvers wanted for general repair works, A.C. and D.C. Top rates.—Phillips & Sons Electrical Ltd., 40, Waterford Road, S.W.6. 2202

ASSISTANT in London office of progressive electrical contractors. Excellent opportunity for man with experience in the trade, costing and stores control, etc.—Box 6106, c/o The Electrical Review.

ASSISTANT Works Manager for North Midlands repair works to control work covering rewinding, repairs, overhauling, etc., and to be capable of re-designing windings for conversions.—Box 2299, c/o The Electrical Review.

BRITISH Electric Co. (Beco Ltd.), require Armature Winders, top rates and conditions. Apply—British Electric Co. (Beco Ltd.), 25/29, Lower Road, Rotherhithe, S.E.16. 146

CAPABLE Electrical Alternator Designer, thoroughly conversant with the design of modern engine-driven alternators, including all conditions requisite for satisfactory parallel running. State age, qualifications, previous experience and remuneration expected.—Box 2180, c/o The Electrical Review.

DE Havilland Propellers Ltd. invite applications for the following vacancy: Draughtsman (design), with good working knowledge of electrical mechanism. Successful applicant will be required to work a 30-hour, 5-day week. Application should be made in writing, stating age, experience and salary required, to—The Personnel Manager, De Havilland Propellers Ltd., Hatfield, Herts. 11

DESIGN Draughtsman required immediately for employment in South-East London area, with experience of high-speed mechanisms. Applications are invited from qualified draughtsmen who are desirous of advancement and willing to accept responsibility. Write, giving full particulars of age, experience, qualifications and present salary, to—Box 149, c/o The Electrical Review.

BAKUBHAI & Ambalal Ltd., 24, St. Mary Axe, London, E.C.3. A large sisal company in Tanganyika Territory invites applications for the following engineering appointments: (a) One Senior Maintenance or Master Mechanic; (b) Three Maintenance Mechanics; (c) One Plant Erector. The Senior Maintenance Mechanic must be a thoroughly practical man with considerable experience in the erection, maintenance and operation of: (i) Diesel generating plant, pumping equipment and power plant generally, steam experience an asset; (ii) The control and organisation of a workshop carrying out all classes of repairs, fabricating parts and producing castings; (iii) The efficient control of organised factory and estate machinery maintenance and the repair and upkeep of transport involving Diesel and petrol locomotives, rolling stock, tractors and road vehicles; this appointment carries a salary ranging up to £75 per month. The Maintenance Mechanics must be practical men with not less than ten years' combined pre-war experience in: (i) Erection, maintenance and repair of Diesels up to 500 h.p., pumps and power plant generally, electrical knowledge an advantage; (ii) Machine shop and fitting experience, electric and acetylene welding; (iii) Repair and overhaul of small Diesel locomotives, petrol road vehicles and tractors; the salary for the appointments is £50 per month, increasing by yearly increments to £60 per month. The Plant Erector appointment calls for a man, preferably single, with experience in: (i) Erection and construction of medium-sized Diesel generating plant, pumping machinery, pipe lines, plant foundations and the installation of various factory plant, shafting, etc.; (ii) The control of labour and the organisation of construction work; (iii) Sufficient technical or drawing office experience to produce simple plant layouts and straightforward drawings, materials, quantities and estimates; salary as appointment (b). Appointments will be on agreement for 4 years, normally with passages paid out and home, with six months' leave on full pay on completion of contract. Free houses and medical attention are provided. Applicants are requested to apply to Bakubhai & Ambalal Ltd., 24, St. Mary Axe, London, E.C.3, for questionnaire, which must be completed with all required information and returned with copies only of testimonials. 2218

DESIGNER-Draughtsman and Contract Draughtsman, switchgear. Progressive positions offered by firm in Midlands, country area. Housing accommodation will be provided. Reply, with full particulars, age, experience, salary required, to—Box 2048, c/o The Electrical Review.

DRAUGHTSMAN required, Enfield district, age between 25/35, with design experience of fractional h.p. electric motors. Applicants with workshop experience plus sound academic background (B.Sc.Eng. or A.M.I.Mech.E.) would be preferred. Reply, age, experience, qualifications and salary required—Box 2311, c/o The Electrical Review.

ELECTRIC Cable Plumber-Jointers required by British company for work in India. Permanent or short-term engagement available. Must be prepared to train native labour in cable jointing. Write, stating age and experience, to—Box 2297, c/o The Electrical Review.

ELECTRIC Lamps. Foremen wanted, experienced in high-speed mass production by large manufacturers in London area. Good salary and prospects carrying pension. Send full particulars to—Box 2280, c/o The Electrical Review.

ELECTRICAL Contractors require Manager. Good salary and prospects for an engineer with experience in estimating for and controlling good class installations of all types.—Box 6109, c/o The Electrical Review.

ELECTRICAL Testers required, preferably with experience of D.C. motors for railways and road transport; also Inspector manufacture of field and armature coils for traction motors. Reply, stating age, experience and salary required, to—Metropolitan-Vickers Electrical Co. Ltd., Attercliffe Common Works, Sheffield, 9. 2277

ELECTRICAL Foreman for duty in Middle East areas. Must possess H.N.C. and have had considerable experience in construction/operation/maintenance of H. and L.T. o/h line and u/g cable systems, switchgear, motors and wiring installations. Age limit 34; if married, must be prepared to live singly for at least first three years. Salary (progressive) from £500 p.a.; plus quarters/messing and allowance between the range £195-£400, dependent on family circumstances. Write full particulars to—Box 1716XY, c/o Charles Barker & Sons Ltd., 81, Budge Row, London, E.C.4. 2058

ELECTRICAL Wholesalers require Storeman for purpose of checking and packing for despatch. Knowledge of electrical material essential.—London Electrical Company Ltd., 92, Blackfriars Road, S.E.1. 41

ENGINEERS and Draughtsmen required for development work on automatic telephone exchange equipment. Apply in writing, giving particulars of qualifications, experience, age and salary required, to—Ref. 634, Siemens Brothers & Co. Ltd., Woolwich, S.E.18. 2307

ENGINEER, capable of running industrial wiring section of London electrical and mechanical engineers under managing director, including interviewing, estimating and supervision of contracts. Applicants please state salary required and give details of experience to—Box 2288, c/o The Electrical Review.

EXPERIENCED Draughtsmen for compound, oil and air type H.T. switchgear. Manchester district. A.S.E.D. rates. State age and experience, etc.—Box 2141, c/o The Electrical Review.

EXPERIENCED Drawing Office Personnel for automobile and aircraft electrical wiring systems, cable assemblies, junction boxes, terminations.—Ward & Goldstone Ltd., Sampson Works, Frederick Rd. Manchester 8. 19

EXPERIENCED Industrial Lighting Engineer required for London area. Excellent prospects for the right type of man. Apply, giving full particulars, to—Veritys Ltd., 66, Quay Street, Manchester, 3. 2286

EXPERIENCED Refrigerator Engineer, Croydon area, only first-class men need apply.—Box 2110, c/o The Electrical Review.

FEMALE Invoice Typist, experienced preferred, for electrical wholesale distributors. State wages, etc.—L.M., Sloan Electrical Co. Ltd., 41 Kingsway, W.C.2. 2260

FLUORESCENT. Large manufacturers require Lighting Sales Engineers, about 30 years of age, for Scotland (Edinburgh), Lancashire and London, preferably already domiciled there. Matriculation and National Certificate E.E. preferred, lighting knowledge and sales experience an advantage. British Nationality. Please state age, qualifications, experience and salary required to—Box 2233, c/o The Electrical Review.

FRIGIDAIRE Distributors require experienced Service Engineer for Coventry branch. Permanent position, good wages. Write full details of experience.—Frigidaire, 99, Port Street, Evesham. 2271

JUNIOR Assistant for Electrical Stores. Knowledge of all electric accessories, cables, etc., essential. Good wages and prospects. Apply, giving full details of experience, wages, etc., to—Staff Manager, W. N. Froy & Son Ltd., Brunswick Works, Hammersmith, W.6. 140

JUNIOR Detail Draughtsman required for interesting work in industrial design section of well-known electrical manufacturing company in London. Fullest particulars to—Box 2305, c/o The Electrical Review.

MAN required for Inspection Department with good mechanical and electrical knowledge of inter-communication telephone equipment. Write, stating full details of past experience and salary required.—Box 2290, c/o The Electrical Review.

POWER Station Superintendent for large modern central power station for iron and steel works. The plant consists of 100,000 lb. per hour coal and gas-fired boilers, 400 lb. per square inch pressure, turbo-blowers and turbo-alternators, and is in process of erection and the first stage will shortly go into operation. The successful applicant will be required to start up the station and superintend the completion of remaining units. The post is progressive and well paid. Applicants should send full particulars of experience and salary required to—Box 2181, c/o The Electrical Review.

PROGRESSIVE North London company requires a Departmental Manager to control the manufacture of small universal electric motors and associate sub-assemblies. Liberal salary to suitable applicant with energy and determination.—Box 2091, c/o The Electrical Review.

REFRIGERATOR Engineers and Mechanics urgently required by S.W. London refrigerating engineers. Good prospects of advancement. Full details to—Box 6020, c/o The Electrical Review.

REPRESENTATIVE required for Scotland for well-known manufacturer. State previous experience with wholesale trade and supply companies, and remuneration required.—Box 138, c/o The Electrical Review

REPRESENTATIVE required for South-West Coast. West Coast and South-West Wales area for well-known manufacturer. State experience with wholesale trade and supply companies, and remuneration required.—Box 139, c/o The Electrical Review.

REPRESENTATIVE to call on garages, elec. and radio stores, London area; must be live man with experience to take over existing connections. Only applicants stating full details of experience, etc., considered. Car owner an advantage.—Box 2119, c/o The Electrical Review.

SENIOR Jig and Tool Draughtsmen, by progressive concern engaged in telecommunications industry, situated in South-East London area. Preference will be given to applicants who have served an apprenticeship and received a thorough practical training. Applications in writing, stating age, qualifications, experience and salary required, to—Box 150, c/o The Electrical Review.

SHOP Foreman for factory in Macclesfield manufacturing small electrical devices by modern methods. Opportunity for first-grade man.—Box 2152, c/o The Electrical Review.

SALES Engineer for automatic generating equipment. Entry to manufacturers of telephones and radio an advantage. Write, giving details of experience and salary required.—Box 2276, c/o The Electrical Review.

SKILLED Test Room Man to organise production in test room engaged in the manufacture of accurate electrical instruments. Applicants must have had previous experience in supervising the manufacture and testing of all types of accurate moving coil instruments. Progressive post for the man who can attain improved production. Factory situated in Home Counties. State age, experience, qualifications and salary required to—Box 2092, c/o The Electrical Review.

TELECOMMUNICATION Engineers required with some technical training, good knowledge of auto. telephone exchange practice, and experience with circuits or apparatus or equipment. Also men with some technical training and practical knowledge of exchange wiring for preparing wiring drawings. Applicants should give full details of age, training, experience, and state salary required.—Ref. 424, Siemens Brothers & Co. Ltd., Woolwich, S.E.18. 2308

TELECOMMUNICATIONS. Chief Inspector required to take charge of inspection and test department. Must be thoroughly experienced in inter-communication telephone equipment. Good prospects for right man. Write, stating full details of past experience and salary required. —Box 2289, c/o The Electrical Review.

TEST Bed Assistant, with experience in testing all types A.C. and D.C. motors.—British Electric Co. (Beco Ltd.), 25/29, Lower Road, Rotherhithe, S.E.16. 147

WANTED for new cable factory in best part of sunny South Africa: (1) Works Manager; (2) Paper Shop Foreman; (3) Wire Drawer; (4) Foreman for Stranding, Paper Lapping and Laying-up; (5) Chief Test Engineer; (6) Chief Chemist; (7) Engineer; (8) Foreman Carpenter for Drum-making, etc. Applicants, not over 45 years of age, must be fully qualified to take complete charge of their respective departments. All appointments for three years, free passage, and accommodation will be found in S.A. Good salaries. All replies, giving details of experience, treated with strict confidence.—Box 6073, c/o The Electrical Review.

WINDER for A.C. and D.C. rewinds, general repairs, etc., for Yorkshire repair works.—Box 2300, c/o The Electrical Review.

WORKS Engineer for steel foundry and engineering works situated on the East Coast of Scotland. Applicants must have electrical experience in A.C. and D.C. plant, also mechanical experience. Give full details of past positions, salary expected, age, and when free to commence duties, to—Box 2293, c/o The Electrical Review.

WORKS Manager for London factory of old-established manufacturers of electrical and radio components. Position calls for energy, initiative and drive. Give full details of qualifications, past and present employment, age and salary required.—Box 6091, c/o The Electrical Review.

WORKS Manager required for light engineering factory in South London. Candidates should be good engineers, capable organisers and strong disciplinarians. The position is permanent and progressive. Reply giving full details of education and experience, age and salary required.—Box 2262, c/o The Electrical Review.

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

BOROUGH of Nuneaton—Assistant Mains Engineer; Box 787—Chief Engineer. All applicants are thanked.

SITUATIONS WANTED

A Chartered Elec. Eng., B.Sc.(Hons.), A.M.I.E.E. (28), six years industrial research and dev. of h.f. heating equipment and applications, seeks executive position in research and dev. in same or similar field.—Box 6110, c/o The Electrical Review.

ACCOUNTANT and Office Manager, wide experience in commercial and industrial firms, seeks responsible post.—Box 6075, c/o The Electrical Review.

A.M.I.E.E. (33), resident Midlands, 5 yrs. manufacturers' test depts., rotating equipment up to 4,000 h.p., transformers, rectifiers, etc.; 4 yrs. industrial admin. involving personal negotiations at director level; position giving similar freedom of movement preferred, consultants, etc., salary envisaged £800, or occasional representation; would emigrate to Australia.—Box 6064, c/o The Electrical Review.

ARMATURE Winding Shop Foreman desires change, experience in production and repairs, assembly, testing and redesigning A.C. and D.C. fractional to 500 h.p. —Box 6102, c/o The Electrical Review.

AUSTRALIA. Chartered Elecl. Engineer joining people in Australia. Experienced selling, commercial, etc. —Box 6101, c/o The Electrical Review.

BRANCH Manager desires change to South Midlands. Wholesale, retail and direct sales, office and personnel administration experience. Free by arrangement. Would consider representative for reputable firm.—Box 6090, c/o The Electrical Review.

BUYER, aged 30, requires progressive and permanent position. Long experience in buying engineering equipment of all types. Knowledge Far Eastern markets. —Box 6072, c/o The Electrical Review.

CHARTERED Electrical Engineer, sick of restrictions as reward for enterprise, seeks scope for energies abroad. Previous tropical experience. Speciality, power schemes (preliminary investigations and reports, planning, development, construction).—Box 6051, c/o The Electrical Review.

CHARTERED Electrical Engineer (30), returned from temporary appointment in New Zealand, now desires position, preferably in S.W., Southern England or London area. Public school education, 6½ yrs. naval elec. lieut. Highest references.—Box 2056, c/o The Electrical Review.

CLERK (48) seeks return to London or Southern Counties after 7 years with Midlands contractors: accounts, correspondence, typing, wages, P.A.Y.E., costing, etc., fully conversant all electrical material, keen, adaptable, conscientious.—Box 5997, c/o The Electrical Review.

ELECTRIC Lamp making. Production executive, A.I.I.A., 12 years' experience, all types, including fluorescent discharge, desires change.—Box 6097, c/o The Electrical Review.

ELECTRICAL Engineer (25), H.N.C., 5 years' thorough practical training in armature winding, installation and maintenance, 4 years' service in R.E.M.E. as Arm. Art. Elect. (S.-Sgt. and W.O.2), seeks progressive position in light or medium electr. industry on testing, research, development, administrative or supervisory work.—Box 6055, c/o The Electrical Review.

ELECTRICAL Engineer (30), specialist in design and production of telecom. equipment, seeks post as Assistant to Works Manager or Managing Director.—Box 6022, c/o The Electrical Review.

ELECTRICAL and Mechanical Engineer, overseas (38), married, present position Chief Electrical Engineer of a power supply company, being responsible for all generation, distribution, maintenance (electrical and mechanical), and general administration, requires position as Chief Engineer or Chief Electrical Engineer of works, institution or similar undertaking in England. With present employers ten years. Will be at liberty to accept new post in three-four months.—Box 6003, c/o The Electrical Review.

ENGINEER, A.M.I.E.E., A.I.Mech.E., 16 years' superintendence experience in production and distribution of electricity and gas in supply companies abroad, seeks responsible position in U.K. or abroad, preferably Dominions.—Box 6065, c/o The Electrical Review.

ENGINEER, electr. dipl., sound knowledge of mech., fl. German expert, short haulage battery traction, des. pos. techni. adv.-assist. to man. dir. or sales, London area.—Box 6105, c/o The Electrical Review.

EXECUTIVE Engineer, A.M.I.E.E., M.I.Mech.E., A.I.I.A. (33), wide interests and experience, seeks progressive appointment, London-Guildford-Portsmouth area.—Box 6086, c/o The Electrical Review.

FORMER Chartered Patent Agent (B.Sc.Eng., M.I.E.E., A.M.I.Mech.E.), who for some years ran the patent dept. of an electrical and mechanical enginering company, after previous design experience, seeks to return to practice in the patent dept. of a manufacturer or research organization in post affording scope for hard worker with initiative and considerable engineering and legal knowledge.—Box 6098, c/o The Electrical Review.

JUNIOR Production Engineer (28) seeks progressive position in London area; 12 years light engineering; served five years' mech'l engineering apprenticeship (tool room and drawing office). Good experience of planning, jig and tool design and assembly lines. H.N.C. in mech'l eng., ex-R.E.M.E.—Box 6087, c/o The Electrical Review.

MACHINE Shop Supt. (46), 8 yrs. executive light eng., seeks re-engagement. Capable of complete control (300 employees), rate fixing, planning (methods), some jig and tool design.—Box 5998, c/o The Electrical Review.

PLUMBER-Jointer experienced all classes E.H.T. and L.T. distribution work.—Box 6100, c/o The Electrical Review.

SUCCESSFUL General Works Manager, A.M.I.E.E., A.M.I.Mech.E., fully trained in modern scientific control of production and personnel, with accountancy qualification and experience as general manager, desires appointment with increasing scope in essential industry. Present managerial responsibilities, approx. 1,500 employees. Enquiries in confidence to—Box 6036, c/o The Electrical Review.

AUCTION NOTICES

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

DEPOT No. 93, P.O.L. SITE, EARDISLEY
(14½ miles west-north-west from Hereford.)

JACKSON & McCARTNEY are instructed to Sell by Auction, without reserve, at the above Depot, on Tuesday and Wednesday, 8th and 9th July, 1947, at 11 o'clock each day:

INDUSTRIAL ELECTRIC EQUIPMENT AND OTHER MACHINERY, APPLIANCES AND MATERIALS

principally comprising: Electric, Incandescent, Stabilising, Gas-fired, Nitriding, Muffle, Shot, Blast, Tool-making, Tilting, Oil Bath, Coke-fired and Melting Furnaces; Melt Winches; Electric (12-volt) Water Pumps; Electric Motors and Fans; Shrink Ovens; Swarf and Dust Extractors; Crack Detectors; Water Coolers; Furnace Chargers; Sturtevante Extraction Equipment and Motors, complete; Quench Tanks; Swarf Crushers; Salt and Oil Baths; Shot-Blast and Oil Extracting Cabinets; Reavel Rolling Drum Rotary Exhausters; Shop Floor Turntables; Petrol Motor Engines; Centrifugal Pumps; Avery 30-ton Testing Machine; Avery 4-ton Weighing Machine; 9,000 Empty Metal Cases; 9,000 Steel Helmets; Emergency Field Kitchens; Gas Vegetable Boilers; Gauge Carriers and Surface Tables; Rockwell Hardness Testers, and other Miscellaneous Surplus Stores and Accessories.

On view Thursday, Friday and Monday, 3rd, 4th and 7th July, between the hours of 10 a.m. and 4 p.m., upon production of Catalogue. Each Catalogue will admit two persons on View and Sale Days. Refreshment Bar on Sale Days only.

Catalogues (1s. each) from the Auctioneers at their Head Office, Craven Arms, Shropshire (Tel. No. 2185). 2296

G. R.

BY DIRECTION OF THE MINISTER OF WORKS

MINISTRY OF WORKS DEPOT, HONEY LANE, WALTHAM ABBEY, ESSEX

VALUABLE GOVERNMENT SURPLUS ELECTRICAL & BUILDING MATERIALS & CANTEEN EQUIPMENT

etc., including Electric Ventilating Units, Bell Indicators, Bell Pushes and Rosettes, Industrial Refrigerators, Junction Boxes, etc., Metal Window Frames, Galvanized Tanks, Buckets, Ventilators, Radiators, Steel Roofing Parts, Hook Bolts and Nuts, Drlving Screws, Wood Floor Sections and Sash Frames, Damp Course Felt, Sinks, Wash Basins, W.C. Pans and Miscellaneous Plumbing Material, Fire Pumps, Chemical Closets; Steam, Gas, Electric and Solid Fuel Ranges and Hot Plates, Boilers, Tea Urns, Stoves, etc., to be sold by auction (without reserve) by S. CHETWOOD & SONS at the above Depot, on Wednesday, Thursday and Friday, 2nd, 3rd and 4th July, 1947, at 10 a.m. daily. View days, Monday and Tuesday, 30th June and 1st July, from 10 a.m. to 4 p.m. Catalogues (price 6d.), admitting one person to the sale and two on view days, obtainable from S. Chetwood & Sons, 33, Sun St., Waltham Abbey. Phone, Waltham Cross 2097. 2264

FOR SALE

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

CITY OF SALFORD ELECTRICITY DEPARTMENT

FOR Sale:—
1 750-kW Rotary Converter.
1 1,500-kW Rotary Converter.
1 400-kVA Scott Transformer Bank, 6,500/460 volts.
1 800-kVA Scott Transformer Bank, 6,500/460 volts.
1 Transformer Core, 324 kVA, 6,600/3,000 volts.

Full details and tender form may be obtained from the Acting City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6, Lancs, to whom they should be returned by noon on Wednesday, 16th July, 1947.

H. H. TOMSON, Town Clerk.
2333

STOCKTON RURAL DISTRICT COUNCIL

FOR Sale: One G.E.C. 400/230-volt, 3-phase, 45-kW, 50-cycle Diesel-driven Alternator, complete with exciter, control panel, oil storage tank, electrically driven oil pump and head tank, starting battery, battery charger, cooling water tanks and exhaust. Offers to be submitted to C. France, Clerk to the Council, Cromer Lodge, Yarm Lane, Stockton-on-Tees. 2330

BOROUGH OF ACCRINGTON

Sale of Electrical Equipment

THE Corporation invite tenders for the purchase of the following electrical plant, viz.: One 2,000-kW British Thomson-Houston Curtis Turbo-Alternator, 3-ph., 50 cycles, 6,600 volts, 3,000 r.p.m., with Cole Marchant Condensing Plant.

Further particulars and permission to view may be obtained from the Borough Electrical Engineer, Corporation Electricity Works, Hyndburn Road, Accrington. Tel. Nos. 2002 and 3374.

Tenders, enclosed in plain sealed envelope and endorsed "Tender for Electrical Equipment," should be forwarded so as to be received by the under-named not later than Thursday, 31st July, 1947.

P. D. WADSWORTH,
Town Clerk.

Town Hall, Accrington.
18th June, 1947. 2301

BOROUGH OF REIGATE ELECTRICITY DEPT.

THE undermentioned transformers are for sale:

4 100-kVA Three-Phase Transformers, Hackbridge make, 11,000 to 420 volts.

These transformers were supplied in 1935 and have had little use. They are oil cooled and in first-class condition.

Offers, in writing, should be submitted to the undersigned as early as possible.

C. ROWBOTHAM, M.I.E.E.,
Electrical Engineer and Manager.

Electric House,
Linkfield Corner,
Redhill, Surrey.
14th June, 1947. 2239

2 ONLY, GENERATOR SETS

ENGINES, 80 h.p., 6-cylinder, Cummins Diesel compression ignition, fitted with electric self-starters, auxiliary dynamos and starter batteries, complete with pump-driven water cooling system through heat exchangers, direct coupled to 54-kW General Electric Co. Generators, D.C., compound wound, 216 amps., 250-325 volts, with shunt regulators. Each set mounted complete on girder frame bed as unit, r.p.m. 1,800 (governed).

The above are offered for sale at the sum of £800 for each set, and orders to view should be addressed to: R. Taylor, Clerk to the Eastern Sea Fisheries Joint Committee, 48, King Street, King's Lynn. 2232

COUNTY BOROUGH OF GREAT YARMOUTH ELECTRICITY DEPARTMENT

FOR sale: 400 5-amp., 250-volt, 50-cycle, Siemens-Schuckert Prepayment Meters, type VW5, 1s. slot. Offers invited.

For sale: 300 Ferranti Quarterly Meters, type C, comprising 2½, 5, 10, 20 amps. Offers invited.

GERARD T. ALLCOCK,
Engineer and General Manager.

Electric House,
Regent Road, Great Yarmouth. 2321

A. Cooksley & Co. Ltd. offer large selection of used Electric Motors, D.C. Write—21/25, Tabernacle Street, London, E.C.2 (Monarch 3357/58). 46

ABOUT 1,000 gr. pairs Electricians' White Porcelain Cleats, 2½" × 1" × 7/16" deep, with two ¼" holes. Absolutely new. Price 24s. per gr. pairs, min. 10 gross, F.O.R. Apply—Box 2153, G.T.C. Ltd., 82-94, Seymour Place, London, W.1. 2318

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. Motors can be supplied from stock or at short notice.—John Phillips & Co. Electrics, 31, Fortune Green Road, N.W.6. Hampstead 8132. 126

ALTERNATOR Petrol Set, all new and complete, 28 kVA, 400/3/50, 4-wire. Delivery from stock for users only.—Box 6070, c/o The Electrical Review.

ALTERNATOR Sets, Diesel or Petrol, up to 300 kVA, 3 or 2-phase, any voltage. Also D.C. Sets up to 50 kW.—Box 6067, c/o The Electrical Review.

B. & W. Water Tube Boilers for disposal: Two 50,000 lb. evap., 310 lb. w.p.; one 30,000 lb. evap., 260 lb. w.p.; one 20,000 lb. evap., 175 lb. w.p.; two 16,000 lb. evap., 190 lb. w.p.; one 12,000 lb. evap., 200 lb. w.p.; one 9/10,000 lb. evap., 200 lb. w.p.; also one 5,000-kW Turbo-Alternator. We install complete, including brickwork. Economisers, Pumps, Piping, Valves, Motors in stock. Please send us your enquiries. We can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists), Middlesbrough (Tel. Middlesbrough 2622). 32

ALTERNATORS. Build your own sets. We have several brand new 10-kVA, 3-ph., 1,500-r.p.m., 400 or 230-v. Alternators in stock, complete with exciters and voltage regulators.—Box 6068, c/o The Electrical Review.

BAKELITE Accessories, 5-amp. Surface Tumbler Switches, etc., available for export only. For details apply to—Box 2269, c/o The Electrical Review.

BALL Bearings, Skefko S.3, with cage, ⅜" bore, ⅞" outside diam., 7/32" wide, first grade, unwrapped. Some hundreds for immediate delivery.—Box 2314, c/o The Electrical Review.

BATTERY Boosters, Ex-C.D., 6/12 v., 5 amps., for overnight charging, £5 5s. each nett.—B.T.A., Cavendish Road, London, S.W.12. Balham 0691/2. 58

BATTERY Chargers, input 230/1/50 or 400/3/50, 36 volts at 50 amps., 1.8 kW.—Box 6093, c/o The Electrical Review.

BATTERY 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

BI-Uni. The New Push-Button Flush-Fitting Domestic Switch. Wholesale enquiries only. Send for details.—Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel. Ger. 1461/2/3. 122

BLISTER Hangars, 91' span × 45' long, and other sizes. Steel or asbestos roofing. Suitable for repair shops, factories, storage, etc. Details from—J. Thorn & Sons Ltd., Box 16B, Brampton Road, Bexleyheath, Kent. Phone, Bexleyheath 305. 43

BLOCKS, best quality, polished wood, imitation walnut. All standard sizes in stock at current prices.—British Elec. & Mfg. Co., 25-27, Berners Street, London, W.1. 65

BRITISH Electric Co. (Beco Ltd.) offer 15-kVA, 400/230, 3-phase, 50-cycles, Petrol-driven Alternator Set complete with control panel, etc.—British Electric Co. (Beco Ltd.), 25/29, Lower Rd., Rotherhithe, S.E.16. 148

BRITISH Electric Co. (Beco) Ltd., 25/29, Lower Road, Rotherhithe, S.E.16, offer from stock 65-h.p., 570-r.p.m., 415-volt, 3-phase, 50-cycle Motors by G.E.C., complete with floor-mounted rotor stator starters. Up-to-date equipment and practically unused. 2033

BRITISH Electric Co. (Beco Ltd.), Electra House, 25/29, Lower Road, Rotherhithe, S.E.16, will be able in 3/4 weeks' time to quote for early delivery of Alternators up to 100 kVA. 114

B.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 0691/2. 10

BURDETTE & Co. Ltd. stock Reconditioned A.C. and D.C. Motors and Starters equal to new. Day and night service.—Stonhouse St., Clapham, S.W.4. Mnc. 4555. 17

CABLE, .1 sq. in. (19/.083), P.B.J., lengths on drums 930, 450, 150 yds.; also .06 sq. in. (19/.064), lengths on drums 720, 350 yds. New, recent manufacture.—Belco, 65, Buckingham Gate, S.W.1. Abbey 7644. 2175

CELLULOSE for industrial purposes (Nobel's), various colours, 800 gallons available.—E. Bennett, 22, Upper Duke Street, Liverpool. Phone, Roy. 6284. 1936

CERAMIC Rods suitable for 200-250 v., 750-1,000 w., 9" × 10½" long, ⅜" dia. 1s. each, lots of 5,000. Sample by request. Sole distributor—Richard Voss, 6, Merton Way, Hillingdon, Middx. 6081

CIRCUIT Breakers, 15 amp., 250 v., single-pole, complete with automatic overload cut-out, robust moulded construction, accepted by most supply undertakings as efficient switch fuses if used in conjunction with our distribution boards; Distribution Boards, 5 and 15 amp., 2, 3, 4 or 6-way, D.P. or S.P. and N.P., wood cases, improved design and finish, no permit required; Ekco and Smithlite Fluorescent Fittings, complete, ex stock, large quantities available, carriage paid; Electric Motors, 1-h.p. squirrel cage induction motors (Tilling-Stevens), 400/440/3/50, 1,430 r.p.m., new; Insulators, suitable for overhead service cables, bakelite, brass inserts, screwed P.O. thread for pin mounting, vertical type with drip groove, 5⅜" high, 3½" dia., large quantities available, sample 2s. per return, discount on quantities; Wood Switch Blocks, 3½" round and square, 6" × 3" × ½", 9" × 3" × ½" and 6" × 6" × 1", white enamelled and walnut finish from 6s. 6d. and 6s. 3d. per doz. respectively. Discount on quantities and for natural finish.—Metropolitan Distribution Ltd., Truro. 2193

"CLEFA" Small Accessories. Copper Earth Clips, Upright Gimbals and other metal parts made to order. Good deliveries.—Central London Engineering (Fabrications) Ltd., 120, Old Street, E.C.1. 108

COIL Winding Machine by Nevilles: 1 Quickway Armature and Stator Winding Machine: 1 Direct Armature Winding Machine; all completely motorised and in good condition. Several Lathes. Replies to—F. W. Mason (L'pool) Ltd., 109 Derby Rd., Bootle 20, Liverpool. 2287

COMPLETE with tubes, Fluorescent Fittings with all gear for immediate delivery. Enquiries—John Phillips & Co. (Electrics), 31, Fortune Green Road, W. Hampstead. Phone, Hampstead 8132. 87

CONDUIT. Immediate deliveries in Duraluminium, new, ex-M.A.P., all sizes ⅜" to 2" diameter available. Special offer of 30,000 feet in ⅜" and ½", 20-gauge, at £22 10s. for 1,000 feet, carriage paid. Reduction quantities.—Electrical Agencies Ltd., College Street, Belfast. Phone 24813. 2135

CONDUIT Through Boxes for 1" and 1¼" conduit.—Box 6096, c/o The Electrical Review.

CRANE: Overhead Electric Travelling Crane, built by Sir Wm. Arrol Ltd. (Glasgow), 20 tons load, span 47 ft., height floor to rails 28 ft., hoisting motor 20 h.p., travelling motor 15 h.p., traversing motor 4 h.p., 460 v. D.C.; all motors by British Westinghouse Elec. Co. Generally in excellent condition and very little used. If D.C. 460 v. unsuitable, can supply Rectifier Set from 3-phase, 400 v., 50 cycles to 460 v. D.C. Can be seen working London. Immediate disposal required.—Evans, Turner & Co. Ltd., Melbourne House, Aldwych, W.C.2. Phone, TEM. 6323. 2283

CROMPTON-Parkinson 5-kW, 200/230-v. D.C. Generators, b/b, 1,500 r.p.m., with coupling, £49 10s. each; Control Panel with ammeter, voltmeter and regulator, £12 10s.—Universal Electrical Co., 221, City Rd., London, E.C.1. 1892

D.C. Switchboard Control Cabinet, 220 v., 120 kW. Marvellous instrument. Bargain £150.—Burton's Works, Astley, Shrewsbury. 6079

D.C. 440-v. totally enclosed Motor, new and unused, variable speed 1,600/1,200 r.p.m., complete with pulley, starter and shunt regulator. Price £65.—Box 6074, c/o The Electrical Review.

DIESEL-driven Alternator Sets of 200 kVA, 91 kVA, 75 kVA, 65 kVA, 60 kVA and 40 kVA, each with electrical equipment, 3-phase, 50 cycles, 400/230 volts.—Newman Industries Limited, Yate, Bristol. 2273

DYNAMOS: 24 kW, 110 v., 650 revs., Westinghouse; 24 kW, 110 v., 1,600 revs., E.C.C.; 9 kW, 60 v., 600 revs., L.D.C.; 12 kW, 60 v., 1,050 revs., Cutting; 8 kW, 80 v., 1,400 revs., Vickers. Plating Dynamos, 9 v., 900 a., new, Crompton Parkinson (Two). Immediate delivery.—W. H. Sugden & Co. Ltd., Glenny Road, Barking. 2158

EARTH-Continuity Conductor Tape, "Portaway" (Regd.) and Patented, for the efficient earthing of all heavy duty electrical equipment. Send for details.—Porter Electrical Products Ltd., 8, Portsdown Road, Leicester. Tel. 78181. 88

ELECTRIC Lamps, Flashlights, Flashlight Bulbs, Portable Fires, Accessories. Prompt delivery.—Suplex Lamps Ltd., Suplex House, 239, High Holborn, W.C.1. Holborn 0225. 116

ELECTRIC Motors, A.C. and D.C. We supply all types and sizes of electrical machinery. Slow speed reduction gears can be supplied to customers' requirements with short deliveries. Send your enquiries to—The Electro Power Co. Ltd. (formerly Be-Be Engineering), 3, Retreat Close, Kenton, Middx. (Wordsworth 4928). 42

ELECTRIC Motors, A.C. We have available a large selection, both new and reconditioned. Inspection invited. Repairs and maintenance given immediate attention. Send particulars of your requirements to—Max Electric Co. Ltd., 190, Thornton Road, Croydon. Thornton Heath 4276. 72

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ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Secondhand 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

ELECTRIC Toaster Elements (first-class mica), 600 watt, 230/250 v., available at 1s. 6d. each. Samples on application.—Brooks & Bohm Ltd., 90, Victoria St., S.W.1. 2022

ELECTRICAL Accessories, including Plugs, Sockets, Switches, Adaptors, etc., and "Beeantee" Bakelite Festoon Striplighting Lampholders, which are available for immediate delivery. Catalogue and price lists sent on receipt of your enquiry.—The Beeantee Illuminations (London) Ltd., 69, Upper Street, Islington, London, N.1. Telephone, Canonbury 4555 and 1034. 71

EXHAUST Fans, 200/250 v., 50 cycles, single-ph., 1,200 r.p.m., totally enclosed induction; 8" diameter blades, £3 5s. 6d. each; 10" diameter, £3 15s. 6d.—Johnson Engineering, 319, Kennington Rd., S.E.11. REL. 1412/3. 57

ELECTRIC Motors: 1 Keith Blackman D.C. 460 v., 0.75 amps., 920 r.p.m., winding series, type TE, complete with starters; 1 Stewart Turner 1-h.p. Pump, D.C., 460 v., No. 2238E416, GPH2000/1000, Ft. Head, 5/30, complete with automatic starter, mercury float switch and float; 1 Worthington Simpson Salvo Portable Fire and Salvage Gunmetal Pump, size bore 3/3½", 2,300 r.p.m., No. 5019800, year 1944, with Mawdsley Motor, D.C., compound wound. Machine No. 60R4767, 2,300 r.p.m., 220 v., amps. 30.2, rating-cont., class 1, 7.4 h.p., enclosed drip proof, 1945, complete with Allen West Starter, No. GO.V559A45/85, year 1945, 220 v., 30.3 amps., 7.4 h.p., and spare parts for motor pump and starter. Electric Overhead Travelling Crane: 1 5-ton Electric Overhead Travelling Crane, as new, span 26 ft., hand-operated electric hoist, with hand-operated trevice, with 12½-h.p. Brooks Slipring Motor, 400 v., also controller for 12½-h.p. motor, 400 v., Ref. No. E.4084A-AY284, resistance 12½ h.p., 145 v., 41 amps, Ref. No. 4084A-AY284, Magnet Brake by E. Holme & Co., Moss Lane, Altrincham, size 2, 415 v., 3-phase, 50-cycles, 2-stroke, 33-pull, year of manufacture 1943, 25 ft. lift. Bus Bars: 450 Bus Bars, English Elect. Co., in 12 ft. sections, 3-phase and neutral, with 6 tappings per section, of 9/16" copper rod, completely cased in and complete with end connectors, in excellent condition and guaranteed, as new. Electric Starters: 1 Allen West, type SC2, No. 1.52091, 2PHP, 400-440 v., 3-phase, 50 cycles Star Delta Starter; 2 do. Direct-On Starters, ¼ h.p., 200-220 v., single-phase, 50 cycles, 2.55 amps., type SCF No. V.395A29; 1 Ellison Starter, 20 amps., 400-440 volts, 50 cycles, No. 342855, oil immersed. Switch Gear and Fuse Boards: 1 Automatic Igranic A.C./D.C. Change-Over Controller, complete with Bus Bar Chamber and Switch Fuses as follows: 1 160-amp. D.P. Switch Fuse; 4 60-amp. do., all mounted on 2" angle iron frame. Conduit Fittings: 200 Galvanised and Black 6 × 3 × 2 Inspection Boxes; 10 6 × 6 × 2½ Inspection Boxes; 150 gross 1¼" Female Brass Bushes; 84 Porcelain Bayonet Cap Holders; qty. of rubber and lead covered wire, also bare copper wire. Condensers: 1 12.5 plus 12.5 U.F. Condenser; 4 300-v. 30 U.F. Condensers; 1 300-v., 50 do.; 1 300-v. 60 do. Electric Welder: 1 British Federal Electric Welder, 100 kVA, 50 cycles, 400 v., Machine No. 6079, Transformer No. 4065/6, water cooled. Blowers: 1 Lawrence Scott 2.5-h.p., 400-440-v., 3-phase, 50 cycles, 3.7-amps, 1,425-r.p.m., rating-cont., conned Star-Delta, complete with Starter and Sturtevant Blower; 4 Keith Blackman Blower Exhausters, type 30, No. U.8798, with electric motor, 400 v., 20 amps., 15 h.p., 2,900 r.p.m., 50 cycles, type PT., date 1940; 4 do. Blower Exhausters, type S.4, with electric motor, 400 v., 11 amps., 8 h.p., 2,900 r.p.m., 50 cycles, type SPT, No. 170114, 1940. Heating Units: 1 Mather & Platt Air Flow Heating Unit, with 15" Fans, unit size 174, tested pressure hydraulic 300 lbs., heating medium steam safe working pressure 70 lbs., 0.1 h.p., 400-440 v., 50 cycles, 3-phase; 1 do., unit size 128. Reduction Gears: 2 D. Brown & Co. Radicon Reducers, 3000/1. Coal and Ballast Hoppers: 20, as new, Coal and Ballast Hoppers, with conveyors, complete with 5" buckets, size of hopper across top 10 ft. sq., depth of hopper 10 ft. × 16 ft. Tool Boxes and Racks: 6,000 Steel Tool Boxes, sizes 2' 2" × 9" × 9"; 600 variable size Steel Racks and Benches. Renolds Chain: qty. of new Renolds 1½" Pitch Chain and Sprockets. Acetylene and Oxygen Gauges: 10 Acetylene Gauges; 18 Oxygen Gauges. Additional Motors: 8 Lancashire Dynamo Crypto, .68-h.p., 3-phase, 50-cycles, 400-v., 1.7-amps., 700-r.p.m., size 1G, No. 81A01, totally-enclosed, Fan Motor; 1 Motor Alternator, 2.5 kW, at unity power, 220 v., D.C., 18 amps., 3,000 r.p.m., 230 v., 1-phase, 11 amps., 50 cycles, weight 450 lbs., fitted with ball races; 1 do. 3 kW, at 0.8 power factor, 220 v., D.C., 18 amps., 3,000 r.p.m., 230 v., 3-phase, 7.53 amps., 50-cycles, weight 450 lbs., fitted with ball races. Pumps: 2 2½" Centrifugal Pumps. Pulleys and Plummer Blocks: 4 40", 4-groove, 2½" bore Pulleys; 4 2". G.M. Plummer Blocks; 26 1½" do. Gas Furnaces: 5 Brayshaw Furnaces, year of manufacture 1940, Ref. No. 9.6962; 2 Incandescent Heat Co. Furnaces, square type. Degreasing Plant: 1 Degreasing Plant. Steel Plate: 30 tons 18G. Steel Plate. Gas Producing Plants: 2 5-therm Gas Producing Plants. Transformers: 22 low voltage Transformers, 230 v., single-phase, 50 cycles, input, output 12 v., 100 watt.—C. J. Rice, 137, Mayplace Road West, Bexley Heath. 55

ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 volts. Also 220 volts. Stock delivery, £7 10s. each.—John Steel, Clyde Mills, Bingley, Yorks. 84

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps, output, complete with weather-proof covers.—Box 34, c/o The Electrical Review.

FACTORY Sheds, 100 ft. × 30 ft. × 10 ft. Steel and asbestos construction. Delivered and erected. Full details from—J. Thorn & Sons Ltd., Box 111, Brampton Road, Bexleyheath, Kent. Phone, Bexleyheath 305. 136

FANS, 12 v. D.C., G.E.C.—Box 6095, c/o The Electrical Review.

FLUORESCENT Chokes, 80 watt. Low noise level, for satisfied users; long life, for low replacement costs; characteristics matched with lamp, for rated lamp life and light output. Prompt deliveries.—Micramatic Ltd., Meico Works, Congleton, Cheshire. 73

FLUORESCENT Fittings. Trough or flush type fitted "Constead" or Hi-Craft Ballast control gear, complete with tubes. Delivery from stock. Apply—Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel. GER. 1461/2/3. 100

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200/300-kW Turbo-Generating Sets, 220/380 volts, 3-phase, 50 cycles, with switchboards.—Reed Brothers (Engineering) Ltd., Bevis Marks House, Bevis Marks, E.C.3. 2130

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COIL winding capacity available. Transformers, chokes, coils and small fine wire bobbins. Quantities preferred.—Coil Winders Ltd., Hartington Street, Bedford. 6016

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21/- Armatures, 11/6 Coils. We are the specialists in Vacuum Cleaner Rewinds and Repairs. Prompt delivery and work guaranteed.—County Vacuum Cleaner Service, 215, London Road, Mitcham. 5993

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ADDITIONAL Agencies required for South of England, including London: (a) Cables; (b) Small Switchgear; and any lines suitable for distributing through wholesalers.—Box 40, c/o The Electrical Review.

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COMPANY MEETINGS

BROADCAST RELAY SERVICE

Expansion of Activities

THE 19th Annual General Meeting of Broadcasting Relay Service Limited was held in London on 19th June, 1947.

Mr. J. S. Wills, the Chairman, in the course of his speech, said that since the end of the financial year Mr. Allan Miller had, to the deep regret of the Board, resigned his position as Chairman and Managing Director owing to his decision to relinquish full-time business activity. He (Mr. Wills) said that he had been invited to join the Board, and upon Mr. Miller's resignation was elected Chairman and Managing Director. Stockholders would be aware of his connection with British Electric Traction Co. Ltd., who for some time had held an interest in Broadcast Relay Service Ltd., and had recently increased its holding, but not to such an extent as to secure control.

Broadcast Relay Service Ltd. had not become a subsidiary of any other company or group. It retained its independence and would continue to be developed solely on its own merits and in the interests of its stockholders, employees and subscribers.

Mr. Miller retained a substantial interest in the company, and his advice and accumulated wisdom would still be available.

Group trading profits had risen by £63,000 to £451,000, and, following an interim dividend on the Ordinary stock at the rate of 5%, free of tax, a final dividend at the rate of 8%, free of tax, was proposed. During the year the group had raised £1,000,000 extra capital by the issue of Preference shares and by way of mortgages on freehold and leasehold properties. This was being utilised in expanding the group's activities, in repayment of bank loans, and in augmenting the group's resources for further developments.

He considered the company's overseas activities would be an important factor in the future, and so an overseas holding company—Broadcast Relay Service (Overseas) Ltd.—was recently formed with a nominal capital of £600,000, of which a proportion had been subscribed, and the balance was on call to finance new developments overseas.

The past year had been one of active development and considerable expansion, to which the only limiting factor had been the scarcity of materials. Many thousands of new subscribers had been connected to Rediffusion services and a promising start made with the development of new areas. The company's services had been made available in additional blocks of flats and in hotels, clubs and offices, while "Music While You Work" equipment had been installed in many more factories.

As regards the extension of the company's licences beyond 31st December, 1949, whilst he was confident they would be extended, no decision on this matter had yet been reached.

The factory at Wandsworth was engaged in developing a valuable export market for radio-heating and communication equipment. Overseas, the group was now entering upon a period of rapid expansion—steps had been taken to operate both Rediffusion services and broadcasting stations in many parts of the world. Their first broadcasting station overseas, Radio Trinidad, would be on the air within the next few weeks.

The report was unanimously adopted. 2360

BRITISH ELECTRIC TRACTION

Record Gross Revenue

THE 51st Ordinary General Meeting of the British Electric Traction Co. Ltd. was held in London on 20th June, 1947.

Mr. H. C. Drayton, the Chairman, said that the gross revenue for the year to 31st March, 1947, was £823,000 and constituted a record in the history of the company. The net profit was £366,000, against £337,000, and the directors recommended a dividend on the Deferred Ordinary Stock of 50%. Reserves and undivided profits totalled almost £3,000,000. That was the amount which they had ploughed back into the company; it was the property of the stockholders and the logical way to deal with it would be to distribute it in the form of Ordinary shares to the stockholders. Any procedure of that kind appeared to the Chancellor to be an almost unpardonable crime, but he was prepared to condone it for the price of 10%. Such an impost put any question of capitalising reserves out of court.

Substantial interests of the group were threatened by the Electricity and Transport Bills. As far as he could make out, the Government's policy was to nationalise certain industries when they were "ripe," which seemed to mean when private enterprise, after doing the pioneer work and risking and often losing money, had at last got a business on an economic and profit-earning basis; then the Government stepped in and reaped the benefits of the harvest sown by private enterprise.

Efficient Transport Services

As to their own particular businesses which were in danger of nationalisation, electricity supply and road passenger transport, when they were started it had meant a lot of hard work and much money had been lost. To-day they were in a prosperous condition, brought about by the company's work over a great number of years in building up and giving an efficient service to the public. He did not think anyone, even the Government, could deny that their road passenger transport organisation was among the most efficient and economical in the country. With the exception of two companies, they had not increased their fares since 1934, although they had had a considerable rise in the cost of labour and operation.

It might be argued that as road passenger transport as a whole was profitable, and there was no guarantee that it would remain so indefinitely, now would be a good time in the interests of the stockholders for them to be nationalised, but a business such as that of this company had not been built up on expediency. They were in the business to provide the most efficient service to the public in the interest of the nation as well as of stockholders, and they must take good times with bad times. The capacity for going into a business and working at it because he believed it was in the interest of the country had been one of the great factors in building up the character, integrity and high standard of the British business man, not only in this country but throughout the world, and therefore he could not accept the argument that because they were prosperous now was the time they should cash in.

He thought stockholders would like to know the total wage bill of the companies with which they were associated. Last year they had paid out in wages £12,500,000; the car miles run by the transport companies in 1946 were 321,700,000, and the number of passengers carried was 1,800,000,000. The companies had paid in fuel tax and vehicle duty, in addition to income tax, approximately £1,750,000.

The report was adopted. 2374

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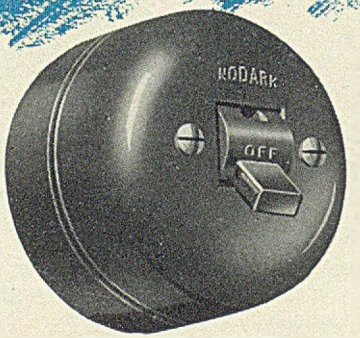

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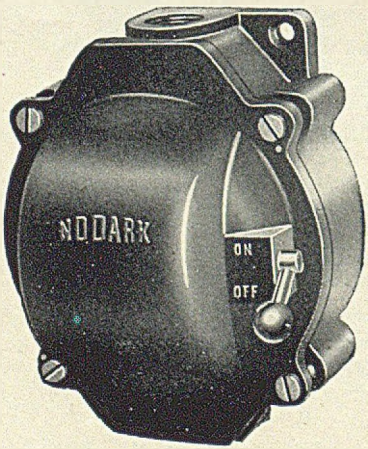

← *STORMPROOF*

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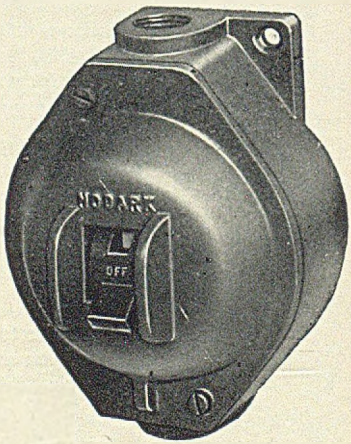

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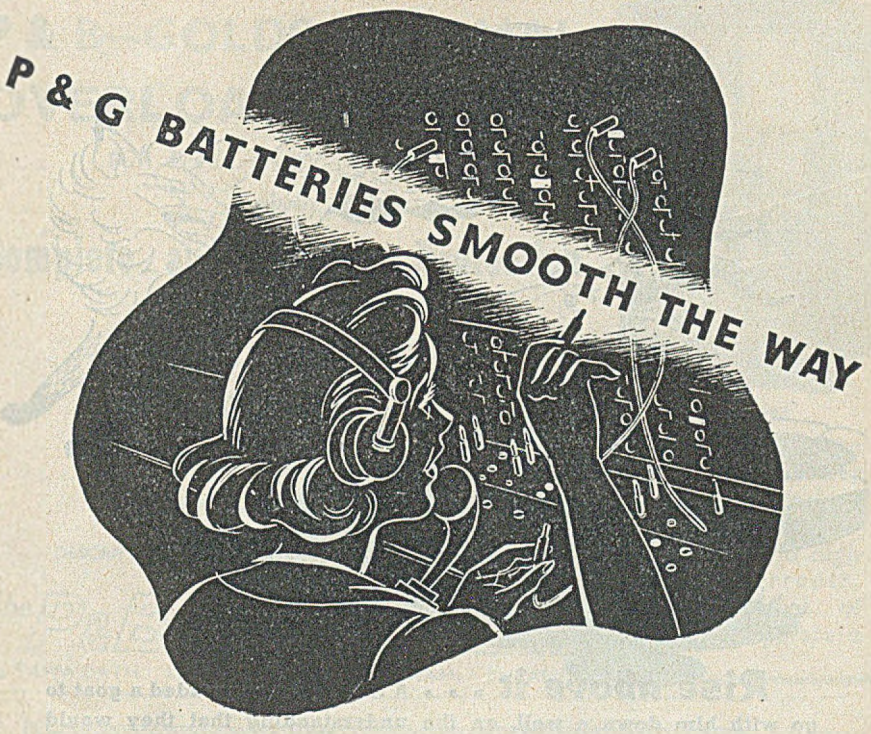

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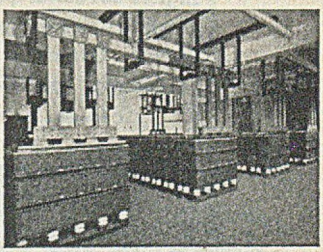

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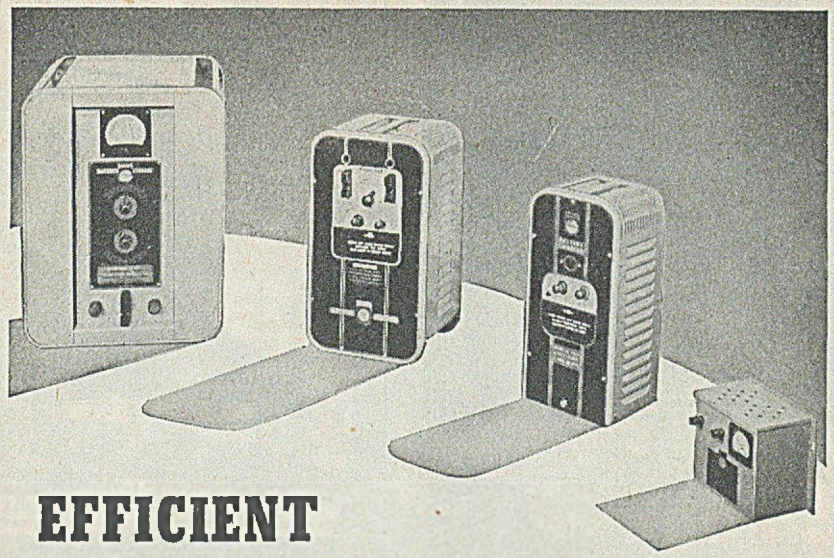

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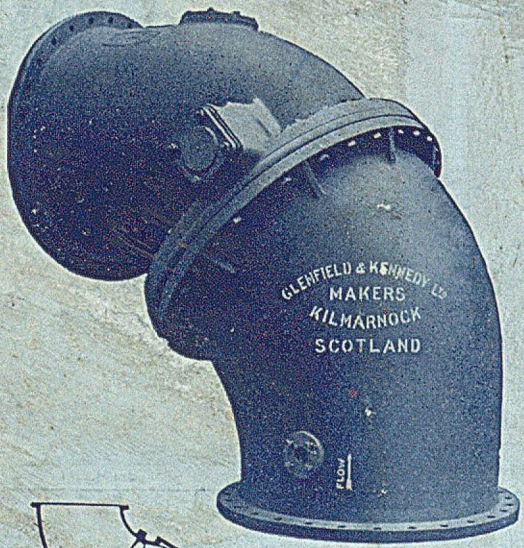

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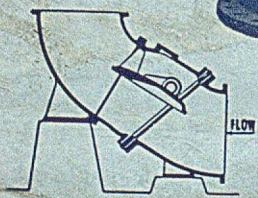

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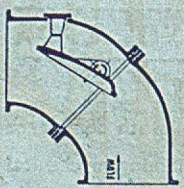

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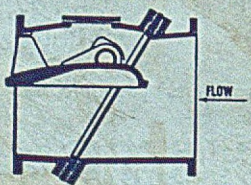

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