ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXV. No. 3500 DECEMBER 22, 1944 9d. WEEKLY

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– to inspect the control gear
– to remove for cleaning or repair

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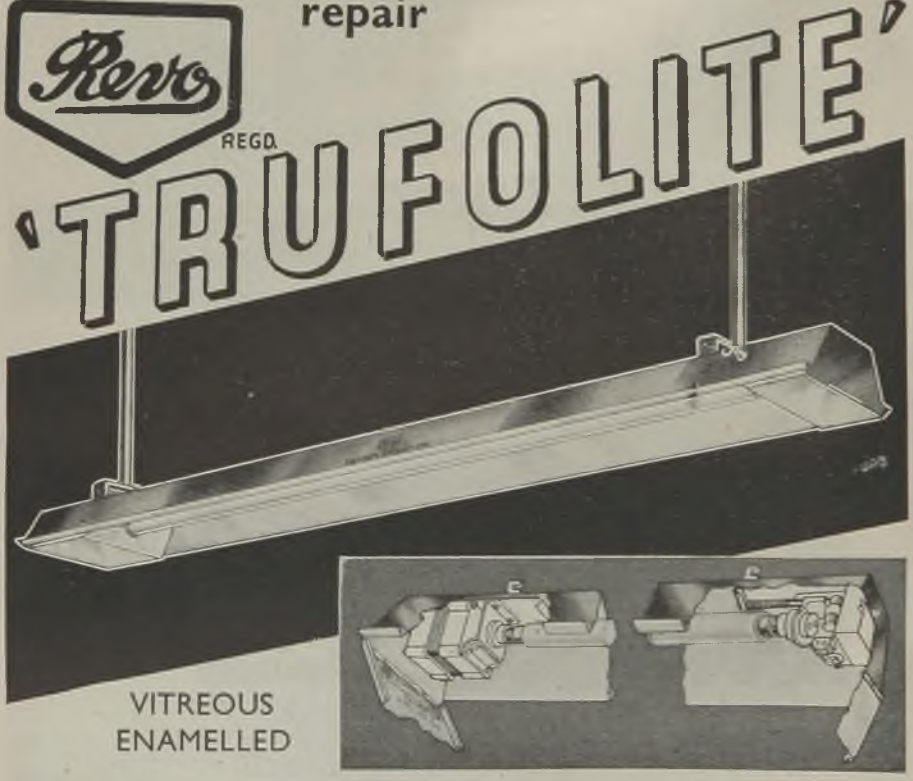

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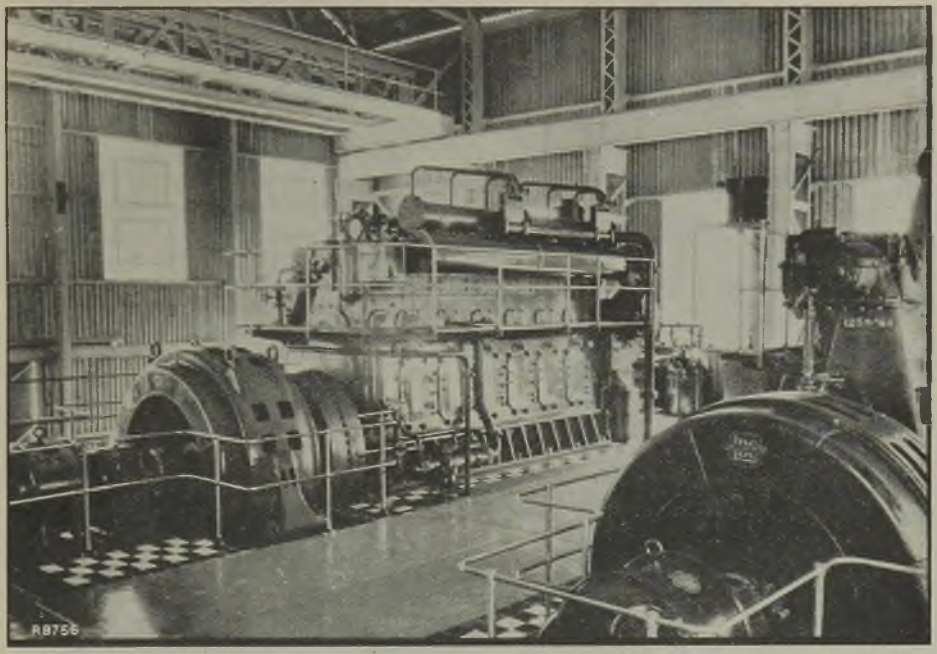

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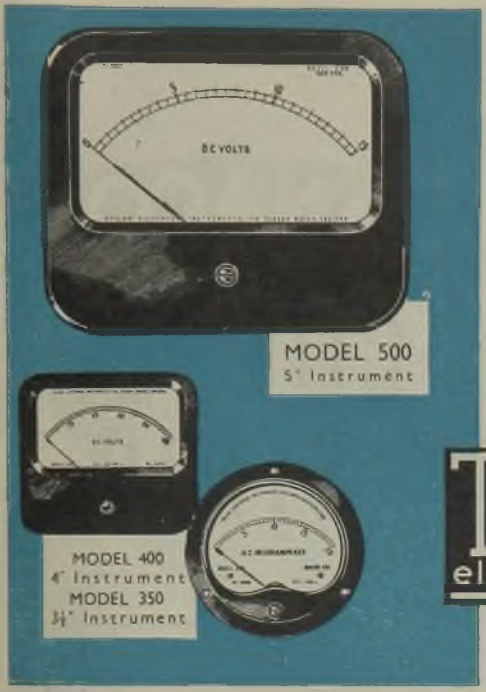

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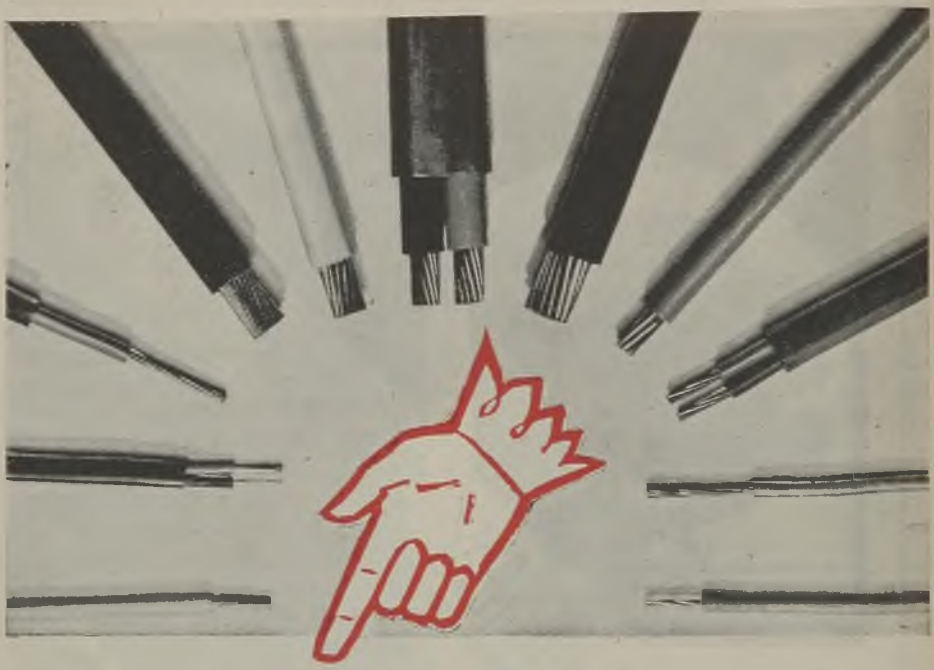

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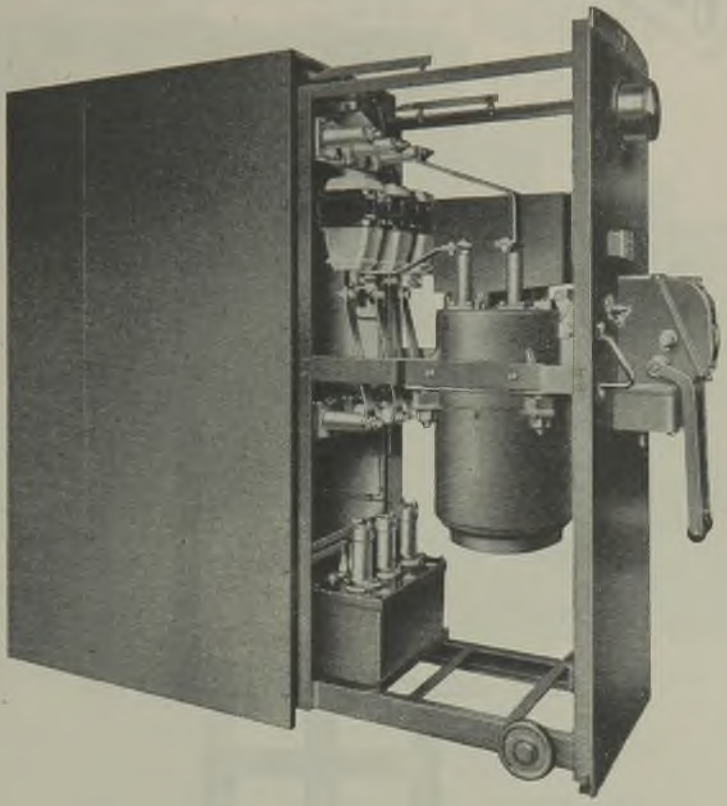

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ELECTRICAL REVIEW

December 22, 1944

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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Electrolytic Hydrogen

Possibilities of Extended Use

IN the success that has attended continuous efforts to secure the full fruits of Faraday's discoveries in electromagnetic science, the importance of his contributions in another sphere, that of electrolysis, has perhaps, tended to be overshadowed. Great as has been the progress in recent years in electro-deposition for decoration, surface hardening, building-up worn machine parts, protection from corrosion, metal refining and reclamation and so on, the full potentialities latent in the ability to cause chemical changes by means of electric currents are still to be exploited.

Not so much has yet been done in this country on the grand scale to resolve water into its constituents as there has in some cases on the Continent, where electrolytic plants of 20,000 kW and upwards are reported to be in operation. Oxygen is obtained more economically in other ways, and in consequence the bulk production of hydrogen becomes the main consideration.

Variety of Applications

Hydrogen already serves a large variety of purposes in industry, of which the preparation of ammonia and the hardening of edible fats are the chief, quantitatively speaking. Increasingly important are its uses in the reduction of metals, welding, annealing and hydrogenation of coal for the derivation of oils. It has been employed directly as an engine fuel, and it has many advantages for the cooling of large alternators. Its use as a substitute fuel is being investigated by Mr. J. S. Just on behalf of the Queensland Government (*I.E.E. Journal*, October, 1944).

Advances in the technique of electrolysis itself by lowering costs of operation may extend the demand for the gas. If high pressure electrolysis is found to be commercially feasible, the smaller "over voltages" at the electrodes should bring about a material reduction in the consumption of energy. This would be of the first importance, since with water as the raw material available for small expenditure, running costs are mainly on account of electricity. The overall advantages of the high-pressure method have yet to be proved, however, and the existing types of cell show performances that justify confidence in their continued use in general.

Power Costs Predominant

The over-riding influence of power costs appears to call for the location of the process in the neighbourhood of hydro-electric stations, *e.g.* in the Highlands of Scotland or at a Severn Barrage. A large load of this kind, which offers the possibility of regulating the current taken to suit system demands, would be exceptional enough to justify a special grid rate to the undertaking affording the supply. Another electrical aspect is the need to convert large amounts of AC to DC; this reacts on the design and lay-out of the electrolytic plant, since arrangements considered suitable by the chemical engineer might militate against the lowest cost of energy at the electrodes. Also, the efficiency of the process is bound up with the avoidance of current leakage

across the electrolyte. From considerations such as these, it has been suggested by Mr. C. E. Bowen (in a paper contributed to the *I.E.E. Journal*, November, 1943) that the province of the chemical engineer is to indicate the quantities or rate of gas production, leaving it to the electrical engineer to decide the choice and installation not only of the electrical equipment but also of the electrolytic plant itself. This view is supported by information presented by him which shows clearly the predominant significance of electricity in either of its two manifestations for the purpose under discussion.

Reorganising Greater London

PROFESSOR Patrick Abercrombie's report on a plan for Greater London is a most remarkable piece of work exhibiting a grasp of the subject which could only have been developed from close and exhaustive study. Decentralisation is the theme of the report and that is a matter in which electricity will play an important part. First the availability of electric power in practically every part of the area facilitates the re-siting of industry and the removal of population; and secondly electric traction is recognised as the best means of clearing up the traffic situation. Although generally railway facilities are adequate in the area there is a need for faster and more frequent services in a number of districts and, as the Southern Railway has demonstrated, only by electrification can these be provided on already congested lines.

Unification of Supply

BETWEEN seventy and eighty separate undertakings are responsible for electricity supply in the area of 2,600 sq. miles which comprises Greater London, and naturally this strikes Professor Abercrombie as an excessive number. He accordingly accepts the proposal of the London and Home Counties J.E.A. that the undertakings in his district should be unified. A regional board is suggested which might deal with electricity alone or with all forms of power, heat and light. Somewhat naïvely, Professor Abercrombie says that " the subject would seem suitable for discussion with the Minister of Fuel and Power "—as though it had not already been discussed *ad nauseam*. We note that the report deprecates the provision of various services to houses where one of them is adequate for the purpose. This should please Mr. F. W. Purse, that ardent advocate of the single service.

Severn Barrage

THE Brains Trust was not in happy vein in answering a question of why tidal power is not used for producing electricity. The Severn Barrage should not have been included in an otherwise probably correct generalisation that electricity could be more cheaply generated by means of steam. In a reference to the Brabazon Report of 1933 no mention was made of its conclusion that appreciable savings could be made by exploiting the tidal bore of the Severn; neither was it made clear that the publication of the findings of a further committee set up by the Government to review the Report in the light of later developments is expected at any time now. Increases in the cost of coal during the past ten years and the possibilities of more rapid construction and lower rates of interest have markedly improved the economic prospects of the scheme.

Transformer Economics

WHATEVER views may be held about the degree of standardisation desirable in the design or dimensions of electrical apparatus, there are unlikely to be divergencies in outlook regarding the need for uniformity in methods of comparing data. A common example (which involves the use of compound-interest tables) is found in the selection of transformers to give the lowest overall costs at various load factors over a number of years, during which the monetary value of the losses may exceed the initial expenditure. The formulæ given by Mr. W. Szwander in his I.E.E. Transmission Section paper (reported by us last week) should enable ready comparisons to be made on an accurate and reasonable basis. His approximations to allow for variations in capital charges, which are less easily forecast than are scientific characteristics, should be especially useful.

Maintenance v. Repairs

THE discussion of Mr. J. C. B. Nicol's I.E.E. paper (a summary of which appeared in our last issue) indicated ready acceptance of the basic principle that the main object of maintenance is the prevention of

breakdowns. This calls for a considerably higher degree of organisation than does the repair of apparatus that has failed through lack of attention to indications that all was not well. It is a truism that the success of any code depends ultimately on able technical supervision and on the conscientious discharge of duties by those engaged, but good work is more likely if carried out within a well-organised framework, such as that described by the author, even if adaptations are necessary to meet individual circumstances.

Security of Supply

AN important task is to convince industrial managements that far more might generally be spent on maintenance organisation without fear of the expense becoming too high an insurance premium, and also that the electrical engineer should have a deciding voice in the choice and installation of the plant for which he is to be responsible. Objections to taking a public supply have been raised on security grounds by managements which look askance at proposals for ensuring much better maintenance for a little more expenditure. Yet, as Mr. Nicol stated, "losses of productive capacity through failure of plant equipment far exceed those attributable to failure of electricity supply.

Voltage Standardisation

As though everything had been arranged, the *Daily Mail* recently published some paragraphs headed "£11,000,000 Standardises Electricity. 230 Volts for All," and stating that "that bugbear of housewives and manufacturers—different electrical voltages—is to be eliminated. A meeting has been called between the Electricity Commissioners and the electricity supply industries to standardise voltages all over the country. . . . It is probable that 230 volts AC will be the standard. Changing all systems over to this voltage is expected to cost £11,630,000, but none of it will be passed on to the consumer." There was some truth in the statement. The Commissioners *are* meeting the electricity supply associations for exploratory discussions and the standard is of course 230 V. The *Daily Mail's* figures are not right, however. The amount to which it refers relates only to the cost of raising the pressure on existing AC systems to 230 V from some lower level. In addition to this the cost of changing over consumers from voltages higher than 230 would be £4,170,000, while the cost of standardising DC voltages would be £1,655,000, giving a total of £17,455,000.

Representation on E.D.A. Council

THE suggestion that a change should be made in the method of election of the Council of the Electrical Development Association has been revived by a number of local authority members in the London area. A brief report of the matter is given in this issue. The aim is to secure a sort of "proportional representation" related to subscriptions. We have no doubt that if there is any general feeling that alterations are necessary they can be amicably arranged without altering the articles of association, as has been suggested. Perhaps one solution would be for more nominations of municipal authority representatives to come from the Incorporated Municipal Electrical Association.

Gas Lighting Perfected

A NEW development in street lighting practice is likely to restore to gas lamps something of their lost prestige. Gas showrooms have sometimes adopted the device in the past, but it has been left to the Stoke Newington Borough Council to extend the innovation to the streets. The secret of the successful operation of the new system is that cables are connected to the standards, so permitting them to be fitted with electric lamps. True, the reason for this arrangement is that it provides the quickest way of securing "moonlighting," but we are told that electricity will in any case be used after the war; new standards of the latest design are to be installed as soon as conditions permit.

Season's Greetings

ALTHOUGH the definite decision on the Western Front which was expected earlier this year has not yet been reached, and in consequence Christmas again finds us at war, 1945 should see the end of the war in Europe. With this thought in mind this Christmas and the coming year may be looked upon as the most hopeful since the beginning of the conflict. We feel more justified than in previous years in wishing our readers at home and overseas a happy Christmas and a brighter New Year.

A Wholly Rural Area—II

Progress Made in Extending Electricity Supplies

WITH the network described in our last issue the West Cambrian Power Co. and its associated companies have satisfactorily covered their area not only on the high-voltage side but also with regard to low-voltage supplies to almost all the principal towns and villages and a considerable number of outlying places as well. The nature of the undertaking, with its sparse, scattered population, has inevitably meant that considerable areas are still without supplies, but even during the war the growing electrical needs of agriculture, etc., have helped to fill in some of the gaps and will substantially simplify post-war developments.

Plans for the period immediately after the war include the completion of the change-over from DC to AC. Besides extending l.v. lines to supply new consumers, much of the old l.v. system will require renovation or reconstruction. Although no big h.v. extensions are contemplated it is hoped to complete a fourth ring-main from Carmarthen through the towns of Llandilo, Llandovery, Lampeter and Carmarthen.

As already indicated, the farming community forms an increasingly large class of consumer. Apart from the mountain region in South-East Cardiganshire and North Carmarthenshire, the farms are fairly evenly spread throughout the area. Few of them are large compared with those in other parts of the country, the majority being under 100 acres in extent, and they concentrate chiefly on milk production. The numbers of applications for new and increased supplies are continuing to grow as the farmers learn of the different ways in which electricity can help them to solve their labour problems and increase production. Especially satisfactory progress has been made recently with farms in the Cardigan area where there are now about 50 connected and at least twenty more are asking for supplies. Throughout the whole supply area the total number of farms served is about 200.

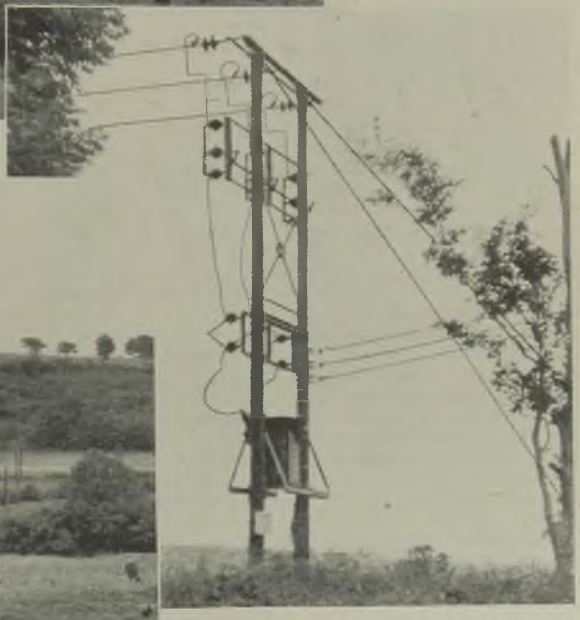
Low-voltage overhead mains at Newport, Pembrokeshire

Electrically driven hand-turning lathes at Davies & Sons' woodworking factory at Abercyth

Special rates are available for farms, including the dwelling houses, and consist of a " unit " charge of a penny plus 12½ per cent. war surcharge, together with a fixed annual charge based on the acreage of the farm as follows:—First 50 acres, 1s. 6d. per acre; next 100 acres, 1s. per acre; next 100 acres, 9d. per acre; next 100 acres 6d. per acre; each additional acre, 3d. A stipulation is made that the minimum fixed

charge should not be less than 25 per cent. of the net rateable value of the farmhouse or £3 whichever is found to be the greater.

Capital contributions are required from farmers on a basic scale up to 500 yards, special rates being charged for larger distances. The capital contribution varies according to whether the supply is three-phase four-wire, single-phase three-wire or single-phase two-wire. In view of the fact that suitable motors for the purpose generally cost rather more than twice as much for single-phase as they do for three-phase, most farmers employing electricity to any extent prefer to take three-phase supplies unless it means a large increase in their service charge. Incidentally the West Cambrian Power Company's own construction department carries out the bulk of the constructional and installation work for the undertaking.



Top: A typical section of single-circuit 22-kV overhead line
Right: 25-kVA, single-phase, pole-mounted transformer supplying Llanfihagel-ar-Arth
Below: 22-kV line to supply Llandyssul (under construction)

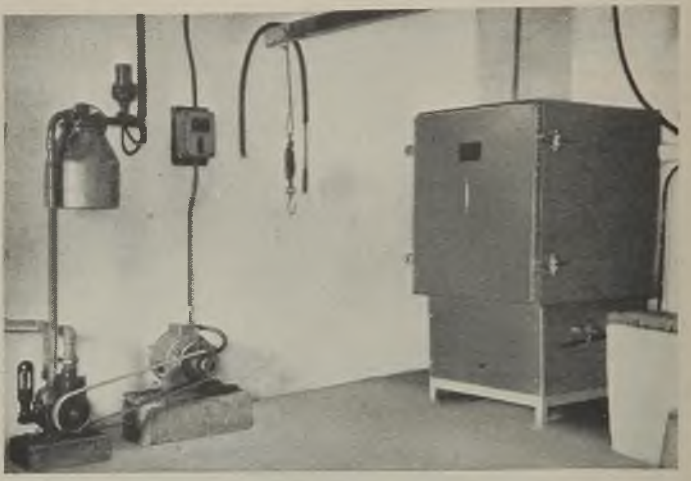
Although we have said that there is practically no industrial load in the area, there are, of course, the usual rural industries to be served, such as granite and limestone quarrying; woodworking; milk production including cheese and the manufacture of dried and condensed milk; seed preparation, etc. There are in addition the shipbuilding yard at Pembroke Dock, Fishguard Harbour and a colliery which take supplies. For all these purposes involving a substantial load special rates are given. Small power users with motors up to 25 HP pay 3d. per kWh for the first 42 kWh per HP installed per quarter, 2½d. for the next 42 kWh per HP installed per quarter, 2d. for the next 42 kWh per HP installed per quarter and 1½d. above, plus 12½ per cent. war surcharge in each case. Under a business and industrial heating

tariff available only for premises lighted solely by electricity there is a flat rate of 1d. per kWh plus 12½ per cent. war surcharge, while other special rates are given for baking, fish frying, large-scale cooking and battery charging.

Although, as might be expected in such an area, the flat-rate lighting tariff has had to be fixed somewhat high (9d. per kWh in most of the area) the "all-in" domestic two-part tariff is, owing to low assessments in the area, comparable with many applying to considerably more populated areas. The fixed charge is 25 per cent. of the net rateable value and the consumer then pays either 1d. per kWh plus 12½ per cent. war surcharge (minimum quarterly charge of £1 8s. 0d.), or only ⅝d. per kWh plus 12½ per cent. war surcharge if a cooker or refrigerator is used (minimum £2 16s. 3d. a quarter or a sum equivalent to 3s. 3d. per £1 of net rateable value, whichever is the greater). An assisted wiring scheme is available in normal times, while domestic appliances are supplied on hire terms at the following quarterly rates:—Cooker, from 2s. 6d.; radiator, from 2s.; refrigerator, from 17s. 6d.; wash boiler, from 2s. and water heater, from 2s. 6d.

Seven consumers' engineers are, in peacetime, available in the various districts specially to advise consumers on their problems. Showrooms have been provided at Carmarthen, Llandilo, Tenby, Haverfordwest, Pembroke, Fishguard, Cardigan, Newcastle Emlyn, Aberayron and Lampeter, in addition to offices at St. Clears, Narberth, Tregaron and Llandyssul. Cooking demonstrations are given regularly at Carmarthen, and in more normal times at Cardigan and Haverfordwest—at each place demonstration rooms have been constructed. Halls are hired elsewhere for special occasions. A portable stand is found very useful for local exhibitions.

As a result of these facilities and the development work so far carried out the three associated companies now serve about 16,500 consumers with a maximum demand of 11,700 kVA and an annual consumption of 30,500,000 kWh, supplied at an average price of 1·717d. Domestic appliances connected include 3,148 cookers, 1,145 water heaters, 307 refrigerators, 1,751 wash boilers and 4,850 fires. Incidentally the company repairs all its own apparatus, including the rewiring of boiling plates, as well as carrying out meter testing. When the war is over the company will be in a good position, not only to extend its scope further afield, but also to improve its services to existing consumers. In any case, for a considerable time there will be plenty of work on hand in just meeting the demands for supplies that have accumulated since the outbreak of war.



Milking plant and steriliser at Partridge's farm, Parce-y-pratt

We should like to thank Mr. H. L. Howard, M.I.E.E., M.I.Mech.E., general manager and engineer of the Electric Development & Securities Trust, Ltd., for facilities to visit the area, and Mr. C. L. Townsend, divisional engineer, for his assistance in the preparation of these articles.

Brazilian Water Power

THE Conselho Nacional de Aguas e Energia Eletrica has recently approved a plan presented to the President by the Ministry of Agriculture for the establishment of a "mixed" (State and privately owned) company which is to promote the electrification of the north-eastern parts of the country by exploiting the Paulo Afonso waterfalls. The initial capital of this company, the Companhia Hidro-Eletrica Nacional do Sao Francisco, has been fixed at crs. 400,000,000, half of which is to be subscribed by the State and the rest by private companies. The first turbines are expected to be in operation five years after the start of construction and a total capacity of 400,000 kW is aimed at. The most important transmission line (220 kV) will go from the waterfalls to Caruaru and smaller lines will distribute the power in bulk. The company will supply power to the states of Bahia, Sergipe, Alagoas, Pernambuco and Paraiba.—*Reuter's Trade Service.*

Small Hydro-Electric Plants

Some Welsh Examples

By J. A. Collier, B.Sc.

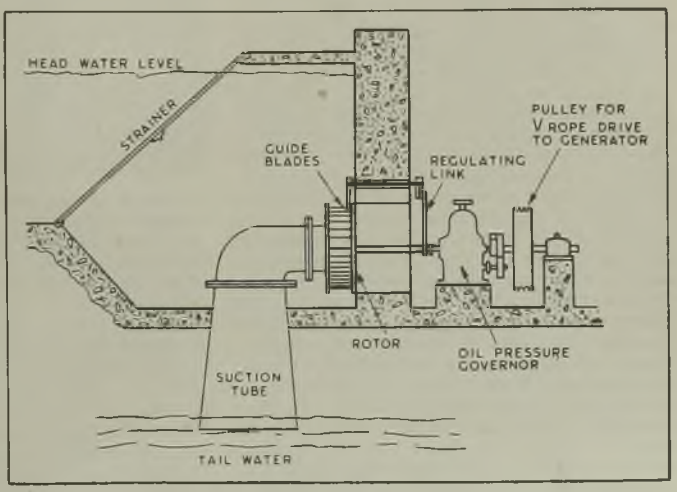
NATURAL waterfalls or existing mill weirs can often be utilised to provide the required head of water for generating electricity without the construction of long aqueducts, thus minimising civil engineering work. Where a number of consumers are supplied, their requirements must be met in lowest water conditions; the extra flow in wetter seasons can sometimes be used for loads which are directly controlled by the undertaking. Where the whole power output is used by a factory or a farm, much greater seasonal utilisation is often possible. The riverside generating house can be inconspicuous and thus escape adverse public criticism. The equipment can often be accommodated in a disused mill-house to be found near most weirs.

The forms of water-wheel are diverse, being in some cases a wooden wheel of the type commonly employed for water-mills, which entails the use of a very slow-speed generator in order to avoid excessive gearing losses. In general, steel turbines are better as they are capable of higher speeds and permit of finer control. Less efficient but more adaptable is the plain Pelton wheel with a single jet. One very compact unit has a vertical shaft with the generator directly driven and mounted at the top.

A good example of water power harnessed for local use is the turbine installed just before the war at the town of Llanidloes in the heart of Wales. Here a 12½-ft. head of water is provided by an old mill weir in the River Clywedog, just above its junction with the Severn. A flow of 2,000 cu. ft. per min. is usually available, though it may drop to 1,000 cu. ft. in dry weather. The turbine installed required 2,300 cu. ft. per min. to give its rated output of 40 HP, but the additional flow of water in winter was enough to justify the installation of a second similar turbo-generator. The simplicity of the equipment accounts for the small initial cost, which was less than £1,000, including all concrete, brick-work and housing, for the two units.

The turbines are of the 24-in. reaction type, as illustrated in section, arranged for radial flow of water inwards from the adjustable Francis-type guide blades. The water is discharged through a 5-ft. tapered suction tube, having its larger end a few inches below the surface of the tail water. The position of the guide blades may be adjusted to control the speed by hand or through an automatic oil-pressure governor, belt-driven from the turbine shaft. The 205-RPM turbine is coupled through a V-rope drive to a 250-V, 25-kW, compound-wound, 850-RPM, DC generator.

The installation is a private undertaking feeding a small group of domestic consumers in addition to a battery-charging station and an arc-welding plant, both of which are controlled by the owner. The battery-charging load approximately follows the seasonal water variations, and the welding plant can be operated at light-load periods of the day. The whole domestic load can be supplied from one turbine, the other being run only when the load on the owner's plant is heavy. Small water-driven turbines will run for long periods without attention, and are often locked away in a small housing in a relatively inaccessible position.



Section through axis of 40-HP reaction turbine

A survey of other water-driven generators

in the vicinity of the above plant yielded some interesting information, since they all differed from each other in some major respect. In the table, figures have been given for available head of water as a basis of comparison. The actual head utilised is much less in some instances, particularly in the case of overshot water-wheels in which the greater part of the wheel diameter does not contribute to the effective head of water.

In general, the overshot water-wheel is not well suited to drive a generator. The speed is slow and very liable to be affected by changes in quantity of water. The main reason for its use is that it can be readily constructed of wood, and experience with mill wheels indicates its form, but this type has been replaced in many places by a Pelton wheel and jet.

Pelton wheels about 4 ft. in diameter are made by bolting a double row of cast-iron cups to the frame of an iron wheel which is often constructed by the local blacksmith; smaller sizes are made by bolting the cups to a simple steel disc. A disused circular saw provides a convenient rotor, and with the addition of cups and a nozzle two Pelton wheels of this form have been working well for years. The jet of water which strikes the cups as they pass under the wheel is projected from a nozzle which may vary in diameter down to ¼ in., according to the pressure and quantity of water. The size of nozzle is usually changed to suit the season.

Speed regulation may be effected by a sluice gate in the head water or a valve in the pipe to the jet; in some cases the jet itself is partly diverted. Much ingenuity has been shown in devising remote control. In one case, the farm using the power is situated about a quarter of a mile away. The poles supporting the conductors also carry a pair of pulleys, over which run two wires which can be pulled at the farm end to control the distant valve. Turbines with automatic speed control were seen in three places, but these were factory-made machines giving high efficiency, but rather beyond the scope of the average small user. Pelton wheels have the advantage that their speed is independent of the tail-water level which so often influences the suction pressure of a turbine or floods the underside of an overshot wheel.

Type	Available head, ft.	Speed RPM		kW	Voltage DC
		Turbine	Generator		
Two reaction turbines (Llanidloes)	12½	205*	850	30	240
Reaction turbine, vertical shaft (Mount Severn)	15½	500*	500	10	230
Overshot water-wheel, also driving mill (Talgarth Mill)	16½	35	1,200	0·5	80
Two Pelton-type turbines (Llandinam)	280 280	840* 1,150*	840 1,150	20 10	220 220
Pelton wheel, 4-ft. dia. (Glanfynnon)	16	80	250	5	110
Pelton wheel, 4-ft. dia. (Llawr-y-glyn)	11½	90	580	5·5	220
Pelton wheel, 28-in. dia. (Cilhaul Farm)	206	90	500	5	230
Pelton wheel, 28-in. dia. (Bronfelen Farm)	150	600	1,500	3·5	110
Pelton wheel, 36-in. dia. (Llwynderw Farm)	90	400	850	6·5	220
Pelton wheel, 28-in. dia. (Vaynor Park)	60	350	1,225	1	50

* Automatic governor fitted.

Various voltages have been adopted. The area considered includes a small town supplied at 230 V and the availability of equipment accounts for the preponderance of approximately the same voltage. In other regions, however, voltages appear to have been settled by the use of a second-hand generator (usually an old motor) run at whatever speed happens to suit the water-wheel and driving pulleys. There is a tendency towards low voltages where batteries are used, some small lighting plants working well at 12 V using standard motor-car equipment.

Most private water-driven schemes are being altered from time to time as owners experiment to find the best working conditions, but, unfortunately, there is no means of correlating the result of such individual research with a view to the design of a few standard equipments which would satisfy most conditions.

Locally constructed plant has been installed at a fraction of the price quoted by large engineering concerns because the latter offer installations that will maintain a supply as steady and reliable as that provided by town mains, whereas the main object of the plant is to replace oil lamps by a better light that is reasonably constant and reliable. Failure of supply during a few dry months in summer can be tolerated if it saves the cost of a large storage pool. Considerable voltage variation is allowable, and manual adjustment of the speed is adequate. Any machinery is usually run when the lights are not in use, so voltage regulation is

unimportant. Farmers usually like to run some of their machinery direct from the turbine, and any machine offered should have a pulley for this purpose. Marshy hillsides provide natural water storage, but recent afforestation schemes have upset the working of some generators due to drainage of bogland. The general impression obtained from this survey is that a big demand exists for inexpensive water-driven generators. The plant at present available from the trade is usually too elaborate and the result, as I have indicated, has been a large amount of amateur construction.

Dewsbury's Fifty Years

Circumstances Which Have Affected Undertaking's Growth

ON December 10th, 1894, the first public supply of electricity was made available at Dewsbury, in the Yorkshire heavy woollen district, and this week the jubilee of the undertaking is being commemorated at a tea at the Town Hall at which the Electricity Committee is entertaining the Council and guests from neighbouring undertakings.

The history of electricity at Dewsbury, from the year 1881 when the late Col. Crompton visited the town to demonstrate the wonders of electric lighting, is told in an interesting manner in a well-produced brochure. The compiler does not attempt to paint a picture of exceptional progress, but sets down what he describes as a "romantic retrospect written to amuse rather than instruct."

Mr. G. H. Sammons, the present engineer

The power station, with two 75-HP and two 150-HP Willans & Robinson vertical reciprocating engines coupled to Crompton two- and four-pole dynamos generating DC at 220 V, was built on a derelict site on which the second gasworks had stood. These gas works ended their career with an explosion which caused fatal casualties, The site was a bad one, the author states; it should have been somewhere near the River Calder in a more central position. Indeed, some years later Mr. R. H. Campion, who was the electrical engineer from 1901 to 1920, sponsored such a scheme, and the history of the undertaking might have been different had he succeeded. In 1898 the Heckmondwike U.D.C. discussed the question of taking a bulk supply, but nothing was done.

During this period London syndicates, which in 1881 had endeavoured to introduce electric lighting into the town, were active and their efforts culminated in 1901 in the formation of the Yorkshire Electric Power Company, with perpetual rights over the whole area surrounding the old borough. When the borough boundaries were extended trouble arose over duplicate supplies and there was litigation between the Council and the company. Agreement was eventually reached, but, the author states, the position has never been entirely satisfactory, and from technical and economic viewpoints the duplicate powers should be abandoned.

These duplicate powers, which bring some industry within the ambit of the power company, are one reason why the Dewsbury undertaking has not progressed as much as some others. Another is that few heavy woollen mills have been electrified, the large quantities of steam and hot water required making it difficult for the mill owner to divorce himself from the steam engine. The availability of cheap coal is given as a further reason and, incidentally, it is mentioned that the first cost of coal to the undertaking was 6s. 6d. a ton.

The introduction of electric tramways in 1903 provided a distinct fillip to the undertaking, but they were discontinued in 1935 and it is considered a great pity that the transport authorities were not prevailed upon to adopt trolley-buses. An interesting record is the attempt in 1906 to introduce regenerative braking, one of the earliest applications of this system. It was operated for only a few years and the power station staff were not sorry to see it go as a sudden rise in busbar volts from 550 to 750 was somewhat disconcerting.

In 1930 the steam plant at the power station was closed down and sold, the whole supply being subsequently taken from the power company.

Finally, statistics of the undertaking show that there are at present 14,730 consumers and in the past year 11,321,000 kWh has been supplied at an average price of 1·92d. with a profit on the year's working of £5,951. A domestic two-part tariff was introduced as early as 1913. An 11,000-V ring main has been laid throughout the old part of the borough and the change-over from DC to AC, commenced in 1930, has been practically completed.

The present chief electrical engineer and manager is Mr. G. H. Sammons, M.I.E.E., who took office in 1941 on the retirement of Mr. R. W. Grubb, M.I.E.E.

Greater London Plan

Electricity Supply and Transport Proposals

MUCH has already appeared in the public Press regarding the "Greater London Plan, 1944," prepared by Professor Patrick Abercrombie on behalf of the Standing Conference on London Regional Planning at the request of the Minister of Town and Country Planning. Copies of this are not available to the public but a fuller edition with illustrations is to be published later.

The plan is so comprehensive and full of interesting detail that we are unable to deal with it as a whole except to mention that it visualises great measures of "decentralisation" of industry and population involving the movement of 1,720 factories employing 258,000 workers (representing a total of 1,033,000 people altogether). This great move would necessitate the expansion of some of the outer towns of the area and the establishment of ten new satellite towns with populations of up to 60,000.

This great movement, it is considered, could be virtually effected in the decade commencing two years after the end of the war. It is noted that the availability of electric power is a potent factor in the transference of industry to new areas and electrification of railways is considered to be the best means of coping with the traffic.

Unification of Supply

Dealing with electricity supply the report says that while electricity is available in most parts of the area there is need for a much greater standardisation of supply. In this connection it refers with approval to the London and Home Counties Joint Electricity Authority's proposals for the unification of the seventy-five separate undertakings in its area and says that consideration should be given to the desirability of forming a regional electricity board to take over these undertakings. In this connection, it is said, the question arises whether such a board should confine itself to electricity or whether it should embrace all parts of one comprehensive public service, providing power, heat and light from coal, electricity and gas.

It is considered that it would be a mistake to standardise house designs which involve the provision of three methods of heating if equally satisfactory houses can be provided which use only one method. Reference is made to the Scott Committee's recommendation regarding the use of electricity in cases where rural houses are not supplied with water from the mains. Such houses could be equipped with electric pumps, and this forms another argument for extending the supply of electricity in rural areas.

In a comment on district heating the report says that the possibilities seem greatest where built-up areas are being reconstructed. It might also be used in the central parts of new towns, but conditions would be less favourable in the case of extensions of existing towns and villages.

Railway Electrification

On the whole, railway facilities are considered adequate and well placed, but there are various defects including overcrowding at peak hours, congestion at some suburban stations and the fact that services have not always increased in speed and frequency with suburban growth.

Drastic alterations or additions are not considered necessary, but the general electrification of railways in the Greater London area, the provision of certain additional short lengths of track and attention to certain matters relating to goods traffic are suggested.

The main lines leading out of London should be electrified to certain points, *i.e.*, Didcot, Princes Risborough, Aylesbury, Watford, Luton, Hitchin, Bishop's Stortford, Chelmsford and Basingstoke. In addition the comparatively short routes of the Southern Railway to the south and south-east might be electrified throughout. The branch lines in the Greater London area should be electrified where this has not already been done.

Short lengths of track and other additions would be required to provide useful connections between the Midlands and North-West on the one hand and several of the proposed satellite towns on the other, besides linking up various regional places. The route may be described as extending from Watford to Chelmsford and details are given of the work which would be involved. A connection would be required to link the proposed chief airport at Heathrow (near Heston) with the Southern Railway at Feltham and a loop at West Thurrock to provide for the proposed development at Avely, Essex, (an L.C.C. "quasi-satellite").

These works should be included in the first period of the plan together with the electrification of the existing lines to Fairlop airport from Liverpool Street; to Hatfield airport from St. Pancras; and to Didcot from Paddington.

Three branches from the "outer goods ring" proposed in the County of London Plan are suggested, mainly comprising existing tracks, and it is thought that consideration should be given to the use of electricity "or some other smokeless method of traction" for goods traffic as well as passenger traffic.

Town and Country Planning

How the New Act Affects Public Utilities

By a Barrister-at-Law

IN the post-war period the relationship between Planning Authorities and public utilities will assume a far greater importance than in the past. Such relationships must be smooth and harmonious; ill-feeling on the part of either or both can create nothing but confusion, but mutual co-operation will undoubtedly promote the well-being of the community in the difficult period which lies ahead.

It was no doubt the appreciation of this fact which led the Government in the early part of last summer to appoint an inter-departmental committee under the chairmanship of the Solicitor-General, Sir David Maxwell Fyffe, K.C., to consider the relationship between Planning Authorities and public utilities. Each class of public utility appeared before this Committee and some measure of agreement was obtained before the introduction of the Town and Country Planning Bill into Parliament. This Bill reached the Statute Book on November 17th and it may be useful to summarise its main provisions in so far as they relate to public utilities.

Compulsory Purchase

Under the earlier Town and Country Planning Act, 1932, Planning Authorities were entitled to purchase compulsorily the land of public utilities only if (*a*) the land was required for the widening of an existing highway, and (*b*) if the undertakers consented thereto, such consent not to be unreasonably withheld. (Third Schedule, Part II, paragraph 2.) The new Act greatly enlarges these powers in areas which have been heavily " blitzed " or are of such bad layout that total reconstruction is necessary. These areas are commonly referred to as " blitzed " and " blighted " areas.

The provisions of the Act regarding the compulsory purchase of public utility land in such areas is contained in Section 13. This applies to land which is used for the purpose of the carrying on of a statutory undertaking (*i.e.*, an undertaking authorised by public general or local Act or by any Order or scheme made under, or confirmed by, an Act to supply electricity, gas, hydraulic power or water) or in which an interest is held for that purpose, " with the exception of any such land which is in respect of its nature or situation comparable rather with the generality of land as respects which the provisions of the Act have effect than of land which is used, or in which interests are held, for the purpose of the carrying on of statutory undertakings."

This definition appears to be cumbersome and an attempt was made, without success, to obtain simplification in the House of Commons. The words " which is used for the purpose of the carrying on of a statutory undertaking, or in which an interest is held for that purpose " would cover every kind of possession known to the law whether freehold or leasehold or even an option to purchase. The difficulty arises in distinguishing between the land of public utilities which is covered by the Section and land which is in respect of its nature or situation comparable rather with " the generality of land " than with public utility land.

In the construction of this complicated sentence, it is suggested that the viewpoint of utility should be taken. If the land is used for the works of the undertaking it has the " nature " of public utility land: similarly if it is in proximity to such land it is by " situation " public utility land. On the other hand, many utilities hold land for eventual use, and these lands may have been let out for farming or grazing until such time as they are required by the utility. It is doubtful whether such land would be included in the Section unless by " situation " it approximates more closely to public utility land than to the " generality " of land.

Protection Afforded by 1932 Act

It must, of course, be emphasised that Section 13 is only applicable where Planning Authorities are authorised to purchase under the 1944 Act, and that the powers of that Act will be exercised mainly but not exclusively in blitzed and blighted areas. In other cases Planning Authorities will still proceed under the earlier Act of 1932 which remains unrepealed, and in such cases the much wider protection conferred on utilities by Section 41 of that Act will remain available. Further, if any land held by public utilities fails, on the tests applicable, to come within Section 13 of the new Act, the effect will be that (1) the ordinary procedure for compulsory purchase, and not the special procedure for public utility land, will be applicable, and (2) compensation will be paid under the general provisions of the Act—*i.e.*, on the 1939 value.

Where, however, land is held to be public utility land under the section—and in disputed cases it will be for the Minister of Town and Country Planning together with the Minister of Fuel and Power to decide—the normal procedure for compulsory purchase will be modified in the following manner:—

If it appears to the utility that a compulsory

purchase Order includes public utility land, the utility may object to the Ministry of Fuel and Power, in which case the Order will not be made or confirmed unless the public utility land is excluded. An Order may then be made authorising the compulsory purchase of the public utility land by the Minister of Town and Country Planning jointly with the Minister of Fuel and Power. If the public utility objects to such an Order it is to be provisional only and of no effect until confirmed by Parliament.

Compensation

In respect of land which, in pursuance of the definitions given above, is public utility land, special provisions relating to compensation are applicable. These are contained in the Fourth Schedule of the Act. Under this Schedule statutory public utility undertakers have the right to elect whether they will claim compensation under the Acquisition of Land (Assessment of Compensation) Act, 1919, or under the provisions contained in the second paragraph of the Schedule. The basis of compensation under the Acquisition of Land Act, 1919, is the amount which the land if sold in the open market by a willing seller might be expected to realise. Where, however, this Act is adopted for the purposes of the Town and Country Planning Act, an arbitrator appointed under the Act would not be entitled to adopt the basis of the reasonable cost of equivalent reinstatement.

If, however, a public utility decides to adopt the provisions of the second paragraph of the Schedule, compensation will be assessed on the following basis:—(*a*) The amount of any expenditure reasonably incurred in acquiring land, providing apparatus, erecting buildings or doing work for the purpose of any adjustment of the carrying on of the undertaking rendered necessary by the proceeding giving rise to compensation. (*b*) Where any such adjustment is made, the estimated amount of any decrease in net receipts from the carrying on of the undertaking pending the adjustment, in so far as the decrease is directly attributable to the said proceeding, together with such amount as appears reasonable compensation for any estimated decrease in net receipts from the carrying on of the undertaking in the period after the adjustment has been completed in so far as the decrease is directly attributable to the adjustment. (*c*) Where no such adjustment is made, such amount as appears reasonable compensation for any estimated decrease in net receipts from the carrying on of the undertaking which is directly attributable to the proceeding giving rise to compensation.

From these provisions it is clear that where, owing to a planning scheme, consumers of an electricity undertaking are moved from one part of the area of that undertaking to another, the undertaking can claim, in addition to any decrease in net receipts, the cost of the work and material involved in laying mains and cables to its former consumers in their new location. Cases may arise, however, in which, owing to a scheme, population is removed to a situation outside the area of their former undertaking. In such a case the mains and cables from which the removed population were formerly supplied will be rendered redundant or useless, and the only basis of compensation would be on the grounds of " decrease in net receipts from the carrying on of the undertaking."

It is thought that this basis of compensation is wholly unsatisfactory, and an amendment was moved by Lord Falmouth in the House of Lords, on behalf of the Conjoint Conference of Public Utility Associations, to enable undertakings to claim the written-down value of any main or cable rendered useless or redundant in such circumstances. The Government refused to accept this, but the Lord Chancellor promised that after full consideration the Government would be prepared to introduce public legislation to deal with the matter. This decision is to be welcomed because the question is one which is bound to arise in a variety of circumstances, in addition to those with which the Town and Country Planning Act deals.

The choice by a public utility of the basis of compensation will no doubt be a difficult matter, but it will be open for any utility which so desires to have part of its claim adjudicated under the Acquisition of Land Act, 1919, and another part on the basis set out in the second paragraph of the Schedule. In either case the assessment of compensation will be undertaken by a special tribunal appointed for that purpose, the personnel of which will consist of:—(*a*) a barrister or solicitor appointed by the Lord Chancellor to act as chairman; (*b*) a valuer and a civil engineer appointed by the Ministry of Town and Country Planning; and (*c*) a person selected by the Ministry of Fuel and Power as a person having knowledge and experience of statutory undertakings of the kind carried on by the claimant.

Mains and Cables in Highways

The Act gives to Planning Authorities power to extinguish rights of way over any land which they have acquired or appropriated, and this would include the right of laying down, erecting, continuing or maintaining any apparatus on, under or over such land. The Planning Authority must in the exercise of this power serve a notice upon the utility indicating that after a specified period the right will be extinguished and requiring the apparatus to be removed. If the public utility objects, it may serve a counter notice and the Planning Authority

must then either withdraw the original notice or apply to the Minister of Town and Country Planning to make an Order in the terms of the notice. In these cases the Minister of Town and Country Planning must act jointly with the Ministry of Fuel and Power and must hold an inquiry before making an Order.

If the objection of the utility is not withdrawn before the making of the Order, it will be necessary to submit it to Parliament before it becomes effective (see Section 25). Where any right is extinguished either by notice or Order, the utility may claim compensation under the Special Utility Compensation Schedule to which reference has been made above.

In addition to claiming the amount of any decrease in net receipts, the utility will be able to obtain the expenditure in labour and material incurred in making any necessary adjustment of its distribution system.

Other matters in the Act which are of interest to public utility undertakings are the following:—

1. Where a utility has been affected by the operations of a Planning Authority under the Act, the Minister of Town and Country Planning together with the Minister of Fuel and Power may by Order confer upon the utility (*a*) powers to purchase land compulsorily or otherwise, and (*b*) sanction any arrangement between the utility and the Planning Authority which may be equitable.

2. A new feature is introduced in the Act by the provision contained in Section 26 (5) which enables a Planning Authority to make representations that it is expedient that new services should be laid, or any existing services extended to new housing estates. If this is done an Order can be made requiring the provision of such services subject to the confirmation of Parliament. It is thought that where the giving of a supply to new housing estates is economic, utilities will be anxious to extend their service without any element of compulsion: where, however, a supply could only be given at a loss, equitable financial provisions could be inserted in the Order.

3. Where the compulsory purchase of land by Planning Authorities, or the extinguishment of any rights previously enjoyed, has made it impracticable for the utility to fulfil any of its existing statutory obligations, the Minister of Fuel and Power can give relief from these obligations on the application of the utility.

It is impossible in the course of an article such as this to deal exhaustively with the many ways in which the duties of the Planning Authorities may impinge upon those of public utilities. From what has been said, it is clear, however, that public utilities will find it necessary to maintain a careful watch upon the activities of their local Planning Authorities in order to ensure that their rights under the Act are maintained.

Prospects in Eire

Canadian Trade Commissioner's Survey

THE prospects for sales of electrical goods in Eire have been investigated by Mr. E. L. McColl, the Canadian Trade Commissioner in Dublin, who considers that a wide range of electrical equipment will be in heavy demand when expansion becomes possible. The list of appliances needed is lengthy, but the situation can be summarised by saying that everything necessary, from generating plant to household appliances, will be readily purchased. Mr. McColl adds that the production of many electrical lines not hitherto made in Eire is contemplated after the war. Consequently substantial supplies of raw (or semi-manufactured) materials will have to be imported, as few of the many needed products are indigenous. The Trade Commissioner mentions particularly wood poles from 30 to 40 ft.

The Electricity Supply Board has an effective organisation to foster the increased use of electricity. It maintains a chain of showrooms in the principal cities and towns, where in pre-war days a wide range of electrical goods was displayed. Wartime conditions, however, have necessitated rationing. Before the war a considerable quantity of Canadian merchandise was stocked, including cookers and washing machines. The Board hires out electric cookers to householders and guarantees service at a moderate charge. Until the outbreak of hostilities German-made electrical goods were dumped on the Irish market at low prices and consequently dominated sales, although Great Britain supplied an appreciable amount of more expensive and better finished appliances.

The experience of the Canadian Trade Commissioner's office in the past was that prices of many Canadian household electrical goods were from 10 to 20 per cent. higher than those of competitive makes. Another factor which militated against the sale of Canadian appliances was that, on account of the voltage difference, they had to be re-wound especially for the market. The voltage in Dublin city is 200/346, while that in all other districts is 220/380, supplied in both cases at 3-phase, 50 cycles, four wire, with multiple-earthed neutral.

Electricity Supply Administration

Consequent upon a decision last June to form a Northern Group of the Electricity Supply Administrative Association it was recently decided to form district branches whose activities will be co-ordinated by the Group. These branches study the systems of local undertakings while the Group arranges periodical meetings in the larger towns in its area. A "broadsheet" is now being issued as an additional link between the branches. In this commercial practice and administration are discussed by members.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AFTER having served for twenty-three years as general manager and engineer of the Stockton-on-Tees Corporation Electricity Department **Mr. S. G. Marston** is retiring at the end of February next.

Mr. Marston, who is sixty-three, was born at Eccleshall, near Stafford, and was educated at the High School, Newcastle, Staffs. After serving an apprenticeship with W. R. Renshaw & Co., electrical and mechanical engineers, Stoke-on-Trent, he was for five years with the Potteries Electric Traction Co., joining the Hanley Corporation Electricity Department in 1904 as shift engineer. He remained with the undertaking when it became part of the city of Stoke-on-Trent and from 1910 to 1920 was mains superintendent. He then went to Sunderland as distribution engineer but held this position only a short time before obtaining his present appointment.

Mr. S. G. Marston

While he has been at Stockton the whole town has been completely re-equipped with new mains and thirty-two substations, and the supply has been changed from DC to AC. In 1932 the whole system was also changed over from 40 to 50 cycles. In 1922 there were 1,028 consumers; the number now is 17,189. In this period sales have risen from 2½ million to 26¾ million kWh and annual income of the Department from £28,000 to £145,000. Mr. Marston is a past chairman of the Tees-side Sub-Section of the Institution of Electrical Engineers.

Mr. J. R. Taylor, A.M.I.E.E., has recently taken up the appointment of power station superintendent with the St. Helens Corporation at the Carlton Street generating station. Mr. Taylor served an engineering apprenticeship with Bartons Mills Ltd., Hull, and joined the electricity supply industry in 1930 when he entered the service of the Hull Corporation Electricity Department. In 1936 he was appointed assistant combustion engineer and later combustion engineer at the Barking generating station of the County of London Electric Supply Co., Ltd., being transferred to the Kent Electric Power Co. in 1939 as engineer-in-charge at the Littlebrook power station. Mr. Taylor, who is well known in the London area, was a member of the Kent Section Committee and the London Companies Sub-Committee of the Electrical Power Engineers' Association.

Mr. A. J. Newman, chief engineer and general manager of Bristol Corporation Electricity Department, is to retire at the end of this month. On reaching the age of sixty-five in 1942, he was granted a superannuation allowance, but consented to continue in office. He has now asked to be relieved of his duties. Pending reorganisation of the Electricity Department, **Mr. I. A. D. Pedler,** his deputy, has been temporarily appointed acting general manager and chief engineer at a salary of £1,800 per annum. Mr. Pedler himself proposes to retire also next June on reaching the age of sixty. Both Mr. Newman and Mr. Pedler received their training with the Bristol undertaking and have completed more than forty years' service.

Mr. Newman was born in Dublin where he received his early education at the High School. Coming to England, he continued his studies at the Merchant Venturers' Technical College, Bristol, and received practical training in the Corporation Electricity Department. In 1904 he was appointed assistant engineer, in 1907 mains engineer, in 1913 distribution superintendent and in 1915 deputy city electrical engineer, becoming "chief" in 1932 on the retirement of the late Mr. H. Faraday Proctor. Mr. Newman has taken a prominent part in the affairs of the industry as a member of the Council of the British Electrical Development Association and a member of the National and the South-West England and South Wales Consultative Technical Committees of the Central Electricity Board. He is a past chairman of the Western Centre of the Institution of Electrical Engineers and a member of the Institutions of Mechanical and Structural Engineers and the Institute of Fuel.

Mr. Pedler also studied at the Merchant Venturers' Technical College as well as in the Faculty of Engineering, Bristol University, and was trained under Mr. H. Faraday Proctor.

Mr. A. J. Newman

Mr. I. A. D. Pedler

He joined the undertaking in 1900, was appointed assistant to the chief engineer in 1904, became mains engineer in 1915 and in 1932 succeeded Mr. Newman as deputy city electrical engineer. Mr. Pedler is a member of the Institutions of Civil and Electrical Engineers.

The Staff Committee of Fulham Borough Council reports that forty applications were received for the two positions of assistant operating engineer at the power station; and that it has appointed **Mr. G. N. Everitt** and **Mr. M. R. Francis,** with commencing salaries of £665. Mr. Everitt, who is thirty-three, was apprenticed in the Sheffield Corporation Electricity Department with which he afterwards served as mains assistant, technical assistant, and assistant mains engineer. He joined the Fulham undertaking in 1937 as assistant mains engineer and in 1941 was

transferred in a temporary capacity to the position of assistant electrical maintenance engineer at the power station. Mr. Francis is forty-four. He served his apprenticeship with the Upper Forest Steel Co., Swansea, and joined the Fulham undertaking in 1936 as a temporary relief charge engineer, being successively promoted to relief charge engineer and (in February last) acting assistant operating engineer.

Out of thirty-five applicants for the position of charge engineer at the power station, the Fulham Staff Committee has chosen **Mr. M. C. Frankham**. The commencing salary is £555. Mr. Frankham, who is thirty-five years of age, received his training in the power station and substation sections of the Great Western Railway and for eight years served as assistant switchboard attendant. He joined the Fulham undertaking in the same capacity and since 1938 has held the position of auxiliary control engineer at the power station.

Mr. T. H. Moore, superintendent of the electricity accounts department, Fulham Borough Council, who is sixty-one years of age, has intimated his wish to retire on superannuation at the end of the year, when he will have completed forty years' service. His services will, however, be retained for the time being in a temporary capacity.

The Social Club attached to the Fulham power station held its annual children's party on Saturday last, when between 200 and 300 children of the employees and of those serving in the Forces were entertained, each of them receiving a gift.

To mark the twenty-fifth anniversary of the foundation of Abell & Smith's Electrical Co., Ltd., Worcester, a luncheon party was held at which those present included the directors and nine employees who had completed twenty-five years' service. **Mr. H. Horton Smith,** managing director, referred to some of the first installations carried out by the company and spoke of the work of the late Mr. C. E. Abell who was mainly responsible for starting the company's five branches. Framed long-service certificates were presented to a number of employees.

Mr. H. Wilson, electrical engineer to the Ashford (Kent) Urban District Council, is to retire next March. He will be succeeded by **Mr. Ramsden Mellor,** borough electrical engineer and manager at Kendal since 1941. The Kendal Corporation is advertising in this issue for a successor to Mr. Mellor at a salary of £677.

Mr. K. R. Sturley, of the Marconi School, Chelmsford, has been appointed chief of the engineering training department of the British Broadcasting Corporation and will take up his appointment on February 1st.

Mr. James Macdonald, chief electrical engineer, Glasgow Corporation Transport Department, is retiring on superannuation but will remain in the service of the Corporation for the time being.

Mr. F. C. Edwards has been appointed sales manager of De La Rue Plastics, Ltd.

Speaking at the Christmas lunch of the Carlisle Electrical Manufacturing Co., Ltd., at Horwich, **Mr. H. V. Carlisle,** the managing director, said that the company's plans for post-war trade were so far advanced that when victory had been won the change-over could be effected with a minimum of delay. The happy relationship between management and staff was emphasised by **Mr. S. H. Collings** (works director), in the toast to the staff.

Mr. E. G. Anness, M.I.E.E., has been appointed a director of Browning's Electric Co., Ltd. Earlier this year Mr. Anness retired from the National Boiler & General Insurance Co., Ltd., with which he had served for many years as chief electrical engineer, London area.

Mr. H. H. Moore, works director of Herbert Morris, Ltd., Loughborough, is retiring at the end of the year, after forty-one years' service with the company.

Mr. A. L. B. Tucker has been elected a director of the Cawnpore Electric Supply Corporation, Ltd., in place of **Mr. S. G. L. Eustace,** who has resigned.

Mr. H. F. Carpenter, principal officer to the West Midlands Joint Electricity Authority, has been elected a vice-president of the Chartered Institute of Secretaries, on the council of which he has served for twelve years.

Mr. H. H. Harley, C.B.E., has been re-elected president of the Gauge and Tool Makers' Association and **Mr. F. W. Halliwell,** M.I.Mech.E., chairman.

Over 150 wounded soldiers from one of the Birmingham hospitals recently spent an enjoyable time at the Warwick works of William McGeoch & Co., Ltd., where they were entertained by the workpeople. After a few remarks by **Major W. Percy McGeoch,** who presided, the Lord Mayor (Councillor W. T. Wiggins Davies) extended a welcome to the men. A meat tea followed, and later there was a concert. The Lord Mayor was accompanied by his daughter, the deputy Lady Mayoress, and others present included Mrs. Percy McGeoch and Mr. William McGeoch (managing director). Arrangements for the party were carried out by two employees of the company, Capt. G. Shale, M.M., and Mr. I. MacQueen.

A Christmas dinner was held at the Imperial Hotel, Birmingham, on December 14th, by the Birmingham Centre of the Illuminating Engineering Society, over 130 members and guests being present. **Mr. J. G. Holmes,** chairman of the Centre presided. The speakers included Mr. C. F. Partridge, Mr. E. Stroud, President of the I.E.S., Mr. A. T. Hayward, president of the Birmingham Electric Club, and Mr. A. J. Pashler.

Mr. Curtis E. Calder has been appointed chairman of the (American) Electric Bond & Share Co. in succession to **Mr. C. E. Groesbeck** upon his appointment as chairman of the company's executive committee (a new position). **Mr. G. W. Walker,** a vice-president, becomes president in succession to the late Mr. S. W. Murphy. **Mr. W. S. Robertson,** a vice-president of the subsidiary, the American & Foreign Power Co., becomes president of that company in place of Mr. Calder.

Mr. H. T. M. Angwin has been appointed chairman of the recently established South Australian Electricity Commission. The other members are Mr. F. H. Harrison and Mr. J. W. Harrod. Messrs. Angwin and Harrison were reported by the *Electrical Engineer and Merchandiser* in August to be going to the

United States to investigate the production and use of coal similar to that obtained at Leigh Creek in the generation of electricity. Readers will recall that the Adelaide Electric Supply Co. has been requested by the South Australian Government to use Leigh Creek coal at its Osborne station (*Electrical Review*, October 20th, p. 543).

Mr. A. F. Cross, sales engineer on the London office staff of British Insulated Cables, Ltd., has completed fifty years' service with the company. Accordingly he was recently presented with a cheque for £50 by Mr. T. H. Martin-Harvey, the deputy chairman, on behalf of the company. Similar awards for fifty years' service have also been made to **Mr. R. Rogers,** of the head office staff, Prescot, and **Mr. J. Tweedle, Mr. A. Brierley** and the widow of **Mr. Edmond Hill,** of the Helsby Works.

Mr. H. S. Bennett has joined the Philco group as telecommunications manager and technical adviser to Mr. L. D. Bennett, chairman and managing director. He has recently been serving as assistant director of the Ministry of Supply. From 1911 until 1926 he was the manager of the Hong Kong telephone system, and from then until joining the Ministry of Supply he acted in an advisory capacity to the Telephone & General Trust Co. and associated companies.

Obituary

Mr. J. H. Farthing.—We reported last week the death of Mr. J. H. Farthing, a director of the General Electric Co., Ltd. Mr. Farthing was one of the company's oldest servants having joined it as a salesman in the fittings department, in 1893, after a period of apprenticeship with a firm of naval architects in London. In 1898 he was appointed manager of the Fixtures and Heating Department at the Manchester branch ten years later he became deputy branch manager and in 1915 manager of the branch which, by this time, had sub-branches at Liverpool, Leeds and Sheffield. He became a director of Salford Electrical Instruments, Ltd., in 1917. Mr. Farthing's business career has, therefore, been spent almost entirely in Manchester and the North West of England where he was well known for his organising ability and charm of manner, both in the electrical industry and in industry generally. He was appointed to the board of the company in 1933. Mr. Farthing leaves a widow and four children to whom we extend our sympathy.

The late Mr. J. H. Farthing

Mr. J. E. Schofield.—The death occurred at Bradford last week of Mr. John Ernest Schofield, aged sixty-three. He was electrical engineer to the Colne Valley Urban District Council, and held a similar position for many years under the former Slaithwaite U.D.C. which it superseded. He also carried on business as an electrical and mechanical appliance merchant at Ravensthorpe, Dewsbury, and practised as a consulting engineer. Before commencing his own business in 1914 he had been for two years commercial assistant in the Bradford Corporation Electricity Department.

Mr. J. D. R. Cox, who died at Pollokshaws, Glasgow, recently, was formerly an engineer in the Glasgow Corporation Electricity Department. In 1916 he was appointed general manager of the Edinburgh and District Tramway Co., and latterly was engaged in a brick-making business in Dumfriesshire.

Mr. J. E. Dudgeon, for the past nine years district engineer of the Northern Ireland Electricity Board in Portadown, died on December 6th.

Will.—Mr. **Howard Marryat,** chairman of Marryat & Place, Ltd., and other companies, left £269,451, with net personalty £211,430.

Air-raid Damage

AS may be gathered from the article on page 897 of this issue relating to the air-raid damage sustained by electricity supply authorities on the South-East Coast, conditions now permit reference to the bombing experiences of individual undertakings. We are therefore now able to disclose the names of the undertakings to which we have referred in the articles published on the subject during the past four years.

The first of the series, appearing in our issue of December 13th, 1940, though referring to a number of London undertakings, dealt largely with one of the worst-hit boroughs, West Ham, and all the photographs reproduced were taken in that district. Further reference to experiences at West Ham was made on October 24th, 1941, in an article by Mr. G. V. Harrap, who was then on the staff of the Electricity Department.

Following visits by a member of our staff to practically all the worst-affected areas in the country, further articles dealing with various aspects of the damage, including protection, effects, and methods adopted for the rapid restoration of supplies, appeared in the issues of August 29th, November 7th and 14th, 1941, and February 20th and 27th, 1942. Apart from London undertakings, including Poplar, Central London Electricity, the County of London Co., Battersea, Northmet, Hammersmith and St. Pancras, particular reference was made to Hull, Plymouth, Manchester, Liverpool, Southampton, Portsmouth, Birmingham, Coventry, Bristol, Swansea, Cardiff and Sheffield.

Discussion on Earthing

At the December meeting of the Northampton and District Electrical Association the vice-chairman, Mr. W. K. Allen, opened a discussion on earthing. Reference was made to protection by means of core balance, leakage trips, and multiple earthing. The question whether supply authorities should provide an earth was raised and it was pointed out that while it might be the ultimate goal there were many practical difficulties to be surmounted. Some members of the G.P.O. Engineering Department were present as visitors.

At the next meeting, on January 10th, a lecture on "Cable Manufacture and Development" will be given.

CORRESPONDENCE

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

Compulsory Registration

WRITING in your issue of November 24th on 'single-pole fusing Mr. W. E. Steward urged the enforcement of the I.E.E. Regulations and the adoption of compulsory registration for contractors and operatives. His contention is supported by the evidence of bad workmanship provided by a piece of jointed cable which was taken out of some Bradford premises a few days ago. In this four pairs of twin lead-covered 7/·029 cables projected from a mass of joints just twisted together and soldered without any signs of real workmanship. No rubber insulating tape had been used and there was no bonding or earthing continuity of any kind. This should be enough to convince any committee considering the question of the need for compulsory registration. For every one of these atrocities that comes to light there are no doubt hundreds that do not.

The electricity using public must be protected against these ignorant amateurs and dabblers and this protection must be forthcoming before the end of the war; otherwise there will be a great influx into the electrical trade of thousands of men, calling themselves contractors or electricians, who know no rules. Do the insurance companies approve of such work; if not, why don't they protest?

Bradford. HARRY MOSS.

[We have seen the specimen to which our correspondent refers and share his indignation. It is questionable, however, whether bad work of this kind is as common as he would appear to imply.—*Editors, Electrical Review.*]

I.E.E. Examinations

I HAVE read with interest the letters from Dr. E. Hughes and Mr. W. K. Brasher, in your issues of December 1st and 8th respectively. It appears that the new syllabuses have been drawn up without any thought of the reactions of students undergoing engineering training. It is not always realised that students have a utilitarian outlook which may be as strong as the urge to acquire knowledge for its own sake. A number of intensive training schemes (Hankey Scheme) have been, and still are, being held to train young electrical engineers so that they can be up-graded in industry. It should be noted that the incentive of obtaining the Higher National Certificate at the end of the six months course is included in the scheme. When obtained, with credits, this is of professional value. On the proposed subject-for-subject basis, the difficulty of adequately covering the published syllabus (4) "Applied Heat (with Light and Sound)" is difficult. I support Dr. Hughes in this matter. Also the model papers Nos. 1 and 2 which we have received are confined to Applied Heat with no reference to the other portions of the published syllabus, so we are left in the dark.

The letter from Mr. Brasher is most unconvincing and appears to be a smoke-screen. Perhaps the Institution does not wish to extend its Students' Section?

Liverpool. J. E. MACFARLANE, B.Sc.Eng., M.I.E.E., A.M.I.Mech.E. *Head of the Electrical Engineering Dept.*, Liverpool Technical College.

I THOROUGHLY agree with the point of view expressed by Mr. A. R. Cureton in your issue of December 8th. Practical engineers are almost unanimous in their opinion that the I.E.E. has become too academic and unpractical.

In the same issue Mr. W. K. Brasher mentions that the I.E.E. Council is "widely representative," whereas it is almost entirely composed of members who are interested in either manufacturing, power supply, or education. Industrial users of electric power, whose applications of it consume some 90 per cent. of the total power generated in this country, are scarcely represented at all, and there is no record in the *I.E.E. Journal* of the very considerable technical advances made in the applications of electric power in industry during recent years. There was formerly a Plant and Applications Committee of the I.E.E. which dealt with this branch of electrical engineering, but for some reason this committee was abandoned some years ago.

Ebbw Vale, Mon. H. G. WEAVER, M.I.E.E.

[Applications of electric power in industry are now the concern of the Installations Section and have already provided subjects for a number of papers read before that Section.—*Editors, Electrical Review.*]

I.M.E.A. Council

A PERUSAL of the representation on the I.M.E.A. Council for the past six years reveals that out of a membership of 348 only some 62 authorities have had representatives on the Council, the figure for the past ten years being 74 or thereabouts. Further, it is found that for the ten-year period ending next June the number of authorities with two or more representatives on the Council was respectively five, four, three, four, three, five, six, six, six, and five. In addition, quite a number of authorities have had continuous representation for periods varying from six to ten years. As it is beyond question that

authorities derive considerable benefit from having a representative on the Council I would suggest that a move be made to amend the articles of association on the following lines.

(*a*) That, with the exception of honorary members only, no authority should be allowed more than one representative on the Council.

(*b*) That, after a period of three years as an ordinary member of Council, a representative must vacate the seat for at least one year before becoming eligible for re-election.

Regarding Centre representation I would suggest that no person be elected for a period of more than two years with an interval of at least one year before becoming eligible for re-election. In conclusion I may suggest that it would be more democratic for Centre representatives to be elected by the full Centre Committee and not, as at present, by the Centre Executive Committee.

Skelton and Brotton. R. L. HEWLING,
Electrical Engineer.

Electricity Supply Reorganisation

APROPOS of the criticism of the proposals of the Association of Municipal Corporations by the I.M.E.A. Council (referred to in the *Electrical Review* of December 1st) the unconscious humorist of the *I.M.E.A. Journal* concludes his comments with the following paragraph :

" As the Report is made by a Committee, it cannot be said to represent the views of all the members, who have not had an opportunity in general meeting, of discussing the proposals."

In view of the recent circulation of the " Brown " and " White " Memoranda by the I.M.E.A. Council (now sadly at variance), these remarks seem merely a case of the pot calling the kettle black. ELECTRON.

A Welsh " T.V.A."

IN your issue of December 8th, you refer to the general desire in Wales for a " T.V.A." This is not as you assume a nationalistic issue but is due to the realisation of a region, which has suffered unparalleled depression, that Welsh resources, like Tennessee resources, must be dealt with from within the region in an integrated manner, and not piecemeal by sectional interests. This feeling had developed before the chairman of T.V.A.'s book " Democracy on the March " made an appearance, otherwise it might have been put down to it for never was a case more powerfully confirmed.

As regards apportionment of capital, the committee investigating the T.V.A. issued a report of some thousands of pages on this issue and absolved the electrical side of the T.V.A. of any element of subsidy from other activities. Indeed the boot is on the other foot as anyone who reads the 1943 annual report can find out for himself.

Denbigh, N. Wales. G. R. JONES.

Peak Loads

SURELY, instead of exhorting all consumers to " Keep off the peak " we should " Keep the peak off," or at least the lighting component of the peak, between 8.0 a.m. and 9.0 a.m. by going back to G.M.T. and transferring this portion of the peak to 4.0–5.0 p.m. ?

In addition to removing a considerable portion of the peak it would no doubt result in a substantial saving in those works where there is only one shift and where the day's work is over about 3.0 p.m. An instance of this is a colliery drawing coal on the day shift only, where the surface workers are going home in daylight after working by artificial light for an extra hour in the morning thanks to B.S.T.

Leeds. J.L.S.

[The answer to the query in the first paragraph seems to be that peak loads on electricity supply undertakings are not the chief consideration involved in extending B.S.T. throughout the winter.—*Editors, Electrical Review.*]

Oil-engine Costs

THE report for 1942-43 on the working costs of heavy-oil engines by the Diesel Engine Users' Association is now available. The tabulated data was obtained from 55 home and overseas stations, one fewer than in the previous year. Some of the tables have been rearranged, or extended, to facilitate comprehension of the facts presented. Allowance must be made in comparisons of the latest with former returns for the present tendency of costs to be abnormal. The slightly better average fuel consumption of 0·595 lb. per kWh generated at a running plant load factor of 67 per cent. was 9 per cent. below the standard curve (21 out of 40 stations) the average consumption of lubricating oil having likewise improved to 2,140 BHPh per gallon.

Twenty-nine home stations (11 overseas) containing 141 engines (59) of 39,544 kW (26,788 kW) carried a maximum load of 20,910 kW (17,349 kW) and generated 25·8 million kWh (42·6 millions) utilising 6,880 tons (11,302) of oil for fuel and 23,267 gallons (43,608) for lubrication. The total average cost for the year was 1·141d. (0·698d.) per kWh produced at a running plant load factor of 63 per cent. (72·5) with the price of fuel at 226s. per ton (158s.) and lubricant at 3s. 8½d. per gallon (4s.) including tax and delivery. All figures in brackets are for stations overseas.

Average long-period costs per kWh generated in 36 stations range from 0·384d. (Crompton Parkinson, Ltd.) and 0·438d. (B.B.C.) up to 0·902d. at home, and from 0·552d. (Karachi Elec. Supply Corp.) up to 0·878d. overseas. The report contains similar data per HPh for waterworks as well as technical engine performance details, which are divided to indicate differences between mechanical injection and air-blast engines.

COMMERCE and INDUSTRY

Constitution of Fuel Council.

Fuel and Power Advisory Council

IN the House of Commons last week Mr. Parker asked the Minister of Fuel and Power why no representatives of publicly owned undertakings or of the interests of consumers of electricity had been appointed to the National Fuel and Power Advisory Council, and why no prior consultations took place with the local authorities on the setting up of this body.

Major Lloyd George replied that the Fuel and Power Advisory Council had deliberately been constituted as a small body, not representative of any particular interests. It would, therefore, have been inappropriate to have consulted organisations of any fuel producers or consumers about the membership.

Overseas Trade Development

In a written reply to a question Mr. Harcourt Johnstone, Secretary of the Department of Overseas Trade, says that the Overseas Trade Development Council has been re-formed and will meet regularly under his chairmanship. Among the members of the Committee are Sir Harry Railing, chairman and joint managing director of the General Electric Co., Ltd.; Sir Eugene Ramsden, chairman of Richard Johnson, Clapham & Morris, Ltd.; Lord Riverdale, a director of the Telegraph Construction & Maintenance Co., Ltd.; Mr. A. J. Boyd, a director of the Metropolitan-Vickers Electrical Co., Ltd.; Mr. A. R. Guinness, chairman of the London Electric & General Trust; Mr. F. B. Duncan, a director of the Marconiphone Co., Ltd.; and Mr. C. F. Merriam, chairman of B.X. Plastics, Ltd.

The objects of the Committee are to study methods of promoting export trade and the nature and extent of Government support to the development of this trade.

Register of Retail Traders

Traders who have withdrawn from retail non-food businesses on their own account during the war should apply to be included on the Board of Trade Register and List of Withdrawn Retail Traders. At present licences are required under the Location of Retail Businesses Order to open most types of retail non-food businesses and this Order will be continued for some time after the war. During the transition period licences will be granted as a matter of course to people on the Register who wish to re-establish themselves in their former businesses in the same area. If a trader is not registered the grant of a licence may be delayed, and also the Licensing Committees will often not know about it and therefore cannot consider the interests of the owner when dealing with applications. Traders who ceased trading through selling their businesses as going concerns are not eligible for the Register, but their names will be included on a supplementary list. Application forms for registration (R.T.R. 2) and copies of an explanatory leaflet may be obtained from Chambers of Commerce, Chambers of Trade, Citizens Advice Bureaux or the Board of Trade (R.T.R.), Neville House, Page Street, London, S.W.1. If the ex-trader himself is unable either to apply or to authorise another person to do so, a member of his family can apply for him.

Discharge Lamps Decontrolled.

Permanent Works Exhibition

The Automatic Telephone & Electric Co., Ltd., has now established a permanent exhibition centre at its Strowger Works, Liverpool, where employees are enabled to appreciate the function of the finished products and the part played by components with which they may possibly have been concerned in machining or assembly. The picture shows that section of the exhibition devoted to displaying the company's normal activities as they have been adapted to the needs of the war.

Part of a permanent exhibition staged at the Strowger Works

The whole of these striking displays were designed and constructed by members of the company's publicity staff, and provide an attractive foyer to the factory cinema which is another feature of the company's works relations policy.

Glasgow Cable Contracts

Glasgow Corporation on December 14th considered a proposal of the Electricity Committee that contracts with certain companies in the Cable Makers' Association should be

renewed for a further period of five years. The Committee, while recommending renewal, had also asked the general manager to make inquiries as to the type and make of cables used by other electricity undertakings. At the Council meeting a member criticised the proposal to renew contracts which, he said, were at first on an annual basis, then had been extended to three years, and now it was proposed to tie the Corporation to them for five years. A Scottish firm, not in the Association, had never been given the opportunity of competing with this "English cartel." It was agreed to refer the proposal back to the Committee.

Labour Problem

A report submitted at last week's meeting of the Fulham Borough Council dealt with the difficult labour situation in the electricity supply industry. The matter was raised two or three months ago by the Hackney Borough Council (*Electrical Review*, October 6th, page 487) which requested the Metropolitan Boroughs' Standing Joint Committee to consider what steps could be taken to alleviate the shortage. The constituent authorities owning electricity undertakings were asked by this Committee to say whether they were faced with a similar problem.

TheFulham Electricity and Lighting Committee says it is informed that the labour situation in the electricity supply industry as a whole has progressively deteriorated over the past two years, and that repeated representations have been made. It has supplied the Standing Joint Committee with details of the difficulties experienced in the Fulham undertaking and has suggested that the matter should be taken up with the Government Departments and central authorities.

American Plant for Dnieper Dam

It was reported in the *Electrical Review* of October 20th that reconstruction of the great Dnieprostroi hydro-electric plant had been begun and that orders had been placed in the United States for equipment. We learn that the International General Electric Co. is supplying nine 90,000-kVA generators operating at 83·3 RPM. The original generators were rated at 77,500 kVA and 88·2 RPM. The 100,000-HP turbines are being built by the Newport News Shipbuilding and Dry Dock Co.

Edmundsons Extensions

Reference has already been made to the large extension programme which is being put in hand by the Edmundson group of companies. Some details have now been received of the Hayle and Stourport extensions.

The Cornwall Electric Power Company's extensions will be made to the existing power plant at Hayle, near Penzance, Cornwall. The additional plant will have a capacity of 15,000 kW and will consist of two water-tube boilers each of 100,000-lb. per hour evaporative capacity, and one 20,000-HP steam turbo-generator. In addition there will be installed considerable ancillary plant, including a new switching station for the additional output. It is anticipated that work will be begun on the site by January 1st, 1945, for completion in September, 1946. Two hundred men will be engaged at the peak period of construction. The estimated cost is £460,000. Messrs. Farmer & Dark, industrial architects, who have been responsible for the design of a number of leading power stations, are the architects. The entire production unit, *i.e.*, boiler and turbine, will be automatically controlled.

An outlay of over £2,000,000 in construction and equipment is scheduled for the new station at Stourport, Worcestershire, at the junction of the rivers Severn and Stour. Technically an extension of the existing Stourport station of the Shropshire, Worcestershire and Staffordshire Power Company, in effect the proposed station will be built alongside this and will be virtually a new station. Its generating capacity will be 60,000 kW. Building operations are to start on January 1st, 1945, and the station is scheduled to be in commercial operation in September, 1947. It will provide continuous work for at least one hundred and fifty men for over two years. Peak employment will amount to five hundred men. The evaporative capacity will be 525,000 lb. per hour, at a pressure of 1,275 lb. per sq. in., and a temperature of 975 deg. F.

Discharge Lamp Order Revoked

The Minister of Works has made the Discharge Lamp Lighting (Revocation) Order, 1944 (S.R. & O. No. 1370, Stationery Office, 1d.) which revokes the Control Order of 1943 (S.R. & O. No. 1201) as from December 14th. The original Order made it necessary to secure a licence from the Ministry for the installation and use of gas or vapour discharge lamps of more than 10 W, such as low-pressure mercury vapour fluorescent tubes, high-pressure m.v. discharge and fluorescent lamps and sodium discharge lamps.

Mr. L. C. Penwill, Director of the Electrical Contractors' Association, has informed his members that he understands that the revocation of the Order will not affect the need for customers and others desiring to install power factor correction condensers to obtain the necessary licences for these from the Ministry of Supply.

Bedford Jubilee Luncheon

Last Friday a luncheon was held at Bedford to celebrate the jubilee of the electricity undertaking, which, as reported in our issue of December 8th, occurred on December 5th. Proposing the toast of the undertaking, the Mayor, Councillor J. A. Canvin, J.P., praised the foresight of the original Electricity Committee, one of the members of which, Mr. J. W. D. Harrison, now ninety-seven, was present. He said that at Bedford all the temporary houses would be equipped throughout with electricity.

In his reply, Alderman W. E. Sowter, chairman of the Electricity Committee, who presided, said that as the undertaking had such a diversity of consumers, it had increased its charges only once since the war, despite serious increases in the cost of coal and materials and despite the lower calorific value of the coal. Any further increase in the price of coal would have to be passed on to the consumer, and as long as the electricity supply industry continued to subsidise the coal industry this would be so.

After a loss for the first ten years of its operation the rural demonstration scheme was now paying its way. The undertaking now planned a big scheme of development and reconstruction involving the construction of a new grid receiving station which would enable the undertaking to meet several times the present

demand. During the past two years 70 per cent. of the consumers south of the River had been changed over to the national standard system and the remainder would be dealt with as soon as possible. He hoped that they would be able to retain local control of the undertaking. In conclusion, Alderman Sowter thanked his committee for its support and also the two engineers with whom he had been associated, Mr. R. W. L. Phillips and Mr. P. G. Campling.

Mr. J. N. Waite, manager, C.E.B. South-East England Area, replied to the toast of the guests proposed by Councillor A. Mitchell-Innes, a member of the Electricity Committee. He said that the best results could be achieved by combining urban and rural areas. Rural supply could be made to pay its way and the diversity factor and combination of urban and rural supplies would reduce the total costs. Electricity supply was not only a business, but also a great social service. It followed that those in control must regard themselves as trustees charged with the duty of making supplies available to all within their area at a cost which enabled it to be used for all purposes. They must also help the consumer by assisted wiring and hiring of apparatus, together with a first-class maintenance service.

Iron and Steel Control

The Minister of Supply has made the Control of Iron and Steel (No. 36) Scrap Order, 1944, withdrawing (i) the restrictions on the treatment, use, and consumption of ingot mould scrap and tramway rails and (ii) the obligation to segregate scrap steel containing tungsten. Copies of the Order (S.R. & O. 1944 No. 1335) may be obtained from the Stationery Office, or through any bookseller, price 1d.

Telephone Lines for Television

It is reported by *Reuter* from New York that the Packard Manufacturing Corporation has developed a process for transmitting television over ordinary telephone lines and a method of recording television programmes for broadcasting in the same manner as sound radio programmes are now transcribed. It is claimed that this makes possible high-fidelity transmission of signals over a standard No. 19 gauge twisted telephone wire, thus eliminating the need for costly coaxial cable.

The invention has been adapted to the production of records which contain not only the programme material but the picture as well. It may also be used to adapt existing broadcasting stations to television transmission as well as audible transmission on a single frequency in the present standard-broadcast band. Utilisation of the standard-broadcast bands will extend the range of the transmitters.

The T.V.A.

How the Tennessee Valley Authority's scheme has resulted in bringing down the price of electricity in the area from 6 cents. to 2 cents. per kWh was mentioned by Mr. David Cushman Coyle, consultant for the scheme, at a lunch time meeting on post-war reconstruction held last week by the Town and Country Planning Association at the E.L.M.A. Lighting Service Bureau. Mr. Coyle pointed out, however, that the generation of electricity was not the primary object of the scheme, which was the prevention of soil erosion. The scheme too was undertaken at a time of exceptional circumstances and he would not like to forecast that similar projects undertaken say for the Danube or Scotland would prove equally satisfactory. Much of the success of the T.V.A. was due to the fact that planning had been done at the correct level and that the body, which was a Government-owned corporation, was non-political and not under the control either of the civil service or of the seven states concerned, which were in fact not even represented. As a result of this freedom from outside control the Authority was able to carry out a unified scheme.

Mr. R. L. Reiss, who presided, said that if the primary object had been the generation of power, matters might have been different. The significant thing was that, starting out with its original purpose of preserving the soil, the T.V.A. now influenced practically every activity in the area.

E.D.A. Constitution

Dissatisfaction has been expressed by a group of local authority members of the Electrical Development Association regarding the present method of constituting the Council. It has been suggested that the articles of association should be altered to provide that the representation of local authority members shall be in the same proportion as their aggregate annual subscriptions bear to the total subscriptions to the Association and a postal ballot is mentioned. We understand that the matter is being discussed with the President (Lord Brabazon) and that a statement will be issued later.

"Wireless World" Diary

The *Wireless World* Diary and Reference Book for 1945 is now available from booksellers and stationers. The price (including purchase tax) is 3s. 4½d.

Fined for Making Gas Lighters

At Edinburgh Sheriff Court on December 7th, R. G. Bunch (trading as the Buccleuch Radio Service) was fined £200 for making electric gas lighters in contravention of the Electrical Appliances (Control of Manufacture and Supply) (No. 2) Order, 1943. It was urged for the defence that the materials employed were of no value in the war effort and the sales were merely replacements of elements for lighters sold before the Order came into force.

Gas-Electric Co-operation

Last month a joint exhibition was held by the St. Austell & District Electric Lighting & Power Co., Ltd., and the St. Austell Gas Co., Ltd. Photographs and plans of post-war kitchens, both electric and gas, lent by E.D.A., the B.C.G.A. and the Bristol Gas Company, were displayed together with some of the latest models of gas and electric cookers.

Electrodepositors' Annual Meeting

At the annual general meeting of the Electrodepositors' Technical Society recently held in London the hon. secretary, Dr. S. Wernick, presented an encouraging report. The Society had held more meetings during the past session than ever before, ten in London and the same number in Birmingham, at the rate of one meeting per month. Some fifteen papers were

presented, so that the increase in the number offered had been well maintained, which might make it necessary at times to publish a paper without its presentation at the Society meetings in the future.

The number of subscriptions received was greater than in any previous session, while a good demand was maintained for the Society's publications and the number of applications for membership during the last session greatly exceeded all previous records.

Eastbourne Showroom Proposal

A special meeting of the Eastbourne Electricity Committee is to be held to consider a scheme by the borough electrical engineer, Mr. N. Boydell, for new offices and showrooms for the Electricity Department.

Contract Price Adjustment Formulæ

The latest figures for the B.E.A.M.A. contract price adjustment formulæ are again unchanged. They are as follows:—(*a*) "Rates of Pay": the rate of pay for adult male labour at December 16th shall be deemed to be 90s. 6d.; (*b*) "Costs of Material": the index figure for intermediate products last published by the Board of Trade on December 16th is 176·2 and is the figure for the month of November, 1944.

Coal Analyses

A report on the analysis of commercial grades of coal in the Nottinghamshire and Derbyshire area (95 pages, 4 plates) has just been published as Fuel Research Survey Paper No. 57 (Stationery Office 2s. net).

Commercial sampling of the output of the same coalfield has already formed the subject of two papers (Nos. 37 and 48) in which over 500 grades are dealt with. The present paper gives the results of a further 213 analyses, which are also the work of the Fuel Research Survey of the Department of Scientific and Industrial Research.

The commercial names of the grades, the seams from which they are prepared, the methods of their preparation and the names of the collieries are given in each case.

Trade Announcements

Negotiations have just been completed whereby the activities of the Machinery Department of J. Gerber & Co., Ltd., have been taken over by G.P.U., Ltd. (whose registration is recorded in our "New Companies" section) which also controls the Electroplant Co. The company will in future trade in the name of the Electroplant Co., with offices and works at the Palace of Engineering, Wembley, Middlesex, formerly occupied by Gerber's Machinery Department.

The new concern, which has already assumed all obligations, will be under the management of Mr. F. L. Kessel, who was previously in charge of Gerber's Machinery Department. Messrs. H. S. Lewis, A.M.I.Mech.E., G. L. R. Jones, A.M.I.E.E., and A. G. A. Rainey, F.C.A., have been appointed directors. The main activity will be to produce "G-Power" units.

The Electrical Department of Hartley & Baldwin, Ltd., has been purchased by Electrical & General Accessories (Leicester), Ltd., 7, Newhall Street, Birmingham, as from January 1st. The new company will carry out all existing orders and contracts entered into by Hartley & Baldwin, Ltd. The transaction does not affect Hartley & Baldwin's Bolt and Nut Department. Mr. Frank Hartley is joining the purchasing company as a director.

Calendars

A scale for seeing at a glance the date weeks ahead is provided with the calendar of Hugh J. Scott & Co. (Belfast), Ltd., Volt Works, Belfast.

Daphne is the name of the blonde adorning the wall calendar received from Mr. Christopher Wade (Gabriel Wade & English).

Daily tear-off sheets are provided on the calendar of Roper Bros., Ltd., 5 South Anne Street, Dublin.

Coloured pictures of the company's products and beauty spots appear on the monthly sheets of the 1945 calendar of Ransomes & Rapier, Ltd., Ipswich. Copies are available at the nominal charge of 1d.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections to any of these may be made within one month from December 13th:—

ALUMILITE. No. 628,613, Class 9. Scientific, photographic, optical and signalling instruments and apparatus; electrical instruments and apparatus not included in other classes; coin- or counter-freed apparatus, etc. No. 628,614, Class 11. Apparatus for lighting, heating, cooking, refrigerating and drying.—Alumilite & Alzak, Ltd., 40, Brook Street, London, W.1.

MORGANITE. No. 630,070, Class 9. Electrical apparatus not included in other classes; crucibles; apparatus and appliances (not included in other classes) wholly or partly of carbon, for metallurgy and metal-working or for heat treatment in chemical, glass-melting, enamelling, dental, electric lamp making and other industrial or scientific processes; instrument parts (not included in other classes) made wholly or partly of consolidated aggregates or masses comprising carbon, metal or carbon and metal.—Morgan Crucible Co., Ltd., Battersea Church Road, London, S.W.11.

HELIOS (design). No. B629,784, Class 11. Electric lamps for cinematograph purposes and for projection lanterns; laboratory lamps and lamps for use in floodlighting.—Helios Electric Lamp & Glass Works, Ltd., 6, Angel House, Islington, London, N.1.

INFORMATION DEPARTMENT

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

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

Manufacturers of "Warmex" blankets.

Transformer Economics

Views on Mr. W. Szwander's Paper

THE Transmission Section of the Institution of Electrical Engineers on December 13th discussed Mr. W. Szwander's paper on "The Valuation and Capitalisation of Transformer Losses" which was referred to in last week's issue.

The discussion was opened by MR. G. F. KENNEDY (Kennedy & Donkin), who said that the author concluded that in considering the merits of two transformers the annual cost of copper losses should more or less equal the annual cost of the fixed losses and, that the total annual cost of the losses should be about 2·5 times the total capital charges on the transformer. Did these conclusions apply to the larger transformers commonly used on the grid as well as to the smaller type referred to in the paper? Although large magnetising current was undesirable from the point of view of users who were purchasing current on a tariff which incorporated a power factor clause, the presence in h.v. cable systems of a large number of transformers taking a large magnetising current improved the stability of the system at light load.

Iron-Loss Reduction

MR. A. G. ELLIS (Metropolitan-Vickers) said the capitalisation formulæ computed by the author in general corresponded well with what had been found in practice, but designers wished to know to what extent the figures and formulæ were considered by power suppliers as representative. Possible developments in materials and the increasing price of coal, with other varying factors, suggested that the time had arrived for a general review of loss levels with a possible reduction all round, particularly in the iron loss. Any radical reduction of the iron loss would require the use of too high grade a steel for economic design. Hot rolled steel of 0·4 W per lb. would be useful for power transformers when extremely low iron loss was required. There was a use for the high-permeability low-loss steels of the cold rolled variety that had been developed in the United States which were capable of working down to half the loss levels of the hot rolled steels normally used in this country. Even if they were not employed to reduce core losses, their use would result in a reduction of weight and dimensions.

MR. F. S. NAYLOR (Southwark) said the author seemed to base his calculations on the idea that the consumer himself bought the transformers, but the vast majority were bought by distributing authorities. The consumer was not concerned with formulæ, but with the cost of the energy supplied to him. A factor which the author had not recognised was that while the iron loss would always come on the peak, the copper loss would not necessarily do so and therefore one must consider diversity when seeking the value of the copper loss. Had the author known of the speaker's 1936 paper he would have been able to avoid one or two mistakes. This and later papers had provided values for the load loss-factor which were nearly double those given in the present paper. There appeared to be a certain amount of confusion about what the author meant by "z," representing the load loss-factor. The author's implication that voltage regulation could be ignored because it involved complication was quite unworthy of him. In his view, the problem was not too complicated and there were many areas where regulation could not be ignored.

Effect of Magnetising Current

MR. D. J. BOLTON emphasised that the magnetising current was a very definite economic element and its value could easily be worked out. The author, however, said in one part of the paper that the result of taking account of magnetising current would be negligible and in another that it would be prohibitive; he could not have it both ways. The author gave an elaborate method of obtaining the capital cost of reducing the losses in preference to the comparatively simple method of calculating through the theory of under-running a standard transformer. Mr. Szwander admitted that his method was not easy to apply in practice because complete information on the price variation of transformers was not readily available, particularly if a wide range of values was to be considered. A little later "the catj umped out of the bag" because the author's curves were largely obtained on the under-running supposition. Neither of the author's rules inspired him with very much confidence; he felt they were both either untrue or irrelevant, and he suggested that in a paper of this sort one looked for something a little more rational and scientific.

MR. E. T. NORRIS (Ferranti, Ltd.) said that although supply engineers did analyse losses in transformers they did not to anything like the same extent have the courage of their convictions and buy transformers in accordance with the principles of capitalisation. One reason was that in many cases capital resources were limited and the cost of capital was not the interest paid on it, but the earning power. The other reason was the uncertainty of the future. For instance, twenty years

ago very few people would have said that the cost of coal would be what it was to-day. Although that might not be a reason for not capitalising, it was a reason for making the best guess possible and trying to keep on the safe side.

MR. G. O. MCLEAN (Edmundsons) commented on the fact that the author had taken only the three-phase transformer for his calculations. Supply engineers responsible for rural areas required a lead as to when economics indicated a change from three-phase to single-phase distribution. The author had used the annual cost in his calculations and only for one year whereas the whole life of the transformer should be taken into consideration.

MR. H. M. LACEY (E.R.A.) pointed out that none of the author's calculations took reliability into account. Although he did not wish to decry the idea of calculating on the basis of minimum cost, he asked users of transformers to remember that they might be giving the designer such a difficult task that they would, in effect, pay more.

MR. G. O. CASTELL (Hackbridge Electric Construction Co.) said that we were told that after the war working hours and production would have to be increased and that to secure both there would have to be better organisation and productive methods. A number of firms were preparing to meet those demands by some form of standardisation. But the author said that transformers should be designed differently for every system and, in some cases, for different parts of the same system. If the supply industry could give some idea of typical figures which would be acceptable generally throughout the country so that more or less standard ranges could be designed to cover the required sizes, manufacturers would be able to contribute towards the increased efficiency of supply and, at the same time, improve production.

PROFESSOR R. O. KAPP favoured existing practice in contrast to the proposals of the author. The fundamental principles as explained in the paper had been fully appreciated in the past, but difficulties had arisen because the losses involved an enormous amount of uncertainty whereas the purchase price of the transformer was in the tender and there was no question about what it was going to be. Further, the rate of interest was not known and the sinking fund contribution was uncertain. Moreover, there was still greater uncertainty as to the manner in which the transformer would be employed during its lifetime. It seemed to him that the only thing to do was to introduce an "uncertainty" factor and perhaps give more weight to the figures that were most certain. He agreed that the economic value of regulation was very important and that it was a direct function of the leakage and thus also of the short-circuit current in the transformer. Therefore, while on the one hand good regulation was economically sound, on the other hand if it involved a heavy short-circuit current and a heavy expenditure on switchgear, the purchaser would want reactance and so settle what the rating was going to be.

The author reserved his reply for the *Journal*.

P.V.C. Insulated Cables

Production and Installation

CABLES insulated with polyvinyl chloride were the subject of a lecture, illustrated with lantern slides, delivered by MR. P. H. BARTON in London to the Association of Supervising Electrical Engineers.

The lecturer commenced with a brief outline of the method of plasticising p.v.c. and its application to conductors by means of forcing machines (somewhat like sausage making) under pressure with heat to form either insulation or sheathing. While the process seemed simple, experience had shown proper control to be essential because of the importance of maintaining correct barrel, head and screw temperatures as well as both screw and running speeds and point and die sizes. If the plastic substance were not kept at a uniform temperature it would be unevenly stressed during its passage between the point and die, which was one of the main causes of cracking and shrinkage.

After mentioning the outstanding properties of p.v.c. cables the lecturer stressed certain troubles which had been encountered in practice, offering advice on how they might be avoided. He then proceeded to explain at some length a series of tests, some of them stringent, devised to ensure that this type of cable would be capable of withstanding varying conditions of service, there being little variation between the generally satisfactory results throughout the tests.

Finally, Mr. Barton briefly described how this class of cable should be handled and installed; also how its insulation and sheathing reacted in different situations in which it was likely to be used. The object of his lecture was to provide sufficient information to indicate that if proper care were exercised during their processing and manufacture, coupled with more co-operation between users and makers, then cables insulated with p.v.c., although not replacing rubber insulated types, would definitely have a place in post-war planning.

Neon Stroboscopic Lamps.—A meeting of the Institution of Electronics (N.W. Branch) will be held at 7.30 p.m. on February 2nd, at the College of Technology, Manchester, when Messrs. D. Besso, B.A., and H. Brown, B.Sc., will give a lecture on "Neon Stroboscopic Lamps with Special Reference to Lamps of the Cold Cathode Type." The lecture will be followed by a demonstration. Non-members may obtain tickets from Mr. L. F. Berry, 14, Heywood Avenue, Austerlands, Oldham.

War on the S.E. Coast

Electricity Undertakings Carry On Under Fire

REFERENCE was made in our issue of November 10th to the war record of the Dover Electricity Department. Further details just released relating to the operation of the electricity undertakings on the South-East Coast emphasise not only the ordeal through which they have passed during the past four and a half years of practically incessant bombing and shelling, but also the courage, foresight and ingenuity of the men responsible for furnishing and maintaining supplies. Frequently it has meant working for very long periods without rest, but, realising the essential nature of the service, everyone concerned has carried out his duties uncomplainingly. The value of mutual assistance schemes too has been repeatedly proved. How successful were the steps taken to maintain supplies can be judged from the fact that on no occasion were supplies cut off for more than a few hours.

To give some idea of the conditions at Dover it may be mentioned that there is virtually no building in the town which has not been damaged to some extent. Both the Marine Station and the Museum substations have been damaged by bombs, while shells have damaged the substations at Deal Road, Wanstone Farm, Sea View Road, Frith Road and South Foreland, the last-mentioned having been hit no fewer than four times. In addition there were ninety-four "incidents" affecting cables, steel kiosks and underground substations.

In July, 1940, a severe air attack was made on the depot ship in the Dockyard causing an intense fire and damaging the h.v. and l.v. mains on the pier and at the defences. These mains had to be proved dead to enable the fire brigade to operate without additional risk ; after this they had to be repaired for this important ship's engines. The auxiliaries were put out of action and a request was made to provide a supply at once to run all the workshop repair plant, etc.

Four switchboard attendants in particular have stood by the undertaking admirably and, although the electricity undertaking is in the centre of the target area, on no occasion have they left their post. The jointing staff has done exceptionally good work. On one occasion when a shell had fractured a 6,600-V trunk feeder, a jointer and his mate were working in the crater when another shell dropped approximately fifty yards ahead of them, causing injuries to personnel. They gave assistance in attending to the injured and then returned to make good the damage to the electricity main. Another jointer, on two occasions, repaired two 500-V feeders which had to be restored as they were supplying important establishments ; these repairs were also carried out while shelling was in progress.

Mr. R. G. Widgery, borough electrical engineer of Dover, describing damage caused by a shell to an underground substation now being repaired

In the area served by the Folkestone Electricity Supply Co., Ltd., there were 264 incidents involving damage to mains, caused by H.E. bombs, parachute mines, flying bombs, and shells. Many of these incidents involved isolation of sections of mains pending clearance and cutting of services. In addition a further 300 incidents were attended for inspection where no major damage occurred to the company's property.

During an enemy air attack on a local aerodrome in August, 1940, an enemy dive bomber crashed through the double-circuit grid lines near the works, causing a total failure of the supply to Folkestone and

Dover. The generating plant was completely out of commission ; boilers were empty and under repair, and chain-grates were partially dismantled ; and coal bunkers were empty ; but the plant was put into commission and on load in eleven hours. The Central Electricity Board effected the repair of one line in 10½ hours, beating the company by half-an-hour. On the same day a h.v. cable supplying the adjacent aerodrome was damaged by a bomb in the middle of the landing ground. The repair was punctuated by frequent alarms and machine - gunning by enemy aircraft.

A piece of 33-kV cable which for 24 hours carried the whole of the power for the Dover district through the steel suspension core, after the outside aluminium conductor strands had been severed by a fragment of shell during a raid

In May, 1941, the generating station and buildings suffered damage by blast from a parachute mine nearby, and in May, 1942, an air attack believed to have been directed at the works and the C.E.B. substation missed the mark by about 100 yards. On fifty-one occasions overhead lines were brought down by flying bombs—on one occasion three major lines simultaneously, and several times cables were damaged by shelling. A wireman cycling to work was shot in the back by enemy aircraft, and the showroom manager and wireman working on damaged property found an unexploded mine.

No fewer than 390 incidents affecting the South-East Kent Electric Power Co., Ltd., included damage to four substations, 223 overhead lines and 129 underground cables. In addition there have been failures of supply caused by barrage balloons, etc. The longest period of failure in Deal and district was under two hours.

In October, 1942, fifty enemy fighter-bombers bombed and machine-gunned East Kent, particularly the Canterbury area. In a matter of a few minutes damage was sustained by the system in eleven separate places spread over a large area. The supplies to the larger sections of the community were fully restored within a few hours, and those to the more isolated areas were restored within 46 hours.

The company's offices were damaged four times by bombs and three times by shells. The air raid shelter at the West Street stores received a direct hit by a 500-lb. bomb, but fortunately no one was in it at the time. In October, 1940, employees of the company captured and held down the first German barrage balloon which drifted across the Channel, but at the time there was a heavy gale blowing and the balloon cable became entangled in the e.h.v. lines at Martin Mill.

In April, 1942, Betteshanger Colliery was attacked, six bombs destroying the boiler house and other surface equipment. The electricity supply was cut off and the generating station at the colliery was put out of action. In an hour and fifty minutes an emergency supply was re-established so that the ventilating fans were again in operation in just over two hours and the water pumping plant within 3¾ hours.

Turbine Blading

Parsons Memorial Lecture

THE annual Parsons Memorial Lecture was delivered by Dr. C. E. Inglis at Newcastle-upon-Tyne, at a meeting arranged by the North East Coast Institution of Engineers and Shipbuilders and the Institution of Engineers and Shipbuilders in Scotland. Dr. Inglis, who was Professor of Mechanical Sciences at Cambridge from 1919 to 1943, was presented with the Parsons Medal, which is awarded by the Royal Society as trustees of the memorial.

The main portion of the address was devoted to the development of a method which the lecturer believed to be the natural process of determining critical speeds and modes of vibration of the shafts as well as the natural frequencies and modes of vibration of the blades of steam turbines. No matter what form of directional constraint was exerted by the end supports, or how variable in section the shaft or blade might be, calculation could be reduced to the solution of two linear simultaneous equations, which always took the same form and were of general application.

The method depended upon expression of the mode of movement in terms of basic functions that represented the distribution of load on a beam of uniform section which produced a similar curve of deflection. By a sort of glorified harmonic analysis any load distribution on beams supported in different ways could be resolved into a series of basic components and, in the case of turbine blades, simple formulæ had been evolved for estimating the growth of natural frequency due to centrifugal action.

The address indicated the method in broad outline only, leaving the details to be studied by those who desired to do so in the printed version of the lecture.

Maintenance Organisation

Importance of Starting Right

IN opening the discussion on the paper by Mr. J. C. B. Nicol on "The Organisation of Industrial Electrical Maintenance" (*Electrical Review*, December 15th, p. 844) at a meeting of the Installations Section of the I.E.E. on December 14th, SIR HENRY CLAY remarked that the system outlined appeared a little complicated and probably in most of the larger works even it would be difficult to get it working satisfactorily unless there were an unusual engineer in charge.

Undoubtedly more attention should be paid to the investigation of breakdowns because that was the best method of deciding what plant was not satisfactory and should be changed and what plant required more maintenance. Nevertheless, he could not imagine many engineers studying the author's history cards. It should be quite possible, however, to produce short reports on all breakdowns, even trivial ones, and lay them on the engineer's desk every morning. An analysis of faults in about thirty cases had revealed that motor starters represented about 80 per cent. of the trouble. Manufacturers might look into this point.

Careful Initial Selection

MR. R. I. KINNEAR, discussing the problem from the point of view of the shipbuilding industry, said that the author's suggestions were much easier to put into print than into practice in certain types of electrical installation. Careful selection of equipment and first-class workmanship were called for in the initial stages and that was one of the directions in which there was the greatest weakness. The routine inspection recommended in the paper suggested, to some extent, pre-existing knowledge of inherent weaknesses of electrical equipment, with which he did not agree. Further, the cost of collecting and maintaining statistics of routine inspections on certain types of plant would far outweigh the losses due to ordinary supervision and the assistance given by the operators themselves.

It was not quite clear what the author meant by "quality control" in connection with routine inspection and the speaker saw great difficulty in maintaining an organisation for the simple and sole purpose of routine inspection. Certainly that would be the case on ships with electrical installations often of the order of 10,000 kW and in connection with which the planning in the initial stages had of necessity to be of the highest class having regard to the nature of the installation and the conditions of operation.

MR. C. F. FREEMAN said that it was the designer who was anxious to improve and change, but that could only be done by co-ordination with the maintenance engineer. He had given information to manufacturers of troubles experienced and in some cases it had resulted in improvement of the apparatus. He recalled that when the late Mr. Marryat read his paper on the standardisation of motor dimensions makers generally did not support the idea. The speaker recently visited a large ironworks in the Midlands in which the engineer had standardised his motor sizes so that when one motor broke down he could immediately replace it with another without holding up operations. The author's system of card indexing seemed very complicated; all the card indexing in the world would not replace personal integrity on the part of the men doing the job.

Large and Small Works

MR. G. T. SHEARS urged the need for inter-departmental co-operation. Records, such as those advocated, were more applicable to very large works. In the case of the smaller works, the task of keeping records fell to the lot of one of the engineering assistants who often started off conscientiously, but whose enthusiasm waned after a while.

MR. F. H. MANN, said he was interested in the author's reference to the annual report of the Electrical Branch of the Factory Department as he had something to do with its compilation. Faulty electrical maintenance was one of the three causes of accidents, but unsuitable design also played a part. Performance could only be guaranteed by periodical inspection and testing.

MR. A. CUNINGTON (Southern Railway) did not think the author ought to be criticised for putting forward high ideals. The maintenance department had always been the Cinderella of the household because the management had not appreciated its importance. Too many troubles arose in connection with industrial equipment because of lack of co-operation between all parties in the initial stages; the maintenance engineer should be brought in at the very beginning.

MR. A. J. BOUSFIELD, referring to the author's suggestion of an "unbiased centre of reference," said he would prefer something on the lines of the Building Centre where plant, tools and materials could be inspected, but without comment. The standardisation of motor dimensions was vital in any works of considerable size. Makers of starters were very often diffident about standardising designs, which they acknowledged would reduce maintenance, owing to fear that

increased cost would lose them orders. He suggested that there should be two grades, one for the buyer who wanted the cheapest article that would comply with standard specifications and another for people who appreciated that it was more economical to pay a little more for greater reliability. He was doubtful about the advisability of the very complete records and reports suggested, except for high voltage plant, oil circuit-breakers, precision relay settings, transformers, etc. The application of the system to motorised units in a large undertaking was a somewhat appalling prospect. In his company's works at Dagenham there were some 11,000 such units.

MR. P. TURNBULL thought that there should be a proper location of the store-keeper's data and a proper record of the replacement parts that were most needed. His firm had standardised 3, 5, 7, 10, 15 and 25 HP motors in the newer plants which had been put down and that had been found very useful indeed. He had gone a long way to curing starter troubles by having contactor type starters, and remote control and housing them in kiosks or separate switch rooms.

MR. R. SHINNIE said that in his case it had been found necessary, in order to minimise the time of a shut down, to clear out the various different makes of starters that formerly existed and install one particular make. He urged the more frequent inspection of fuse boxes to prevent contacts oxidising and causing trouble. The inspection of motors every six weeks would require a large maintenance staff in the average factory; he felt it was best to put in the best quality apparatus and let well alone, providing the plant was running satisfactorily.

MR. NICOL replying to a number of the points raised, said that the system outlined in the paper had not been installed anywhere yet. His main purpose was to encourage other engineers to give information of their own particular systems and he was pleased that the discussion had provided a great deal of useful information from that point of view.

Information for Contractors

Christmas and New Year Holidays

THE National Federated Electrical Association has notified its members that the following days are to be regarded as holidays in the electrical contracting industry and if such days are worked the rates shown against them will be paid:—Saturday, December 23rd, bare time rates only. Monday, December 25th, double time for all hours worked. Tuesday, December 26th, time-and-a-half for all hours worked. Alternatively the following days will be approved holidays:—Saturday, December 30th, bare time rates. Monday, January 1st, bare time rates only except where local rules of certain towns in the North-Eastern Area, Manchester and Salford, Scarborough, and Sheffield apply; in such cases time-and-a-half is payable for all hours worked. Tuesday, January 2nd, bare time rates only. In addition time-and-a-half is payable for all hours worked on Wednesday, December 27th, when the local rules of Derby, Leicester, Nottingham and Scarborough apply. If these days are not worked no wages are payable in establishments not scheduled under an Essential Work Order.

Extra Clothing Coupons

Arrangements have been completed for the issue of extra clothing coupons for industrial workers. Particulars are given in Leaflet T.C. 45 obtainable from all Ministry of Labour and National Service offices. The leaflet sets forth circumstances in which supervisory and administrative workers may obtain extra coupons.

Third-Party Liability

Mr. Penwill draws E.C.A. members' attention to the necessity for all cases of third-party liability to be dealt with by the Association under its insurance policy covering all members. Admission of liability invalidates all claims as in a case quoted. A member carried out an electrical installation in a particular factory. After its completion an operative employed by another firm on entirely different work came into contact with certain of the wire which suspended electrical fittings installed by the member and brought down a whole row of fittings, causing a considerable interference with production. The member, in the national interest, reinstated the fittings without an order from his customer, whereupon the insurance company contended that this was tantamount to an admission of liability.

Electric Tools for Builders

SOME 500 members of the London Section of the Master Builders' Association attended a recent exhibition in the Connaught Rooms of electrical hand tools suitable for use in the building industry. Mr. H. C. Harland, president of the Association, presided. Among the tools on view were rip and cross-cut saws, hammers, power planes, drills, screwdrivers, sanders of both rotary disc and belt types, grinders, shears and routers. Some of them, owing to war conditions, are not in production to-day, but if sufficient demand is forthcoming the Ministry of Supply will no doubt see that the builders get what they require.

Mr. F. C. Orchard, chief electrical engineer of Hornsey, introduced the exhibition with the remark that it was not fair to say that the average British workman worked any less hard than his opposite number in America, but the increased output was obtained very largely by the provision of power driven tools. The employer must be prepared to adopt a more co-operative outlook by sharing some part of the profits with the people who helped to make them. When the operative was convinced that he was to reap an advantage of a financial nature, he would be more likely to receive the tools in a better frame of mind.

ELECTRICITY SUPPLY

Belfast Plant Proposals. Paisley and Voltage Standard.

Belfast.—ADDITIONAL GENERATING PLANT.—The City Council has approved a report of the city electrical engineer and general manager (Mr. W. J. McC. Girvan) recommending the installation of additional plant at the Harbour power station. The estimated cost exceeds a million pounds. Mr. Girvan stated that, following the erection of a station by the Government and its interconnection with the Harbour power station, all supplies in Northern Ireland, excluding the requirements of the county borough of Derry, were now being given from those stations. In view of the heavy demands on manufacturers for central station generating plant for Great Britain and elsewhere the Ministry of Commerce should be requested to communicate with the Minister of Fuel and Power informing him of the urgent needs of Northern Ireland and asking him to make provision in the manufacturers' programme for the supply of plant for Northern Ireland for service during the winter of 1946-47.

Brighton.—INCREASED HIRE CHARGES.—The borough electrical engineer (Mr. H. Pryce-Jones) having reported that the cost of maintenance had risen very seriously over the past few years, the Public Utilities Committee has increased the hire charges for standard domestic apparatus. For the last financial year the maintenance costs were £4,350 per quarter. Under the revised scale the total rentals will be equal to the maintenance costs.

Chesterfield.—CONTROL SYSTEMS DEMONSTRATED.—After a representative of the General Electric Co., Ltd., had explained the ripple system of remote control of street lighting and emphasised other uses and advantages of such a system, the Lighting Committee inspected a control panel temporarily installed at the power station and also a concrete lighting column fitted with an "Oxford" type diffractor lantern. At the electricity showrooms the control system was demonstrated by means of a model street lighting unit, including street bollards which had been prepared under the supervision of the borough electrical engineer (Mr. W. W. Grimes). The Committee decided to obtain estimates of the cost of such an installation.

Dagenham.—INSTALLATIONS IN HOUSES.—The Borough Council has decided to have electricity installed in fourteen houses in Crescent Road.

Keswick.—PURCHASE OF UNDERTAKING DISCUSSED.—The Lighting Committee has reported to the Urban District Council on a meeting held recently with the Electricity Commissioners on the question of the Council's taking over the electricity supply in the urban area.

Lichfield.—RURAL CHARGES REDUCED.—The Electricity Committee has decided to reduce the ordinary lighting rates in the rural area to the same level as for the city.

London.—ELECTRIC PUMPING.—The Metropolitan Water Board is to remodel and electrify the Ferry Lane pumping station at a cost of £19,900.

Manchester.—FRINGE ORDER.—The Corporation has decided not to object to the granting of a Fringe Order to Oldham Corporation to supply electricity to four cottages at Failsworth, in the Manchester area of supply.

Paisley.—VOLTAGE STANDARDISATION.—Mr. Donald Ross, burgh electricity engineer and manager, reported to the Electricity Advisory Committee recently on a meeting of electricity suppliers which he had attended when the standardisation of voltage was discussed and several speakers had opposed 230 V as the standard. The Committee recommended that the engineer should oppose standardisation at 230 V and press for 240/250 V.

Portslade.—ELECTRIC LIGHTING SCHEME.—The Urban District Council on December 12th decided to carry out a scheme for converting all street lighting in the district to electricity. The proposal was originally made at the outbreak of the war and a contract had been prepared with a Brighton firm who are now to be asked to submit a revised tender. The Ministry of Health is to be asked to authorise a loan to finance the scheme.

Swindon.—ALLOCATION OF SURPLUS.—The Electricity Committee reports a surplus for the year ended March 31st last of £17,173. Of this £12,300 is to be used for rate relief.

Thurrock.—EQUIPMENT OF PORTAL-TYPE HOUSES.—The Tilbury Electricity Committee (the Thurrock U.D.C. owns two electricity undertakings, Tilbury and Grays) reports having received a letter from E.D.A. on the subject of the equipment of Portal-type houses. It was resolved that the Housing Committee should be asked to consider applying for a 100 per cent. allocation of electrical houses, having regard to the Committee's experience of the demand for electrically equipped houses.

Tynemouth.—METER REPLACEMENT.—The Town Council is to include £4,000 per annum in the accounts of the electricity undertaking for the replacement of the two-coil meters which do not comply with the provisions of the Electricity Supply (Meters) Act of 1936.

RADIO and TELEPHONY

France.—TELEVISION NEXT MONTH.—Television will be resumed in France next month (January), says a report received from Paris by *Reuter*. The broadcast will be transmitted three hours a day, three days a week. As there are only fifty-three television receivers in France these transmissions will be experimental for a long time.

New Zealand.—DEMAND FOR TELEPHONES.—At the end of March 31st last there were approximately 8,000 applications for telephones waiting to be filled. The number of subscribers increased from 177,030 to 181,717 during the year, but the connection of new telephones was limited by the shortage of equipment. By reconditioning obsolete apparatus, and with the help of limited stocks which arrived from overseas, it was possible to ease the position at exchanges where switching and line accommodation was available.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Crompton Parkinson, Ltd.—Speaking at the annual meeting on December 15th, Mr. Frank Parkinson, the chairman, welcomed the Government's full employment and social security policy. Referring to the company's part in this Mr. Parkinson said that the community could only distribute the wealth it created. In a country like ours which of necessity must export the question of truly economic production must be the keystone of the success of any plan. The company's success depended on its ability to serve its customers with the best products at reasonable prices and this could only be achieved by good direction, ample capital, efficient management and complete co-operation between all workers in the task of increasing wealth by raising the output per worker. The relationship between the company and its workers had never been on a sounder basis than it was at present.

The problem of re-establishing our export trade demanded the most intelligent co-operation between industry and the Government. If we made the best use of our position as a large buyer of imports and if industries raised their efficiency to the highest level there would be ground for confidence in the future of our export trade.

The Electric Furnace Co., Ltd., announces a profit of £79,262 for the year ended March 31st last (against £54,544 for 1942-43). To this is added dividend from subsidiary, £4,000 (against £5,321). Provision for taxation is £55,000 (against £32,000) and £10,000 is again transferred to general reserve. The dividends on the preferred ordinary and ordinary shares are maintained at 8 per cent.

The report states that much important Government work has been completed during the last four or five years and technical development has been rapid under the stress of war. There are now great opportunities for applying to normal industry many wonderful new discoveries. The company has taken an active part in developing new forms of electric heating, some of which will supersede the less accurately controlled fuel-fired furnaces. Special reference is made to the improvement of heating with " megacycle or electronic " equipment.

Contacts are being renewed with the company's American friends. The French assets, written off in 1941, appear to be intact and steps are being taken to reactivate pre-war connections with the leading French metallurgical works with a view to re-opening export trade.

Bullers, Ltd., record a net profit of £24,602 for the year ended July 31st last, as compared with £23,984 for the preceding year. Debenture redemption takes £3,821 (£3,638), the pension fund £5,000 (same) and preference dividends £3,750. A final dividend of 5 per cent. is to be paid, making 7½ per cent. (same) and £32,761 (£26,577) is carried forward.

Heenan & Froude, Ltd., report a trading profit of £55,990 for the year ended August 31st last, as against £48,886 in 1942-43. The net profit, before taxation, is £47,368 (£42,487). A final dividend of 5 per cent. and a bonus of 5 per cent. are again to be paid, maintaining the total distribution at 15 per cent., and £10,472 (£7,604) is carried forward.

African Cables, Ltd.—At the company's annual meeting held in Johannesburg recently Mr. R. B. Hagart, chairman, said that the volume of business done during the year had been lower than in 1942-43, but the results were satisfactory. Net profit was £56,583 against £62,244, and the dividend was maintained at 15 per cent.

Broom & Wade, Ltd., have again declared a final dividend of 15 per cent., maintaining the past year's distribution at 22½ per cent.

W. & T. Avery, Ltd., are paying an interim dividend of 5 per cent. (same).

New Companies

Foster Electrical Supplies, Ltd.—Private company. Registered December 8th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, electrical, engineering and building equipment and accessories, electric lighting, telephone and broadcasting contractors, etc. Directors: M. V. Ely, 104, Brighton Road, Sutton; A. J. Sturgeon, Gerrans, River Avenue, Thames Ditton; and R. E. V. Ely, 21, Murray Road, S.W.19, director of Foster Transformers & Switchgear, Ltd. Registered office: Apex Works, Morden Road, S.W.19.

Whiteley & Holroyd, Ltd.—Private company. Registered December 2nd. Capital, £10,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical fittings and accessories, etc. Directors: R. W. Short, 20, Staveley Road, Shipley; and B. Taylor, Sowden House, Thornton, Bradford, directors of Shorts (Lifts), Ltd. Registered office: Providence Works, Ellinthorpe Street, Bradford.

G.P.U., Ltd.—Private company. Registered December 11th. Capital, £10,000. Objects: To carry on the business of mechanical, electrical and water and gas power engineers, manufacturers of, and dealers in, wireless goods, etc. Directors: A. G. A. Rainey, C.A., Redmile, Serpentine Road, Sevenoaks, and G. L. R. Jones, 59, Kingsway, Wembley. Registered office: Redmile, Serpentine Road, Sevenoaks, Kent.

Waghorn Electrical Contractors, Ltd.—Private company. Registered December 11th. Capital, £2,000. Objects : To acquire the business of an electrical contractor carried on at 91, Eccles Road, S.W. 11. The first directors are J. A. Waghorn, Kimpton, Andover, Hants ; and A. F. Smith, Ashvale, Arundel Avenue, E. Ewell, Surrey. Registered Office : 91, Eccles Road, S.W.11.

R. & P. Distribution, Ltd.—Private company. Registered December 7th. Capital, £1,000. Objects : To carry on the business of manufacturers of, and dealers in, wood separators,

batteries, accumulators, acids, containers, electrical plant and accessories, etc. Directors: B. Bertwhistle, Loch Leven, Bromley Road, Bingley, Yorks, and A. C. Coe, C.A., 7, Regent Drive, Skipton. Registered Office: Victoria Mills, Church Street, Bingley.

Brito-Canadian Machine Co., Ltd.—Private company. Registered in Edinburgh, December 7th. Capital, £20,000. Objects: To acquire the business of the Brito-Canadian Machine Co., at 9/11, Fairfield Street, Glasgow, S.W.1, and elsewhere, and to carry on the business of dealers in refrigerating plant and machinery, etc. Directors: T. Gracey, 277, Paisley Road W., Glasgow, and three others. Registered Office: 9/11, Fairfield Street, Govan, Glasgow.

Electrical & Mechanical Installations (Brentford), Ltd.—Private company. Registered Dec. 8th. Capital, £500. Objects: To carry on the business of electrical, mechanical and general engineers, etc. Directors: E. E. Moore, 22, Green Dragon Lane, Brentford, and A. V. T. Upton, 112, Preston Hill, Harrow. Registered Office: 50, High Street, Brentford, Mdx.

Partridge Transformers, Ltd.—Private company. Registered December 8th. Capital, £200. Objects: To acquire the business of an electrical engineer formerly carried on by the late N. G. R. Partridge, Ph.D., at 76/8, Petty France, Westminster. Directors: Mrs. Violette R. Partridge, 21, Castle Rd., Bedford, and A. L. Bacchus, 89, Sheen Court, Richmond, Surrey. Registered Office: 76/8, Petty France, S.W.1.

A. E. D. (Electric), Ltd.—Private company. Registered December 7th. Capital, £200. Objects: To carry on the business of electrical, electronic, wireless and mechanical apparatus manufacturers and dealers, etc. Subscribers: Margaret L. Coates and Phyllis B. G. Burnett, 69, Moorgate, E.C.2. Solicitors: Stone & Stone, E.C.2.

Battery & Auto-Electrics (Torquay), Ltd. Private company. Registered December 9th. Capital, £500. Objects: To carry on the business of electric lighting and equipment specialists, manufacturers of, and dealers in, electrical goods, etc. Directors: K. D. MacGregor-Bowron, Hilsdon Lea, Burchington Avenue, Torquay; and W. T. Milne, Harbour Lights, Hennepyn Road, Torquay. Registered Office: 29, Park Road, St. Marychurch, Torquay.

Truevolt Electric Service, Ltd.—Private company. Registered December 4th. Capital, £100. Objects: To carry on the business of electricians, engineers, etc. Directors: H. Norman and Mrs. Sonia M. Norman, both of Kimpton House, Kimpton, Herts. Registered Office: 42, High Street, Kimpton, Herts.

David Reid & Co., Ltd.—Private company. Registered in Edinburgh, December 2nd. Capital, £6,000. Objects: To carry on the business of engineers, electrical engineers, contractors, etc. First directors: T. G. Marr, 9 Princes Street, Falkirk, and five others. Registered Offices: Station Terrace, Larbert.

R. J. Adcock & Co., Ltd.—Private company. Registered December 6th. Capital, £5,000. Objects: To acquire the business of manufacturers and repairers of electric motors and apparatus carried on at Islip Works, Kentish Town, as R. J. Adcock & Co. Directors: R. J. M. Adcock, 3, Hasluck Gardens, New Barnet; and Edith K. Randall, 19, Clevedon Mansions, Lissenden Gardens, N.W.5. Secretary: E. K. Randall. Registered Office: Islip Works, Islip Street, N.W.5.

Payne Bros. (Catford), Ltd.—Private company. Registered December 6th. Capital, £200. Objects: To carry on the business of electrical engineers and contractors, etc. First directors: Vera W. Payne, 38, Ravensbourne Park, S.E.6; and S. J. C. Bradley, 53, Downsall Avenue, Seven Kings, Ilford. Registered Office: Arcade Chambers, Catford Broadway, S.E.6.

Companies' Returns

Statements of Capital

Babcock & Wilcox, Ltd.—Capital £4,620,000 in £1 shares (100,000 6 per cent. preference, 200,000 5 per cent. second preference and 4,320,000 ordinary). Return dated June 13th. 100,000 preference 179,056 second preference and 4,299,656 ordinary shares taken up. £1,029,884 paid. £3,548,828 considered as paid. Mortgages and charges: Nil.

A. Hirst & Son, Ltd.—Capital, £20,000 in £10 shares (100 preference and 1,900 ordinary). Return dated July 1st. 100 preference and 1,220 ordinary shares taken up. £2,200 paid. £11,000 considered as paid. Mortgages and charges: Nil.

West Devon Electric Supply Co., Ltd.—Capital, £450,000 in £350,000 ordinary stock and £100,000 preference stock. Return dated June 6th. All stock taken up. £386,513 paid. £63,487 considered as paid. Mortgages and charges: Nil.

J. S. Ramsbottom & Co., Ltd.—Capital, £10,000 in £1 shares. Return dated August 8th. All shares taken up. £1,000 paid. £9,000 considered as paid. Mortgages and charges: Nil.

Crypton Equipment, Ltd.—Capital, £1,000 in £1 shares. Return dated September 18th. All shares taken up. £1,000 paid. Mortgages and charges: £60,000.

Painter & Madew, Ltd.—Capital, £2,000 in £1 shares. Return dated October 2nd. 1,445 shares taken up. £1,085 paid. £360 considered as paid. Mortgages and charges: Nil.

Increases of Capital

Ashtead Electric Cable Drums, Ltd.—The nominal capital has been increased by the addition of £1,100 in £1 ordinary shares beyond the registered capital of £900.

S. E. M. Developments, Ltd.—The nominal capital has been increased by the addition of £9,900 in 9,900 unspecified shares of £1 each beyond the registered capital of £100.

Mead Electric Co., Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £1,000.

Mortgages and Charges

York Shipley, Ltd.—Assignment of proceeds of contract, dated November 29th, 1944, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

STOCKS AND SHARES

TUESDAY EVENING.

PRE-CHRISTMAS week seldom brings much grist to the Stock Exchange mills. The present season is unlikely to prove any exception to what has come to be regarded as an established convention. Prices keep firm, and amongst the front rank industrials there is little indication of a setback after the long period of advancing prices. A feature is the animation amongst radio shares.

Home electricity supply ordinary shares are, for the second consecutive week, without any change, apart from a few pence rise in Edmundsons last week. The Overseas group is almost equally quiet. Palestine Electric " A " shares are 6d. down at 34s. 6d. The Canadian issues hold the gains secured last week, when Montreal Light, Heat and Power rose 2½ points to 25. Atlas Electrics at 7s. have gone back a few pence.

Home Railway Heaviness

Home railway stocks tend to wilt, prices easing off more by reason of lack of interest in the market than from any noticeable pressure to sell. Interest continues to be concerned with the probable, or possible, fate of the stocks upon expiry of the agreement between the Government and the companies which is to last, according to the loosely worded clause, for one year after termination of the war. Nationalisation is a word which, from the point of view of the railway stockholder, causes a certain amount of apprehension. But it is asked whether, should a Labour Government come into power, it would be worth while for it to take over the railways to any greater extent than is now the case. The uncertainty which continues to be felt in regard to the outlook serves to counteract the otherwise favourable effect which might be produced by the near approach of the dividend season.

Equipment and Manufacturing

Callender's Cable ordinary have now come into line with British Insulated, at 5¾. This price allows a yield of no more than £3 9s. per cent. on the basis of the 20 per cent. dividends that both companies are paying. Henley's also pay 20 per cent. The price of the 5s. shares is 6d. higher at 27s. 6d., the yield at this level being £3 12s. 9d. per cent. Another share in active demand has been Johnson & Phillips, where a further advance lifted the price to 79s. There is vague talk of a possible increase in the dividend, at present 15 per cent. British Thermostat have risen 2s. 6d. to 22s. 6d. Crabtrees at 44s. have put on 1s. Midland Electric Manufacturing at 7 3/16 are 1/16 better, and De la Rue are 1/16 down at 9⅜. Tube Investments at 5 3/16 are 2s. 6d. to the good. Reyrolles rose to 72s. 6d. Ferranti 7 per cent. preference recovered the dividend deducted from the price, and a few pence in addition. Laurence, Scott are a good market, hardening to 14s. Crompton Parkinson, English Electric and Hopkinsons secured small gains, and Veritys rose 1s. to 9s. 3d. A few falls included Strand Electrics at 11s. 6d., Metal Industries " B " at 49s., and Telephone Properties at 20s.

Radio Excitement

Amongst the few outstanding features of a quiet week has been the activity and the strength of the prices in the market for radio shares. The lead was secured by Cossors. From 28s. 9d. the price was run up to 33s. with never a break. From that price it reacted to 31s. 3d., leaving 2s. 6d. gain on balance. Rumour has played with the idea for some time past that the company will declare a tax free dividend of 25 per cent., against 10 per cent., tax free, in the previous year, which in its turn was an improvement of 2½ per cent. net upon the dividend for 1942. At the beginning of this year the price of Cossors stood at 22s. 6d. Some people contend that the present price is quite high enough; others, taking a longer view, declare that Cossor shares may go higher by reason of the brilliant prospects which the future holds for the company and its activities. Electric & Musical Industries, " Emis," after a rise to 37s. 6d., reacted to 35s. 6d. In their case, the 8 per cent. dividend is regarded as being no guide to the potential dividend-paying capacity of the company.

Miscellaneous Matters

Cable & Wireless ordinary is 1½ higher at 84½ and Globe Telegraph ordinary moved up at 40s. Orientals came on offer; the price fell 1s. 6d. to 48s. Anglo-Portuguese hold their last week's rise at 29s. 6d. Automatic Telephones are 1s. up at 68s. and Telegraph Condensers keep firm at 25s. Watford Electric ordinary eased off to 6s. on the idea that the beginning of dealings in the new shares, on Monday in this week, might bring in a few to the market. British Electric Resistance hardened to 5s. 3d. A florin rise in Falk, Stadelmann preference brought the price to 31s. Electrolux are 5s. higher at 13¼. Telephone Rentals at 12s. 6d. are 3d. to the good. A bargain at 30s. 6d. was marked last Friday in Ward & Goldstone.

High Prices : Low Yields

Investment that looks for a decent rate of return on its money finds it difficult nowadays to obtain shares that will comply with the requirement. Newman Industries florin shares at 7s. 3d. ex dividend, at which price there are 5,000 on offer, give a yield of 5½ per cent. on the money. The company paid an interim dividend of 7½ per cent. Lancashire Dynamo £1 ordinary shares have come on

(*Continued on page* 906)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price Dec. 19	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Ordinary					
Bournemouth and Poole	12½	12½	62/6	..	4 0 0
British Power and Light	7	7	33/–	..	4 4 10
City of London	7	5½	30/–	..	3 13 4
Clyde Valley	8	8	42/–	..	3 16 0
County of London	8	8	43/–	..	3 14 5
Edmundsons	6	6	31/–	..	3 17 5
Elec. Dis. Yorkshire	9	9	45/6	..	3 19 6
Elec. Fin. and Securities	12½	13½	60/6	..	4 9 0
Elec. Supply Corporation	10	10	50/6	..	3 18 6
Lancs. Light and Power	7½	7½	37/–	..	4 1 1
Llanelly Elec.	6	6	26/6	..	4 10 7
Lond. Assoc. Electric	3	4	26/–	..	3 1 6
London Electric	6	6	30/6	..	3 18 8
Metropolitan E.S.	8	8	43/–	..	3 14 5
Midland Counties	8	8	41/6	..	3 17 0
Mid. Elec. Power	9	9	44/–	..	4 1 10
Newcastle Elec.	7	7	32/–	..	4 7 6
North Eastern Elec.	7	7	34/6	..	4 1 2
Northampton	10	10	50/–	..	4 0 0
Northmet Power	7	7	41/–	..	3 8 4
Richmond Elec.	6	6	26/–	..	4 12 4
Scottish Power	8	8	40/6	..	3 19 0
Southern Areas	5	5	23/–	..	4 7 0
South London	7	7	30/–	..	4 13 4
West Devon	5	5	24/–	..	4 3 4
West Glos.	4½	3½	25/–	..	2 16 0
Yorkshire Elec.	8	8	43/–	..	3 14 5
Public Boards					
Central Electricity :					
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	106	..	4 5 0
1963–93	3½	3½	104	..	3 7 4
1974–94	3½	3½	100½	..	3 4 8
London Elec. Trans.	2½	2½	98½	..	2 10 9
London & Home Counties 1955–75	4½	4½	112	..	4 0 4
Lond. Pass. Trans. Bd.					
A	4½	4½	121½	..	3 14 1
B	5	5	122½	..	4 1 8
C	3	3½	69	..	4 14 2
West Midlands J.E.A. 1948–68	5	5	106½	..	4 14 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	7/–	–3d.	—
Calcutta Elec.	6*	6*	46/6	..	2 11 9
Cawnpore Elec.	10	7	41/3	..	3 7 9
East African Power	7	7	35/–	..	4 0 0
Jerusalem Elec.	7	5	29/–	..	3 9 0
Kalgoorlie (10/–)	5	5	10/6	..	4 15 3
Madras Elec.	Nil	4	32/6	..	2 9 4
Montreal Power	1½	1½	25	..	—
Nigerian Elec.	8	10	35/–	..	5 14 5
Palestine Elec. "A"	5*	5*	38/6	–6d.	2 12 0
Perak Hydro-elec.	6	7	13/–	..	—
Tokyo Elec. 6%	6	6	25	..	—
Victoria Falls Power	15	15	88/9	..	3 7 7
Whitehall Inv. Pref.	—	6	26/–	..	4 12 4

Company	Dividend Previous	Dividend Last	Middle Price Dec. 19	Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing					
Aron Elec. Ord.	15	15	61/–	..	4 18 4
Assoc. Brit. Eng.	6	7	57/6	..	2 8 9
Assoc. Elec. :					
Ord.	10	10	57/6	..	3 9 5
Pref.	8	8	39/6	..	4 1 0
Automatic Tel. & El.	12½	12½	68/–	+1/–	3 13 7
Babcock & Wilcox	11	11	53/–	..	4 3 0
British Aluminium	10	10	46/–	..	4 7 0
British Insul. Ord.	20	20	5¾	..	3 9 0
British Thermostat (5/–)	18½	18½	22/6	+⅛	4 2 3
British Vac. Cleaner (5/–)	30	30	32/6	..	4 12 3
Brush Ord. (5/–)	8	9	11/–	..	4 1 9
Burco (5/–)	15	15	16/6	..	4 11 0
Callender's	15	20	5¾	+5/32	3 9 0
Chloride Elec. Storage	15	15	85/–	..	3 10 7
Christy Bros.	12½	17½	77/6	..	4 10 4
Cole, E. K. (5/–)	10	15	27/6	–1/8	2 0 0
Consolidated Signal	24	27½	6¾	..	4 1 6
Cossor, A. C. (5/–)	7½*	10*	31/3	+⅛	1 12 0
Crabtree (10/–)	17½	17½	44/–	+1/–	3 19 7
Crompton Parkinson Ord. (5/–)	20	22½	33/6xd	+6d.	3 7 3
De La Rue	35	40	9⅝	–1/8	4 3 4
E.M.I. (10/–)	6	8	35/6	–9d.	2 5 1
Elec. Construction	10	12½	58/9	..	4 5 0
Enfield Cable Ord.	12½	12½	64/–	+6d.	3 18 2
English Electric	10	10	55/6	+6d.	3 12 2
Ensign Lamps (5/–)	25	15	21/3	..	3 10 8
Ericsson Tel. (5/–)	22*	20*	53/9	..	1 17 8
Ever Ready (5/–)	40	40	42/–	..	4 15 3
Falk Stadelmann	7½	7½	34/6	..	4 7 0
Ferranti Pref.	7	7	31/3xd	+1/16	4 8 2
G.E.C. :					
Pref.	6½	6½	33/3	..	3 18 4
Ord.	17½	17½	98/–	..	3 11 6
General Cable (5/–)	15	15	17/–	..	4 8 3
Greenwood & Batley	15	15	48/9	+1/16	6 3 0
Hall Telephone (10/–)	12½	12½	31/6	..	3 19 4
Henley's (5/–)	20	20	27/6	+6d.	3 12 9
4½% Pref.	4½	4½	24/–	..	3 15 0
Hopkinsons	15	17½	73/9	+6d.	4 12 9
India Rubber Pref.	5½	5½	23/–	..	4 14 9
Intl. Combustion	30	30	6⅞	..	4 12 4
Johnson & Phillips	15	15	79/–	+1/–	3 15 9
Lancashire Dynamo	22½	22½	100/–	..	4 10 0
Laurence, Scott (5/–)	12½	12½	14/–	+6d.	4 9 3
London Elec. Wire	7½	7½	38/–	..	3 19 0
Mather & Platt	10	10	55/–	–1/8	3 12 9
Metal Industries (B)	8	8½	49/–	–1/–	3 9 6
Met. Elec. Cable Pref.	5½	5½	21/3	..	5 3 6
Mid. Elec. Mfg.	25	25	7 1/16	+1/16	3 9 10
Murex	20	20	5	..	4 0 0
Newman Ind. (2/–)	20	20	7/3	..	5 10 0
Philco (2/–)	—	—	14/9	–3d.	—
Power Securities	6	6	29/6	..	4 1 4
Pye Deferred (5/–)	25	25	32/6	..	3 17 0
Ransome & Marles	20	20	87/6	..	4 11 4
Revo (10/–)	17½	17½	44/–	..	3 19 7
Reyrolle	12½	12½	72/6	+1/8	3 9 0

(Continued on next page)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Dec. 19	Rise or Fall	Yield p.c.
Equipment and Manufacturing (*Continued*)			£ s. d.		
Siemens Ord.	7½	7½	36/3	..	4 2 9
Strand Elec. (5/–)	10	12½	11/6	–6d.	5 5 8
Switchgear & Cowans (5/–)	20	20	20/9	..	4 16 7
T.C.C. (10/–)	5	7½	25/–	..	3 0 0
T.C. & M.	10	10	56/–	..	3 11 6
TelephoneMfg.(5/–)	9	9	12/–	..	3 15 0
Thorn Elec. (5/–)	20	20	28/9	..	3 9 6
Tube Investments	20	22½	5⅞	+½	4 6 9
Vactric (5/–)	Nil	22½	17/6	..	6 8 6
Veritys (5/–)	7½	7½	9/3	+1/–	4 1 1
WalsallConduits(4/–)	55	55	52/6	..	4 3 10
Ward & Goldstone (5/–)	20	20	30/–	–6d.	3 6 8
WestinghouseBrake	12½	14	75/–	..	3 14 8
West, Allen (5/–)	7½	7½	8/9	..	4 5 9
Traction and Transport					
Anglo-Arg. Trans :					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc.	Nil	Nil	6½	–1½	—
Brit. Elec. Traction :					
Def. Ord.	45	45	1200	..	3 15 0
Pref. Ord.	8	8	190	..	4 4 3
Bristol Trams	10	10	57/–	..	3 10 2
Brazil Traction	1½	2	26½	–½	7 9 7
Calcutta Trams	6½	7½	72/6	+2/–	2 1 5
Cape Elec. Trams	5	6	26/–	..	4 12 4
Lancs. Transport	10	10	47/6	..	4 4 3
Southern Rly. :					
5% Prefd.	5	5	77½	..	6 9 2
5% Pref.	5	5	119½	..	4 3 8
T. Tilling	10	10	62/6	..	3 4 0
West Riding	10	10	47/6	..	4 4 2
Telegraph and Telephone					
Anglo-Am. Tel. :					
Pref.	6	6	124	..	4 16 7
Def.	1½	1½	30	..	5 0 0
Anglo-Portuguese	8	8	29/6	..	5 8 6
Cable & Wireless :					
5½% Pref.	5½	5½	117	..	4 14 0
Ord.	4	4	84½	+1½	4 14 8
CanadianMarconi	$1 Nil	4cts.	9/6	..	—
Globe Tel. & Tel. :					
Ord.	8½*	5*	40/–	+6d.	2 10 0
Pref.	6	6	31/–	..	3 17 5
Great Northern Tel. (£10)	Nil	Nil	28	–1	—
Inter.Tel. & Tel.	Nil	Nil	19	..	—
Marconi-Marine	7½	7½	35/6	..	4 4 6
Oriental Tel. Ord.	16	10	48/–	–1/6	—
Telephone Props.	Nil	6	20/–	–½	6 0 0
Tele. Rentals (5/–)	10	10	12/3	..	4 1 8

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 904)

offer at 101s. 3d., and Christy Bros. ordinary shares can be bought at 78s. 9d., both these returning at the prices mentioned £4 8s. 9d. per cent. on the money. Brush ordinary yield a trifle over 4 per cent. English Electric and General Electric return rather over 3½ per cent. and Associated Electrical Industries at 58s. give a yield of £3 9s. 0d. Expectations of expansion in the post-war period are responsible for the price of Crompton Parkinson "A" ordinary shares being as high as 33s. 9d., at which the return is no more than £3 6s. 6d. By comparison, the 3¾ per cent. yield obtainable from Westinghouse Brake at 75s. looks almost liberal.

Reports and Accounts

Literally hundreds of companies make up their accounts to the end of the calendar year. December 31st (a Sunday this year), is the popular date for rounding off the year's results, and company reports appear in the New Year early or late, according to the practice of the various undertakings. The difficulty of making up accounts promptly is increased by shortage of staff and other war conditions, but the plea may be entered that many companies could, if they tried, hasten publication of their accounts, and present these in time for shareholders to gain a reasonably up-to-date view of their company's affairs. In some cases, the figures are not made available until eight, nine or even twelve months after the date to which they are made up. From the point of view of immediate interest, this tends to rob them of whatever value they would otherwise possess. A company earns additional respect from its proprietary by issuing its report and accounts as early as possible after the turn of the company's financial year, and it does not seem too much to ask that everything should be done to provide information that shall be as up to date as is possible in the circumstances.

Calcutta Trams

After the fall which had occurred in the price of Calcutta Trams in the last two weeks it was not, perhaps, surprising to find a rally on the strength of fresh theories advanced to justify the previous optimistic estimates. Shortly put, the case is that the Calcutta Corporation decided to buy the undertaking of the Calcutta Tramways, but the Bengal Government stepped in and forbade the transaction, claiming that the sale would involve the Calcutta Corporation's raising a loan. From 75s., the price of the shares dropped to 58s. 6d. It has now recovered to 72s. 6d. The latest theory is that the Government of Bengal has no status in the matter, and that the Calcutta Corporation, under its powers, is entitled to complete the purchase. Consequently, hopefulness revived bringing with it a few buyers attracted by the fall that had taken place in the price of the shares.

NEW PATENTS

Electrical Specifications Recently Published

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

F. S. ASH and Metropolitan-Vickers Electrical Co., Ltd.—"Automatic electric regulators." 9155. June 7th, 1943. (565897.)

Babcock & Wilcox, Ltd.—"Fusion welding." 8486/43. September 1st, 1942. (565886.)

Birmingham Electric Furnaces, Ltd., A. G. E. Robiette and P. F. Hancock.—"Process for the heat-treatment of iron or iron alloy castings." 7380. June 11th, 1941. (565887.)

F. Bradbury.—"Electrically operated differential mechanism." 6737. April 28th, 1943. (565850.)

British Thomson-Houston Co., Ltd.—"Electric switches suitable for carrying heavy currents." 8114/43. May 21st, 1942. (565823.) "Apparatus for starting and controlling electric discharge devices." Cognate applications 5964/43 and 5965/43. April 21st, 1942. (565843.) "Magnetic induction accelerators." 795/43. January 20th, 1942. (565864.) "Casings particularly suitable for toasting appliances." 9327/43. June 10th, 1942. (565899.)

A. F. Burgess (Zenith Radio Corporation).—"Radio receiving sets." 8113. May 21st, 1943. (565794.)

Callender's Cable & Construction Co., Ltd., and A. B. F. G. Richardson.—"Construction of stop valve." 9443. June 11th, 1943. (565902.)

R. B. Canning.—"Electrical terminal connections." 17624. December 10th, 1942. (565811.)

H. Fawcett, J. Stewart and Metropolitan-Vickers Electrical Co., Ltd.—"Drawing instruments." 10324. June 25th, 1943. (565908.)

W. T. Griffiths.—"Electrical contacts." 11749. August 20th, 1942. (565807.)

C. Gruenberg and H. Davis. "Insulated electric cable and couplings for the same." 2789. February 19th, 1943. (565782.)

V. Hope.—"Brush holder assemblies for dynamo-electric machines." 4764. March 24th, 1943. (565786.)

A. H. Hunt, Ltd., R. A. Grouse and F. L. G. Bettridge.—"Manufacture of electrical condensers." 6665. April 27th, 1943. (565874.)

Lodge Plugs, Ltd., and B. Hopps.—"Radio-screening of sparking-plugs." 8412. May 26th, 1943. (565853.)

J. Lucas, Ltd., and E. J. Bills.—"Electric battery plate separators." 6579. April 23rd, 1943. (565871.)

Marconi's Wireless Telegraph Co., Ltd.—"Grid electrodes for thermionic valves." 17619/42. December 10th, 1941. (565810.) "Variable inductance devices." 8608/43. May 29th, 1942. (565895).

P. H. Morrison and Plessey Co., Ltd.—"Electric contacts." 17935. March 3rd, 1944. (Divided out of 565045.) (565859.)

Mullard Radio Valve Co., Ltd., and W. H. Morris-Airey.—"Inductance coils." 14167/42. November 8th, 1943. (565776.)

J. G. Murdock & Co., Ltd., and B. J. Henderson.—"Code signal receiving circuits." 8247. May 24th, 1943. (565890.)

Philips Lamps, Ltd.—"Radio receivers." 8343/43. May 25th, 1942. (565795.)

Revo Electric Co., Ltd., and F. H. Reeves.—"Tubular fluorescent electric lamp fittings." 8277. May 25th, 1943. (565891.)

A. Reyrolle & Co., Ltd., J. Christie and A. Allan.—"Electric switchgear." 6795. April 29th, 1943. (565877.)

A. J. Roberts.—"Electromagnetic vibrators." 2889. February 22nd, 1943. (565799.)

Rubery, Owen & Co., Ltd., E. Coupland and D. D. Arnott.—"Electrical connectors for use in a flash-welding plant." 5805. April 12th, 1943. (565822.)

G. S. P. Scantlebury and E. L. C. White.—"Thermionic valve amplifier circuit arrangements." 6443. April 21st, 1943. (Addition to 564250.) (565870.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Electric signalling systems." 3635. March 5th, 1943. (565785). "Radio navigational systems." 8993. June 4th, 1943. (565896.)

Standard Telephones & Cables, Ltd., and A. J. Maddock.—"Electrical contact arrangements." 8453. May 26th, 1943. (Addition to 558169.) (565856.)

Standard Telephones & Cables, Ltd., N. H. Martin and C. P. Smith.—"Rotary number indicators." 8394. May 26th, 1943. (565852.)

E. R. Visser and J. C. Haslam. "Corrosion preventing devices for secondary batteries." Cognate applications 6225/43 and 16324/43. April 19th, 1943. (565845.)

Westinghouse Brake & Signal Co., Ltd.—"Manufacture of electrical rectifiers of the copper oxide type." 8223/43. May 25th, 1942. (565825.)

Whessoe Foundry & Engineering Co., Ltd., and K. W. Francombe.—"Extra high tension switchgear for use with small currents at high voltages in plant for the electrical precipitation of dust in gases." 7468. May 11th, 1943. (565885.)

Association of Scientific Workers

THIS Association has sent us two booklets which it has recently published. The first contains a report on part-time scientific and technical education based on the results of a questionnaire circulated to Government establishments and metallurgical, chemical and engineering industries. This shows that local educational facilities and travelling facilities are in need of improvement and that many more establishments should give their adult employees opportunities for further education during working hours.

The other booklet comprises "Freedoms of Science," by Sir Robert Watson-Watt, in which the importance of the scientific workers having a voice in planning is urged; and "Freedom from Want," by Dr. A. H. Bunting, in which the implications of last year's Hot Springs (Virginia) Conference are dealt with.

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.

Inverurie.—Town Council. Electric lighting throughout the burgh. Specifications from W. W. Conner, burgh surveyor.

Orders Placed

Bradford.—Electricity Committee. Recommended for extensions at Valley power station:—1,250,000 g.p.h. reinforced concrete cooling tower.—Davenport Engineering Co. Four 750-kVA transformers.—English Electric Co. Boiler feed pump and circulating water pump.—Mather & Platt. 33-kV cables for 22,500-kW (No. 6) turbo-alternator.—British Insulated Cables. Reinforced concrete chimney, raft and piling.—Tileman & Co. Building steelwork for boilers, bunkers and annexe.—Dorman Long.

Dartford.—Electricity Committee. Recommended. Electric drive for lift at electricity works (£195).—J. & E. Hall.

Glasgow.—Corporation Education Committee. Accepted. Electrical work at Pennilee temporary school (£685) and at workshop at Stow College annexe (£95).—Corporation Electricity Dept.

London.—FULHAM.—Electricity Committee. Accepted. High-pressure and low-pressure feed pumps.—Mather & Platt. Coal conveying plant.—Naylor Bros.

Manchester.—Electricity Committee. Accepted. Mercury arc rectifier equipment.—Hewittic Electric Co. Transformers.—Hackbridge Electric Construction Co. 660-V DC switchgear.—Bertram Thomas (Engineers). Battery and charging equipment.—Britannia Batteries. Street lighting lanterns.—Wardle Engineering Co. Water cooling tower.—Davenport Engineering Co.

Tynemouth.—Corporation. Accepted. Metal rectifier charger for Transport Department (£59).—Sun Electrical Co. Cables for three years.—British Insulated Cables.

Warrington.—Electricity Committee. Accepted. One 200,000 lb. per hr. boiler with auxiliary plant (£156,800); extraneous pipework (£18,983); central evaporator plant (£6,777); main feed and steam range (£9,472); circulating water pump (£11,142); circulating water pipework (£3,010); water treatment plant (£4,661); reinforced concrete piling and sheet steel piling (£8,262); constructional steelwork (£60,927); remote water level indicators for Nos. 3 and 4 boilers (£439); modifications to ash handling plant (£912); stanchions, columns, etc., for strengthening on control room and meter room floor (£530); and access platform to economiser of No. 2 Boiler (£149).—Simon Carves. Three steam temperature recorders (£198) and two rotor temperature indicators (£100).—English Electric Co. Control gear for barring gear of No. 3 turbo-alternator (£110).—Brookhirst Switchgear. Spares for 6·6-kV switchgear (£239).—Ferguson, Pailin.

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.

Birmingham.—School huts, Bordesley Green and Handsworth (£10,400); city engineer.

Brandon (Co. Durham).—Factory for Midlands hosiery firm; particulars from U.D.C. surveyor.

Brighton.—Additions, sanatorium (£6,700); borough engineer.

Bristol.—Junior mixed school and infants' school, Filwood Park; borough engineer, 7, College Fields, Clifton, Bristol.

Enfield.—Factory extension, 700, Gt. Cambridge Road; Donald Hamilton.

Gateshead.—Nurses' accommodation at Queen Elizabeth Hospital; F. H. Patterson, borough engineer.

Alterations and additions, central transport depot (£3,700); Anglo-Scottish Construction Co., Ltd., builders, Newcastle-on-Tyne.

Gravesend.—Proposed school, site between Rochester Road, Old Road East and Abbey Road; G. E. Hill, borough engineer, 6, Woodville Terrace.

Horsham.—Provision and equipment of physiotherapy department at Hospital (£5,000); secretary to the Horsham Hospital Supporters' Association.

Luton.—Rehabilitation department (£3,500), Luton and Dunstable Hospital, Dunstable Road; clerk to the Hospital Board of Management.

Northampton.—Massage department (£1,500), and additions to X-ray department (£2,000), Northampton General Hospital; clerk to governors.

North Riding.—Maternity homes at Northallerton and in the Cleveland area; county architect, County Hall, Northallerton.

Sheffield.—School huts (£2,800); M. J. Gleeson, Ltd.

Premises for mass radiography, Ellin Street (£1,250); city architect.

South Shields.—Joiners' shop for T. R. Dowson & Co., Ltd., and sawmills at Templetown, for Clunie & Sons; F. W. Newby, architect, King Street, South Shields.

Sawmill, Jarrow Road, for Clayton & Armstrong, Low Fell, Gateshead.

Stoke-on-Trent.—First block of Technical High School, Burslem; A. Burton, city engineer, Town Hall.

Tynemouth.—Conversion of Royal Jubilee School into cinema; W. Stockdale, architect, Howard Street, North Shields.

Offices for the Tyne Port Health Authority; borough engineer, 19, Howard Street, North Shields.

Reconstruction of Moor Park Hospital; borough engineer.

To Wimshurst's problem (strange but true!)
Three words provide a full solution,
One simple sequence gives the clue:
Volt, Re-volt, Revolution.

James Wimshurst, in his day, was a man of some consequence. It is but the irony of fate that his name should survive only in association with the Wimshurst Machine, the fruit of his leisure hours. This was an ingenious contrivance for inducing electricity at high voltage; the machine is now just of academic interest, but its part in the evolution of such modern marvels as X-rays and Television has assured its place in the annals of science.

To-day, the experimenter has everything made easy for him. He has at his command materials perfectly adapted to his needs. In DISTRENE (Regd.), for example, he has an ally whose value can only be appreciated in actual use. **Here is an insulating material which has revolutionised high-frequency electrical design.**

BX DISTRENE (Regd.)

COMPRESSION STRENGTH	7 *tons per sq. in.*
SPECIFIC GRAVITY	1·06
WATER ABSORPTION	*Nil*
COEFFICIENT OF LINEAR EXPANSION	·0001
SURFACE RESISTIVITY (24 hours in water)	3 × 10^8 *megohms.*
DIELECTRIC CONSTANT 60—10^6 CYCLES	2·60—2·70
POWER FACTOR UP TO 100 MEGACYCLES	·0002—·0003

DISTRENE is made in sheets, rods and tubes, and in powder-form for injection moulding.

BX PLASTICS LTD., LARKSWOOD WORKS, LONDON, E.4

LH/BX224

PURITY

"Pure as the lily," though poetic, is not very precise. We *can* be precise as to the purity of hydrogen and oxygen produced by Knowles electrolytic plant—guaranteed to give hydrogen 99·95% pure with oxygen 99·8% pure.

Hydrogen of this purity can be used without further treatment for processes such as the hydrogenation of oils for foodstuffs, synthetic processes involving catalysts, reduction of metals, etc.

Besides the merit of producing such pure gases, Knowles equipment has many technical and operating advantages, including absolute safety under all conditions, very low maintenance charges and long trouble-free life.

Plants in operation all over the world, from small to the largest sizes. A typical large plant absorbs 10,000 amps. at 650 volts, yielding 49,500 cu. ft. of hydrogen per hour.

Electrolytic plant forms a highly suitable off-peak load.

KNOWLES ELECTROLYTIC PLANT FOR HYDROGEN & OXYGEN

IEPCO

THE INTERNATIONAL ELECTROLYTIC PLANT CO. LTD.
SANDYCROFT CHESTER

HO13

L. WEEKES (LUTON) LIMITED

Plugs and Sockets

WEEKES' Watertight Plugs and Sockets are available in the following standard forms :—

(i) Fixed Plug, Socket and cable box.
(ii) Fixed Plug, Socket and cable box with Interlocked Isolating Switchfuse.
(iii) Swivelling Plug and Socket with cable box.
(iv) Swivelling Plug and Socket with cable box and Interlocked Isolating Switchfuse.

Cartridge Fuses

WEEKES' Indicating Cartridge Fuses are available in over 50 types, and those of 2-amp size and over give definite indication when "blown."

Weekes' Fuses carry their rated current indefinitely, and give overload protection against currents 150% of normal or over.

Standard Ratings :—0.5-500 Amps up to 600 V. Higher ratings supplied to order. Special designs also made for replacements.

Switch-fuses with Plugs

WEEKES' "Safetee" Combined Switchfuses with Interlocked Plugs, incorporate in one unit the advantages of efficient quick-break switch coupled with the use of indicating Cartridge Fuses, for protection, and plug-in connectors.

The range includes :—

D.P., T.P., T.P. and N., 4-pole types in standard ratings up to 500 amps, 250 or 500 volts, A.C. or D.C.

Full details will be sent on request.

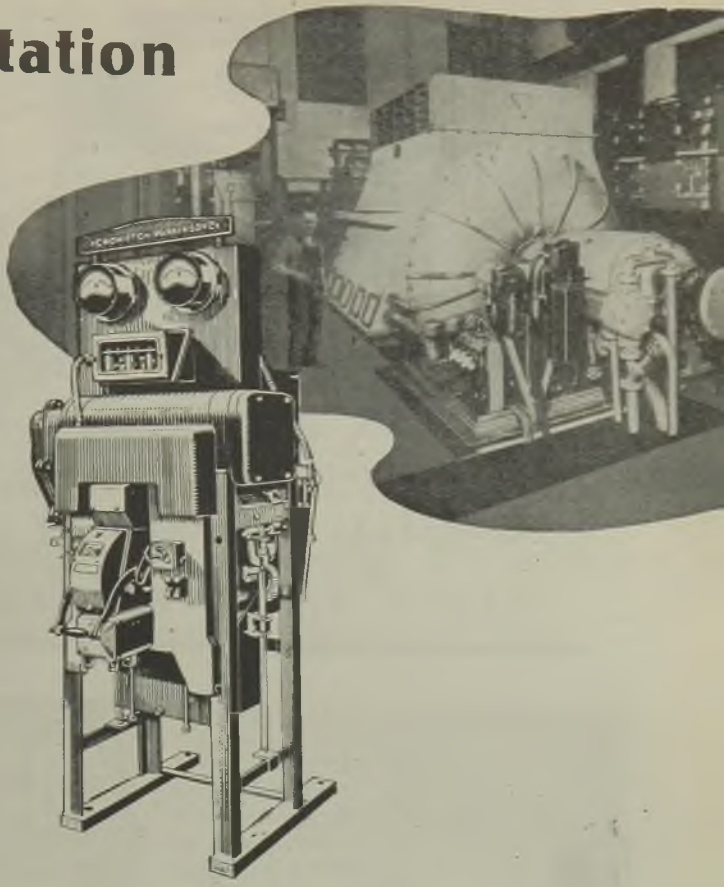
Contractors to H.M. Admiralty, War Office, Air Ministry, etc.

L. WEEKES (LUTON) LIMITED
LUTON. BEDS.

London Office : 36-38 KINGSWAY, W.C.2
Telephones : Holborn 1091 ; Luton 278
Branches : Birmingham, Glasgow, Newcastle

Crompton Short-Circuit Testing Station

Electrical Review, December 22, 1944



..behind Crompton Switchgear.

The Crompton Short-Circuit Testing Station issues certificates of performance for ratings up to 350 mVA at 11kV, and 75 mVA at 400 volts, through the Association of Short-Circuit Testing Authorities of which Crompton Parkinson are members.

The Station has been designed to provide tests in strict accordance with the appropriate standards and to produce more severe conditions than are likely to arise in service. The rated performance and dependable operation of Crompton Switchgear is thus assured. Crompton Switchgear is made for ratings up to 350 mVA.

CROMPTON PARKINSON
LIMITED

ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2

Static CONVERSION OF SINGLE-PHASE TO THREE-PHASE

NO MOVING PARTS—*nothing to go wrong or wear out.*

HIGH EFFICIENCY — *about 95% at full load.*

GOOD POWER FACTOR—*the converter slightly improves the power factor of the demand on the mains.*

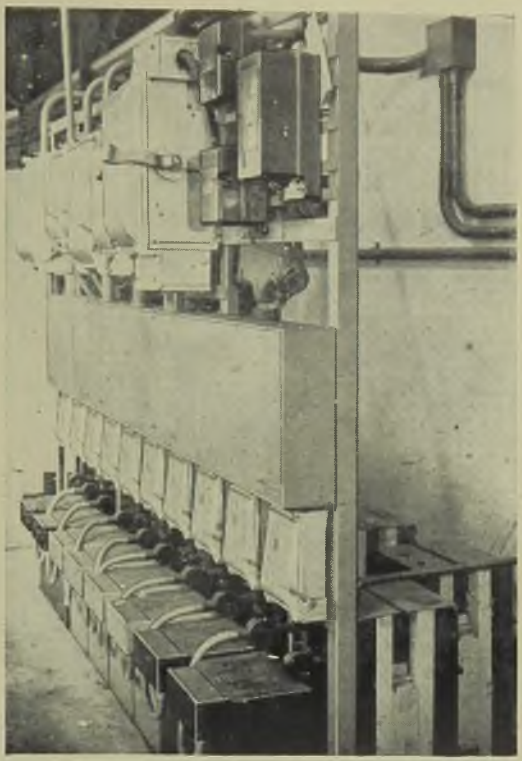
GOOD VOLTAGE BALANCE *with load variations from zero to full load.*

SIMPLE TO OPERATE — *no complicated control gear.*

EASILY ADDED TO *as the plant extends.*

MOST ECONOMICAL *and cheap to install.*

NO ATTENTION - NO RENEWALS



Installation of phase converters and controlling switchboard operating a total of 130 H.P.

WESTINGHOUSE

STATIC PHASE CONVERTERS

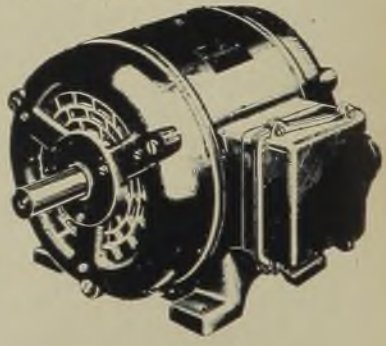
Write for descriptive pamphlet No. 11 M

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., Pew Hill House, Chippenham, Wilts

H

Extra starting torque ?

. . . Here is your motor.



Where you have a drive demanding extra starting effort, you may think it difficult to obtain a suitable motor. That is until you look into the Parkinson standard range of A.C. motors. There you will find the Parkinson "Tork"—a motor with just that extra starting torque that is needed. It would be the same if you required other special characteristics. Parkinson Flow Production has made it possible to offer a standard range of over 2,000 types which includes many that you usually expect to have specially made. The Parkinson A.C. Motor Service can save you a great deal of time and money.

CROMPTON PARKINSON
LIMITED

ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2 *and Branches*

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First post on Monday**, at Dorset House, Stamford Street, London, S.E.1. (*See notice below for Christmas.*)
THE CHARGE for advertisements in this section is 2/- per line (approx. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.
SITUATIONS WANTED. — Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

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

Original testimonials should not be sent with applications for employment.

CHRISTMAS
CLASSIFIED ADVERTISEMENTS

Our issue of **December 29** closed for press on **Friday, December 22.**

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 41 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

BOROUGH OF KENDAL

Electricity Department

Appointment of Borough Electrical Engineer

THE Council invite applications for the position of Borough Electrical Engineer. Applicants must not exceed 45 years of age and must possess a recognised professional qualification, and have had experience in a responsible position, in the administration, management and development of an Electricity Undertaking, both in the engineering, distribution and commercial branches of the work. The main supply of electricity dealt with by the Council's undertaking is taken in bulk, but a small generating station is maintained and practical knowledge of the operation of Diesel oil engines would be an advantage. The "unit assessment," based on the year ended 31st March, 1944, is 6.9 millions.

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

The salary offered is according to the agreement dated 9th July, 1941, made by the National Joint Committee of Local Authorities and Chief Electrical Engineers for the Electricity Supply Industry, and will commence at £677 9s. per annum, rising, at the commencement of the third year of service, to the full scale salary in accordance with Clause 10 of the said Agreement.

Applications, stating details of the candidate's qualifications, experience, age and present appointment, and accompanied by not more than three recent testimonials, should be delivered to the undersigned, in an envelope endorsed "Borough Electrical Engineer," not later than 31st December, 1944.

Canvassing, either directly or indirectly, will be a disqualification.

H. RHODES,
Town Clerk.

14, Kent Street, Kendal.
12th December, 1944. 1150

CONTROL Engineer required to operate modern E.H.T. board and D.C. switchboard at generating station in Home Counties, N.J.I.C. rate 2s. 4½d. per hour. State experience, age, married or single, to—Box 1154, c/o The Electrical Review.

LONDON POWER COMPANY LIMITED

APPLICATIONS are invited from suitable candidates for the following positions:—

Boiler House Engineer

Candidates should have had experience in the control and operation of large water tube boilers, combustion equipment and auxiliary plant. They would be required to take charge of operation of boiler plant on shift duties. Applicants must have received a sound technical training and have had good general engineering experience.

Salary in accordance with E.P.E.A. Schedule, Grade 8, Class K, at present amounting to £516 per annum.

Senior Control Room Operator

Applicants must have had experience in the control of large electric supply systems, and paralleling of large turbo-generators. They must have received a sound technical training, and have had good general engineering experience.

Salary in accordance with E.P.E.A. Schedule, Grade 9, Class K, at present amounting to £419 per annum.

The successful candidates for the above positions would be required to pass a medical examination in order to qualify them for the Company's Sick Pay Scheme. Applications, stating age, qualifications and experience, and including copies of testimonials, should be addressed to the—

Superintending Engineer,
Deptford Generating Station,
London Power Company Limited.
Stowage Wharf,
Deptford, S.E.8. 1142

NORTH-EASTERN ELECTRIC SUPPLY CO. LTD.

Shift Control Engineers

APPLICATIONS are invited for positions as SHIFT CONTROL ENGINEER in the power stations of the above Undertaking. The duties include the operation of High Voltage Switchboards, the control of Electrical Output from the station, working out results, and general electrical assistance in the operation of the station. The vacancies are located in the Tyneside and Tees-side areas. The salary will be in accordance with Grade 10, Class G, of the National Joint Board Schedule. The commencing salary is at present £270 0s. 0d. per annum.

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

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

The Engineer,
Operation Department (Generation),
North-Eastern Electric Supply Co. Ltd.,
Carliol House,
Newcastle-upon-Tyne, 1. 1159

ELECTRICAL Testers required by well-known Manchester firm manufacturing motors and generators, for vacancies on relaxation of present restriction on employment. State age, experience and wages required.—Box 1158, c/o The Electrical Review.

LONDON POWER COMPANY LIMITED

Control Room Assistants

REQUIRED for shift duty. Wages and conditions as No. 10 Area, D.J.I.C.—present inclusive rate 2s. 4d. per hour for 48-hour week. Applicants should give details of age, technical training and experience, and application should be forwarded to—

Superintending Engineer,
Deptford Generating Station,
London Power Company Limited,
Stowage Wharf,
Deptford, S.E.8. 1143

A vacancy is open for the appointment of a man experienced in tendering to specifications for Electrical and Centrifugal Pumping Machinery, with opportunity later for sales services to applicant possessing resource and imagination. Practical shop experience advantageous but not imperative. Salary £300 upwards according to experience and qualifications. Apply—Ministry of Labour and National Service, Employment Exchange, Alloa. 1162

APPLICATIONS are invited for the post of Shift Charge Engineer. The salary paid and conditions generally are in accordance with the National Joint Board Schedule. Grade 8, Class F, at present £387 per annum. Applicants must have sound theoretical knowledge and practical experience in the operation of H.P. boilers, turbo alternators, E.H.T. and L.T. switchboards and usual auxiliary plant. Applications, stating age, and giving full particulars as to training and subsequent experience, with copies of any testimonials, to be addressed to—The Chief Engineer, Slough Estates Ltd., Trading Estate, Slough, Bucks. 1155

ASSISTANT Chief Storekeeper for London warehouse, experience in electric light equipment. Permanent position with good salary, rising to chief storekeeper, to young man with ability and initiative. Reply in confidence, stating age, experience, previous salary, to—Box 1061, c/o The Electrical Review. Present staff have been advised.

ENGINEER required by well-known firm in the Manchester district immediately after removal of present restriction on employment, for handling of enquiries or orders for motors, generators and allied equipment. State age, experience and salary required.—Box 1157, c/o The Electrical Review.

MANAGER required for design and development work on small electrical fittings by medium-sized engineering works in South-West London. Excellent post-war prospects exist for the right man, who will be given plenty of scope and support. Please write, stating age, experience and remuneration expected, to—Box 1074, c/o The Electrical Review.

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SALES Representative required for North London by electrical wholesaler. Knowledge of electrical trade preferred, and own car an advantage. Permanent and progressive position. Remuneration by salary, commission and expense allowance.—Box 1114, c/o The Electrical Review.

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The fact that goods made of raw materials in short supply owing to war conditions are advertised in this Journal should not be taken as an indication that they are necessarily available for export

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