ELECTRICAL REVIEW
FOUNDED 1872

Vol. CXXXIX. No. 3595 OCTOBER 18, 1946 9d. WEEKL


ALUMINIUM
RISING POWER MAINS
in multi-floored factories, office buildings and blocks of flats, bare aluminium bus-bars have numerous advantages :
Suspended in a vertical metal duct (with non-inflammable baffles where required), they eliminate fire risk.
Economical in installation and maintenance costs.
Withstand heavy overloads.
Easily accessible for extensions, as the load increases with business.
Takes up minimum space where change of direction is required.
BA
Enquiries:
THE BRITISH ALUMINIUM Co. Ltd.
(Electrical Sales)
SALISBURY HOUSE. LONDON. E.C.2

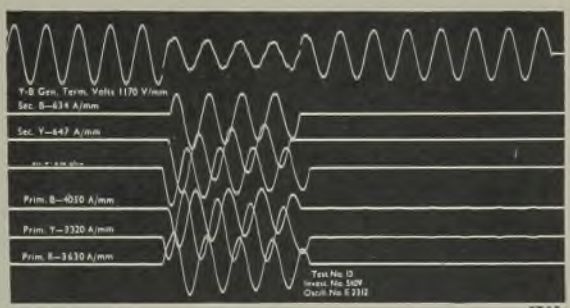
Generator TRANSFORMERS

The 80,000 kVA Transformer. Photograph taken after the test. This is one of 5—80,000 kVA and 2—87,000 kVA 11/66 kV generator transformers supplied to the London Power Company (Battersea).

Ferranti Large High Voltage Generator Transformers are designed on facts confirmed by full-scale practical tests.

In 1935 a Ferranti Generator Transformer of 80,000 kVA 66 kV was tested to destruction by a series of 14 full-scale short circuit tests.

A typical oscillogram showing 1,420,000 maximum instantaneous kVA (720,000 kVA symmetrical r.m.s. value.)



FT67

LARGE POWER TRANSFORMERS supplied by Ferranti ——

Over 9,000,000 kVA for voltages 33 kV and above
Over 6,000,000 kVA for voltages 66 kV and above

FERRANTI LTD.

HOLLINWOOD · LANCS.

LONDON OFFICE: KERN HOUSE · KINGSWAY · W.C.2.

FT67

"BIG BEN" is always up to the minute, never falling a step behind or getting one in front. Unlike Big Ben, we at SANDERS-WEDNESBURY endeavour to be always a step in front, but the abnormal conditions of today unfortunately will not permit us to keep pace with the demand for our products. Shortage of supplies, restrictions, etc., are gradually being overcome—meantime, modifications to existing ranges and entirely new designs are being planned to keep Sanders switchgear, fusegear, sockets, plugs etc., "up to the minute."

WM. SANDERS & CO. (WEDNESBURY) LTD., WEDNESBURY, STAFFS.

Write for this

free guide to battery charging

.It is, of course, mainly a catalogue of Westinghouse battery chargers, but it also contains a technical appendix on the theory of accumulators and charging; hints on installation of chargers; testing accumulators; methods of charging. Anyone interested in battery charging will find the book of great use and a copy may be obtained on application.

WESTINGHOUSE

WESTALITE

BATTERY CHARGERS

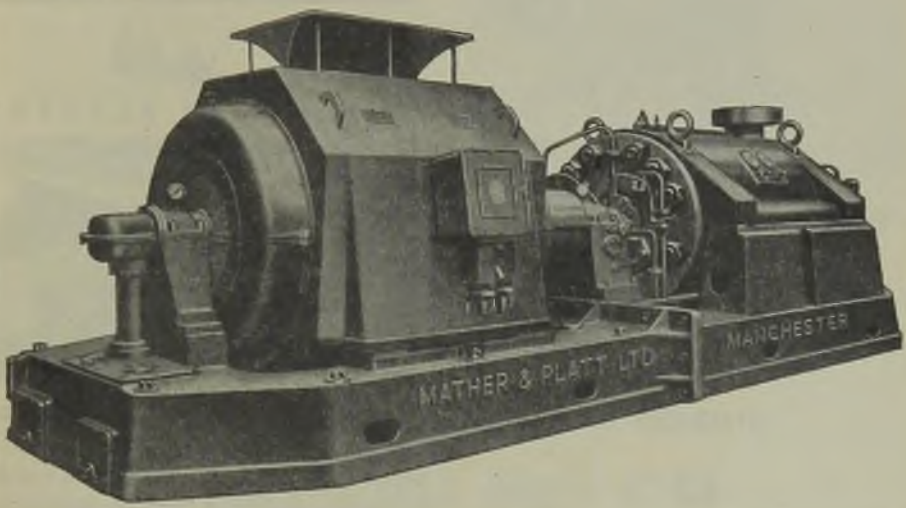
DEPT. E.R.

Westinghouse Brake & Signal Co. Ltd., 82 York Way, King's Cross, London, N.1

3,000

Horsepower
Volts
r. p. m.
lbs per sq. inch pressure.

TAKING NOT MORE THAN 4½ TIMES full load current when started by switching direct on to the supply mains, this Mather & Platt 3,000 H.P. 3,000 Volt, 3,000 r.p.m. Squirrel Cage Motor drives a Mather & Platt Boiler Feed Pump operating at a pressure of 3,000 lb. per sq. inch.

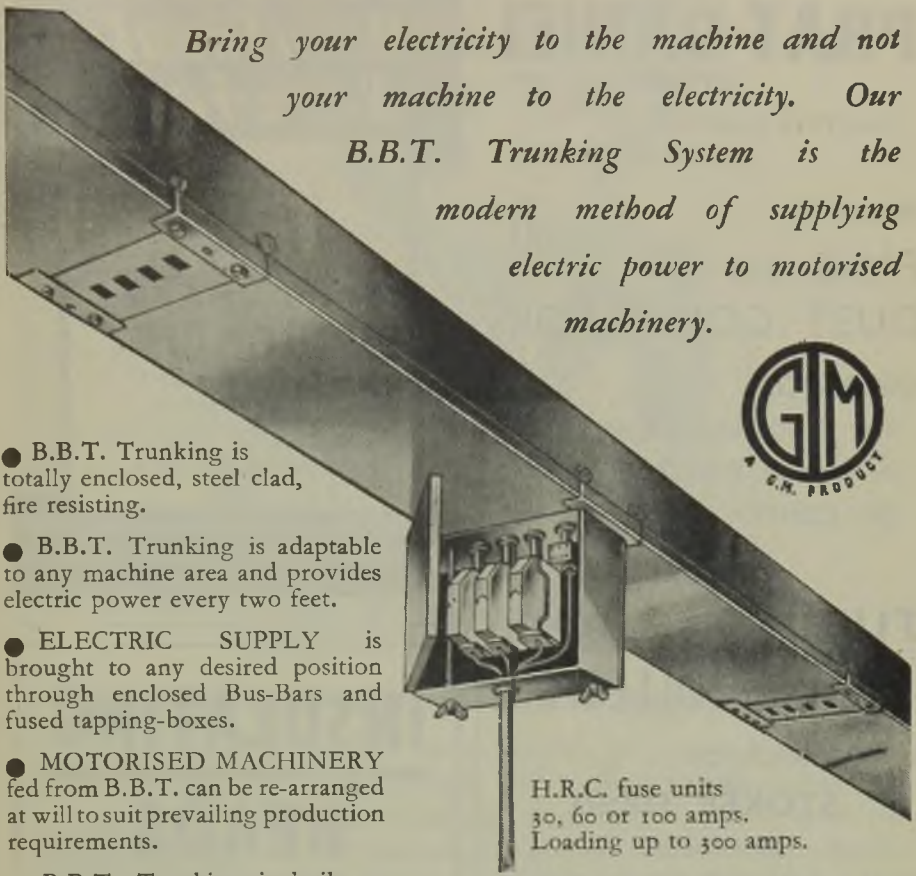


MATHER & PLATT LTD
PARK WORKS MANCHESTER 10

AERIAL VIEW OF WORKS
HIGGS MOTORS

Do you want to save costs, labour and trouble?

Bring your electricity to the machine and not your machine to the electricity. Our B.B.T. Trunking System is the modern method of supplying electric power to motorised machinery.



G.M. PRODUCT

- B.B.T. Trunking is totally enclosed, steel clad, fire resisting.
- B.B.T. Trunking is adaptable to any machine area and provides electric power every two feet.
- ELECTRIC SUPPLY is brought to any desired position through enclosed Bus-Bars and fused tapping-boxes.
- MOTORISED MACHINERY fed from B.B.T. can be re-arranged at will to suit prevailing production requirements.
- B.B.T. Trunking is built on the unit principle and can be extended readily.
- B.B.T. Trunking can be installed well ahead of motorised machinery since the precise position of machinery need not be known in advance.

H.R.C. fuse units
30, 60 or 100 amps.
Loading up to 300 amps.

- B.B.T. Trunking is standardised in 12 ft. lengths:

	Overall
3 Ph. 3 wire . . .	$9\frac{3}{8}$" x $3\frac{1}{2}$"
3 Ph. 4 wire . . .	11" x $3\frac{1}{2}$"

- B.B.T. Trunking is approved and used by Government Departments.

G M ENGINEERING (ACTON) LTD

Switchgear Manufacturers Mechanical Engineers

STANDARD ROAD, NORTH ACTON, LONDON, N.W.10. *Tel: ELGar 6601*

If magic could make switchgear

If switchgear could be produced out of the hat, the present heavy demand for M.E.M. gear could be met without delay. **Everything short of magic is being done,** and in spite of labour and material shortages, controls and restrictions, the output of M.E.M. goods is mounting every day.

The task of distribution falls to the wholesaler and he is doing a magnificent job in allocating all available goods fairly and equitably. Keep in touch with him and he will see that you are served as quickly as supplies permit.

M·E·M

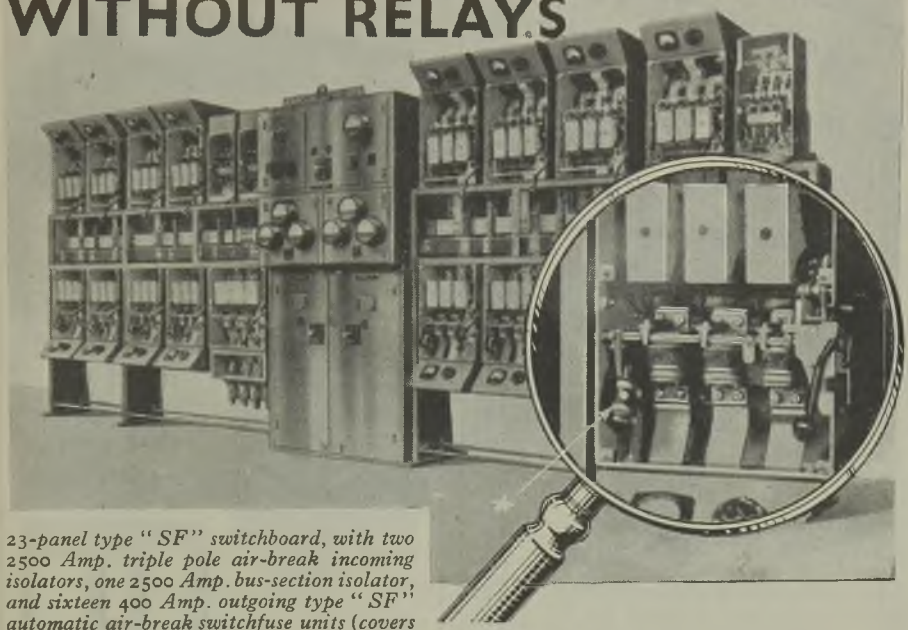
MIDLAND ELECTRIC MANUFACTURING CO. LTD., TYSELEY, BIRMINGHAM, 11

SWITCH, FUSE AND MOTOR CONTROL GEAR, ELECTRIC FIRES AND LOCALISED LIGHTING EQUIPMENT

London Showrooms & Stores: 21-22 Rathbone Place, W.1 : **Manchester Showrooms & Stores:** 48-50 Chapel St., Salford, 3

Earth-Fault Protection

WITHOUT RELAYS



23-panel type "SF" switchboard, with two 2500 Amp. triple pole air-break incoming isolators, one 2500 Amp. bus-section isolator, and sixteen 400 Amp. outgoing type "SF" automatic air-break switchfuse units (covers removed).

for Medium Voltage, Automatic Air-Break Switchgear

The unit illustrated is used for works distribution on the L.N.E.R. system at Cowlairs. Complete earth-fault protection (J. & P. Patent No. 563,060) is given by fitting into the outgoing switch-fuse units core balance current transformers operating low voltage striker fuses (starred in the illustration above). The striker fuses *trip all three phases*. By dispensing with relays both size and cost of the board are reduced. Publication S.G.26 gives full details of earth-fault protection.

Another reason for installing J. & P. Equipment

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

B

SIMPLEX

S 5

A

BALL

in aid of

Electrical Industries Benevolent Association

will be held on

Friday, November 8th

1946

8.30 p.m. to 1.30 a.m.

at

GROSVENOR HOUSE

PARK LANE, W.1

•

DANCING TO

DEBROY SOMERS AND HIS BAND

•

BRILLIANT CABARET INCLUDING

CHARLIE CHESTER

HELEN HILL

•

Single Tickets 30/- including Buffet

SUPPER SERVED AT THE TABLES

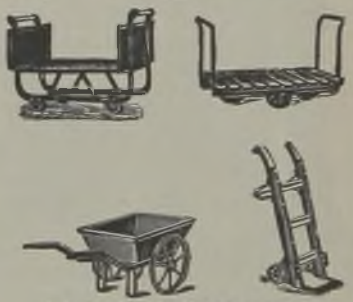
CAR PARKING FACILITIES AVAILABLE.

EVENING DRESS OPTIONAL

Owing to limited accommodation, early application for tickets, obtainable from

E.I.B.A., 32 OLD BURLINGTON ST., W.1, *is advised*

The Association is indebted to The General Electric Co. Ltd. for the gift of this space.



ELECTRICAL REVIEW

October 18, 1946

Managing Editor :
Hugh S. Pocock, M.I.E.E.

Technical Editor :
C. O. Brettelle, M.I.E.E.

Commercial Editor:
J. H. Cosens

Contents :—

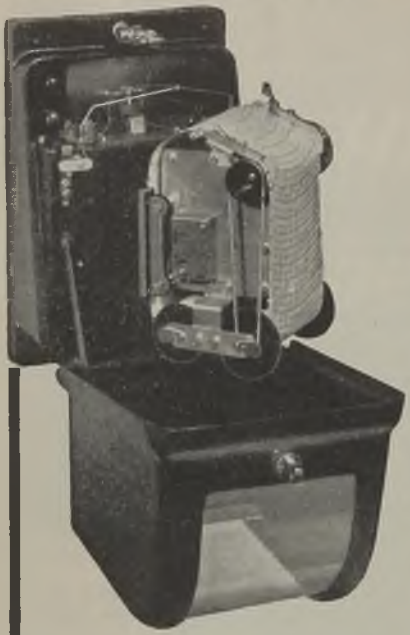
EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1

Telegraphic Address : "Elecrev, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (50 lines).

Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.

Annual Subscription, post free : Great Britain and elsewhere (except Canada), £2 7s. 8d. ; Canada, £2 3s. 4d.

Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."



"INKWELL" GRAPHERS

maintain their Leadership with these Exclusive Features :—

- Instantaneous response—the pen travels across the chart in less than $\frac{1}{3}$rd second with no overswing.
- Low power consumption—A.C. Ammeters take less than 0.5 watt.
- High efficiency magnetic damping—ensures faithful records of widely varying loads.

WRITE FOR CATALOGUE SHEET 300

EVERETT EDGCUMBE

COLINDALE WORKS
LONDON, N.W.9
Telephone : COLINDALE 6045

Manufacturers of all kinds of indicating and recording electrical instruments and photometry experts

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIX. No. 3595. OCTOBER 18, 1946 9d. WEEKLY

Boiler Availability

Coal Economy from Efficient Cleaning

SEVEN lean years of fuel stringency have been forecast. Ministerial appeals for voluntary self-denial in the use of fuel of all kinds must be heeded if more severe deprivation is not to come through force of circumstances. This is especially the case with electricity, which is needed not only in homes but also to keep factories working, without which willingness to make personal sacrifices in order to increase exports would be in vain.

The electricity supply industry, as a user of an eighth of the coal mined desires whole-heartedly to make its full contribution to fuel economy. Yet because the production of electricity from the smallest possible amount of coal, as a condition of its own remarkable progress, has always been a cardinal aim (and a reduction in lb per kWh generated of more than 40 per cent has been made during the past twenty years), there is no obvious margin for further economy in the power stations.

Supplies of Cheap Fuels

If generating plant capacity and other conditions made it feasible, the biggest help that electricity could give would be by accelerating its own expansion, as in this way low-grade fuel would be used instead of the better qualities required for more specialized processes. This does not mean that any of the widely varying kinds of low-grade coal can be dumped on any power station. That would be to underrate grotesquely the scientific thought that has been devoted to combustion problems.

Existing stations were designed for the burning of certain classes of cheap fuel, which their owners were at liberty to select as most suitable. Although reasonable flexibility has been allowed, the limits have often been overstepped in recent years and boiler-house operators, many of them with insufficient training, cannot be expected to keep clean fires with unfamiliar and varying qualities of fuel.

Heating-Surface Deposits

Boiler plant of the future (15 million lb per hr evaporation capacity will probably have to be installed annually during the next dozen years) will, no doubt, be designed to suit the fuel instead of the other way about. In ensuring trouble-free operation, researches of chemists into means of reducing the formation of bonded deposits on heating surfaces will undoubtedly play an indispensable part.

In view of its immediate bearing, the session of last week's " Fuel and the Future " Conference of most importance to electrical engineers appears to us to have been one devoted to the availability of water-tube boilers. Older methods of cleaning boiler external surfaces are largely obsolete in face of the greater evaporative capacities, the high steam pressures and temperatures, and the carrying of sustained loads for longer periods necessitated by modern conditions.

The short-term aim of the Boiler Availability Committee, which presents a notable example of effective co-operation between manufacturers, users and research organi-

zations, is to enable boilers to give continued service between annual overhauls up to the standard achieved by turbines. The work of the Committee has already resulted in some cases in an eight-fold improvement and it was surprising to hear that the simple recommendations of Bulletin MC/131 were not everywhere being carried out. Improvements in boiler cleaning (down to the metal) will not only increase the effective kW of generating plant urgently needed; they will also enable the most modern units to be run at better efficiencies and make it unnecessary to transfer their load to older and more numerous smaller and less efficient plant, thus saving coal.

Trade with Russia

SINCE Sir George Nelson's return from his visit to Russia (see *Electrical Review*, October 4th) it has been announced that the Swedish Government has extended a credit of about £69 million to Russia for the purchase of Swedish goods, including electrical equipment. The term of the credit is fifteen years and the effective rate of interest to be paid is under 2½ per cent. Apart from this, arrangements are being made for the resumption of the normal exchange of products between the two countries. It is possible that Swedish electrical manufacturers are in a better position than British companies in the matter of deliveries, but whether this is so or not the agreement should act as spur to our people to strain every muscle to meet some of Russia's electrical needs. It is reported that English Electric Company representatives are following up Sir George Nelson's recent visit with detailed offers.

Registration of Engineers

ONCE again the question of the abuse of the term "engineer" has been brought up. It was referred to in a letter published in our last issue and it formed the subject of a paper read by Mr. C. L. Champion before the Engineers' Guild last week. Mr. Champion contends (though not in the same words) that the application of the term to anybody who carries a piece of oily waste or uses a hammer (or in the electrical industry anyone possessing a pair of pliers) has had a most deleterious effect upon the status of the profession. He points to the success attained in some of the Dominions and in the United States by the registration of engineers (although we believe that American engine-drivers still enjoy the description). Mr. Champion considers that the attainment of registration in this country would be beneficial to the engineer and the public and thinks that it is a possibility. We are entirely in favour of registration but realize that its advocates have a hard row to hoe.

Purchase Tax Refunds

RETAILERS have complained of the injustice of the arrangement by which goods in stock on which purchase tax has been paid still carry that tax when reductions or remissions are made. This places them at a disadvantage compared with others who have no stocks of the goods and can sell new supplies without the tax addition. The public will naturally go to the latter or wait until tax-free supplies become available. Hitherto, on account of the hand-to-mouth nature of much retail business nowadays, the effect has not been insupportable, but with increasing supplies, which will enable stocks to be carried, it is possible that some trades will be seriously prejudiced. It is therefore to be hoped that the representations on the subject which have been made to the Customs and Excise authorities by the National Chamber of Trade will have some effect.

Small Hydro Stations

LIMITATIONS on the use of water-power resources on a small scale are illustrated by the proposed Isle of Man scheme referred to in this issue. Its practicability depends upon the linking up of the 5,250 kW available with the coal-fired generating units, which provide standby for deficiencies in either plant or water. Only limited storage of water is feasible, even at upwards of £122 per kW, so that the economic comparison may be between the overall cost of hydro-electricity with the fuel cost alone of a steam station. Paradoxically it is the high-capital-cost small hydro plant with low running expenses that is most economically operated for taking the peaks, leaving the long-hour load on the undertaking to be carried by cheaper steam sets with high coal costs.

Cold Strip Rolling

Precision Control Arrangements in Production on Continuous Tandem Mills

IN the *Electrical Review* of August 2nd and September 20th, we described the specialized electrical applications to steel slab production and hot strip rolling at the works of John Summers & Sons, Ltd., at Shotton, Chester, and we now propose to deal with the cold rolling processes at the same works.

The coils of strip from the hot strip mill are fed by cranes on to a gravity conveyor by which they are passed on to one of two continuous pickling lines. In the process of pickling, the scale which has formed on the steel during cooling is removed chemically. Each pickling line comprises four tanks containing hot sulphuric acid, together with a hot water tank for washing the strip.

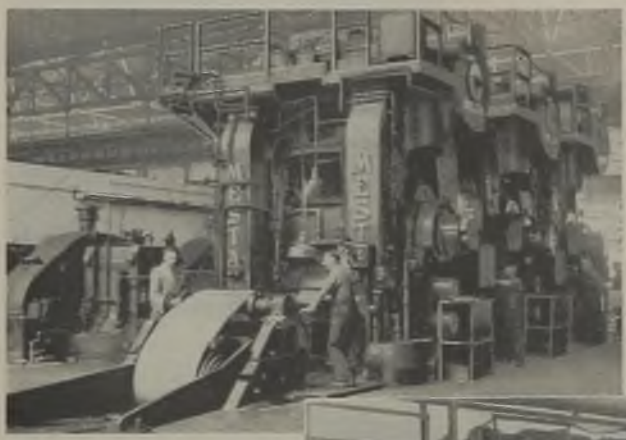
At the entry end of each pickling line the coils of strip are passed, in turn, through the "processor," the shears and the welder

The coils of strip are first fed through a "processor" at the entry end of the pickling line, the purpose of this machine being to break up the scale mechanically. To maintain a continuous strip through the pickling line the coils are either welded or mechanically stitched together at the feeding end. One pickling line

In the pickling lines (above) the scale on the strip is removed chemically. The strip is re-coiled in an up-coiler (right) at the delivery end of the pickling line

The tanks are constructed of steel plate and are lined with rubber and acid-resisting brickwork. Each acid tank is 60 ft long by 3 ft 6 in. deep and has a capacity of 6,000 gallons, while each water tank has a capacity of 3,000 gallons.

has a butt flash welder and the other an automatic atomic hydrogen welding machine. Both of these processes make a weld which can be later passed through the cold reduction mill without fracture. The strip, after passing through the tanks, is dried with hot air and is then re-coiled in an up-coiler and discharged on to a gravity conveyor for storage before cold rolling. The driving motors on the pickling lines are all d.c. machines, and a 4-to-1 speed range is effected by shunt-field control, in order to provide suitable adjustment of the rate at which the strip passes through the tanks. The maximum strip speed is 210 ft per minute. A device which automatically maintains the tension of the strip as it passes through the acid consists of a roll inside the first tank which operates a limit switch which, in turn, controls the speed of the pinch rolls feeding the material into the tanks. It also operates a system of signalling lights at the entry and delivery ends of the line, thus indicating conditions of tight and loose strip.



The three-stand tandem cold rolling mill effects a 60-70 per cent reduction in the thickness of the strip; feeding end of mill

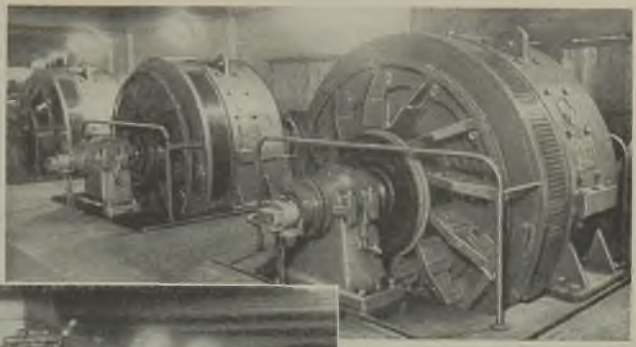
After pickling, the coils are handled by ram tractors, and then placed on gravity conveyors ahead of the tandem mill. The ram tractors run on the floor, and will lift a coil up to 18,000 lb in weight. These tractors as originally supplied by the makers had six-cylinder petrol engines driving 9/18 kW 48-V d.c. generators, but the power units proved very difficult to maintain and a conversion was made to overhead trailing cable operation, the generators being built into a motor-generator set carried on the tractor. There are four motions, namely: travel, hoist, power steer and coil rotation.

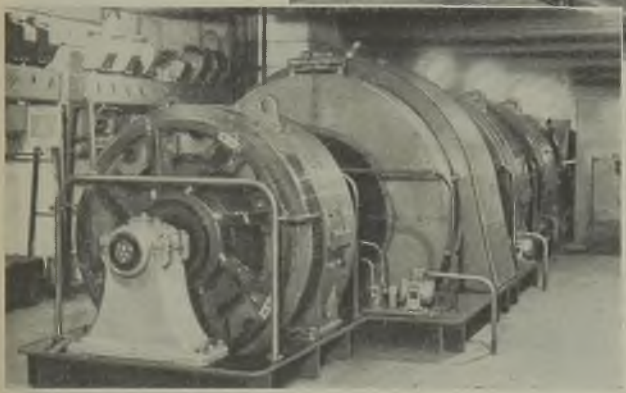
The three-stand tandem continuous cold rolling mill effects a 60 to 70 per cent reduction in the thickness of the strip, and gives a very accurate control of the finished thickness. It has three stands, each driven by a 1,500-H.P., 300/600-r.p.m. d.c. motor, the variable speed being necessary to take care of the progressive reductions through each stand and the range of finished gauges. The delivery speed is from 640 to 1,280 ft per minute, and the material is re-coiled on a winding reel. The control of all the functions is centralized in control cabinets attached to the mill housings, and all the main mill motors are fed from a motor generator set under Ward-Leonard control. There are two generators in parallel, each being a 1,750-kW, 600-V, 750-r.p.m. machine. The drive for the winding reel is worthy of special note. As the coil builds up in diameter obviously the coiler motor speed must be reduced, but at the same time a greater torque is required in order that the tightness

A winding reel at the delivery end of the mill has a specially controlled drive to ensure that the tightness of the coil remains constant

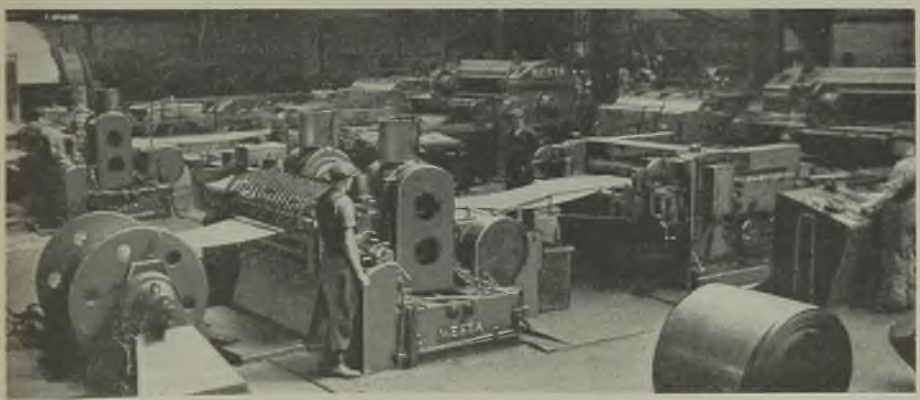
of the coil shall remain constant. The product of the torque and speed gives constant H.P. input, and the automatic regulator holds the motor input constant. This control is effected through the medium of current regulators, which operate on the shunt field of the winding-reel motor and its series booster.

After cold reduction, most of the material is taken through rotary shear lines for cutting into lengths, although material can be supplied direct in coil form if required. Each rotary shear line consists of a feed reel, a side trimmer, a leveller and a rotary shear. The coil is rolled into the feed reel, then passed through the three machines, and after shearing, the sheets are piled on a conveyor table. The side trimmer cuts a ribbon from each side of the strip to give an accurate width and the ribbon scrap is cut into short lengths by means of a rotary scrap cutter and discharged into scrap boxes. The rotary shear lines have a speed range of 100/300 f.p.m., this range being obtained by shunt-field control of the d.c. driving motors. A very accurate speed adjustment is necessary between the trimmer and leveller in order to hold a slack sheet between the two units, and to achieve this each motor has a vernier shunt-field regulator.





All the main mill motors (above) are fed from a two-generator m.g. set (left) under Ward-Leonard control



Each rotary shear line for cutting the material into lengths consists of a feed reel, a side trimmer, a leveller and a rotary shear

After shearing, the sheets are passed to the annealing department. Annealing is necessary at this stage as the cold rolling produces work hardening of the steel, and for most sheet-metal processes a soft ductile steel is required. The annealing plant was built by the Incandescent Heat Co., Ltd., and comprises 42 bases, each capable of holding 120 tons. The annealing covers are of the radiant tube type, fired with clean producer gas, the cleaning operation being done in a Whessoe electrostatic detarring plant. The annealing furnaces are fully instrumented and electrical automatic temperature control of the annealing cycle is provided through the medium of motorized gas and air valves.

After annealing, the majority of the steel goes through the "skin pass" mills. This process, also called "temper" rolling, is to give a good and slightly hard surface to the sheet, which is otherwise dead soft after the annealing operation. There are two skin pass mills, with four-high roll assemblies and having a tilting table on the feed side and a leveller on the delivery side. One of the mills can be converted for either sheet rolling or coil rolling. When on coil rolling, feed reels are used on the entry side of the mill, and a winding reel on the delivery side of the mill. The skin pass mills have 750-H.P., 600-V 300/600 r.p.m. d.c. driving motors supplied from motor-generator sets with Ward-Leonard control. The speed range of the skin mills is 500/1,000 f.p.m.

The ram tractors will lift a coil up to 18,000 lb in weight

After skin-passing, most of the steel sheets are passed through oiling machines to protect the surface from rusting, and the material then passes to the inspection and packing department for dispatch.

The hot and cold strip mills are served by an elaborate system of oil and grease lubrication, and electrical control plays an important part in these systems. There are two principal oil supplies, one to feed the back-up roll bearings and one to feed the pinion stands and reduction gears. The oil is held in steam-heated storage tanks and is pumped into pressure vessels. Pressure control switches, which operate the motor-driven pumps automatically are so graded that should any pump fail a stand-by pump will automatically be brought into service. An elaborate system of both visual and audible alarms serves this scheme, while interlocking relays are provided to prevent any of the main units from being started when oil supplies are not available.

After annealing, the majority of the sheet steel is passed through "skin pass" mills for "temper" rolling

All the grease points are connected to a Farval centralized grease system, and in the case of the hot strip mill two circuits—the fast and slow cycles—are provided; one gives a grease supply approximately every 20 minutes, and the other approximately every hour. The grease pump delivers at about 1,000 lb per sq in.

The electrical equipment for the three-stand tandem mill and the two skin pass mills were supplied by the British Thomson-Houston Co.; the auxiliary driving motors were supplied by the General Electric Co.; and the auxiliary control gear by the Igranic Electric Co.

Fault Localization

Errors Due to Connecting Leads in Slide-Wire Tests

By G. W. Stubbings, B.Sc., A.M.I.E.E.

A FAULT in a cable with a loop of unknown equivalent length can be localized from one testing position with a slide-wire bridge, if a third cable to the far end of the loop is available. The third cable is virtually used to find the ratio of the equivalent lengths of the two cables of the loop. As with all other bridge tests for fault localization, this test is liable to an error due to the resistances of the leads connecting the loop to the slide wire, but this error can easily be eliminated by making one additional test for balance of the bridge, if two connecting leads are used, a and b, a having twice the resistance of b.

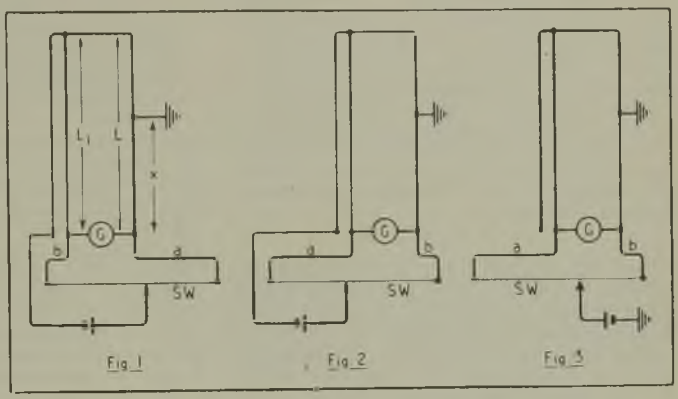
The connections for the three balance tests are shown in the diagrams. In Fig. 1 a battery is shown first connected to the far end of the loop, and the lead of higher resistance, a, is joined to the faulty cable of the loop. Let K be the number of millimetres of slide wire equivalent in resistance to that of the lower resistance lead, L the length of the faulty cable, L_1 the equivalent length of the sound cable of the loop, and x the distance of the fault. Then if n_0 is the millimetre distance of the moving contact from the zero of a metre slide wire with the bridge in balance, then, as one arm of the bridge is increased in equivalent length by K and the other by 2K, we have:—

$$\frac{n_0 + 2K}{1{,}000 + 3K} = \frac{L}{L + L_1}$$

The leads connecting the slide wire to the cable loop are then interchanged as shown in Fig. 2 and a new balance is obtained with the moving contact n_1 millimetres from the zero point. We now have $\frac{n_1 + K}{1{,}000 + 3K} = \frac{L}{L + L_1}$ and from the two equations we obtain $n_1 + K = n_0 + 2K$, and $K = n_1 - n_0$. Without touching the connecting leads to the slide-wire, the battery is disconnected from the third cable and put to earth as shown in Fig. 3. If n_2 is the new position of the moving contact for balance we have:—

$$\frac{n_2 + K}{1{,}000 + 3K} = \frac{x}{L + L_1}$$

From this and the preceding equation we obtain $x = L \times \frac{n_2 + K}{n_1 + K}$ and substituting the value of $K = n_1 - n_0$ we obtain x in terms of L, n_0, n_1 and n_2. The required condition that the resistance of one lead is double that of the other is easily satisfied by using the same cable size and making one lead exactly double the length of the other.



Export Inquiries

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

Greece.—An Athens manufacturers' agent asks to be put into touch with British makers of electric lighting fittings, radio receivers and accessories, and domestic appliances. (X. 164.)

Belgium.—Representation is required by a Brussels firm of British manufacturers of small measuring instruments, industrial voltmeters and ammeters, wires and cables, miniature circuit breakers and power transformers. (X. 165.)

Views on the News

Reflections on Current Topics

THOUGH there is still a very great shortage of good appliances, it is rather difficult for manufacturers to estimate at the present moment what the actual demand is, or is likely to be in a few months' time. Most of the appliances supplied to the retailers (including of course electricity undertakings) have been on order for some time and in any case rarely stay in electrical showrooms for more than a few days. For this reason it has become a widespread practice for retailers to order many times the numbers of appliances they really require. It is nothing unusual for them to ask for ten times the quantity they need in the hope of getting a tenth. Manufacturers are not deceived by these inflated orders and endeavour to share out their supplies as fairly as possible, but it is hard for them to plan their production ahead because of the prospect of widespread cancellation of orders as soon as their output is sufficient to meet genuine requirements without difficulty.

* * *

Mr. John Langdon-Davies, whose remarks on the shortcomings of an electric toaster were referred to in my last week's notes, has sent a reply to my comments. I pointed to the difficulty of providing the right plug with any appliance sold to the public. Mr. Langdon-Davies says:—

> "Clearly a manufacturer cannot know what plug will fit in a specific locality; but surely an arrangement could be made whereby the local retailer, who *does* know, could supply the right plug, either by specifying it in his order or by some financial adjustment. In this way the purchaser would buy a complete article. In the case of my toaster the very large London department store who were selling it were 'afraid they hadn't got any plugs'."

My reply is that even a local retailer cannot, without a great deal of trouble (probably including a visit to his customer's premises), specify the correct plug. The remedy is a standard plug—and my readers know something of this question.

* * *

Mr. Langdon-Davies opens up an even wider horizon in his next remarks:—

> "The more important point is whether the public can ever have 'proper discrimination in these matters.' It would help if simple instruction in the use of domestic scientific equipment were taught in elementary schools, along with the use of the telephone, the reading of meters, the wiring of fuses and other everyday techniques of this scientific age."

Attempts, encouraged by the Electrical Association for women, are being made to impart this kind of knowledge to future housewives now at school and it is hoped that a more discriminating generation is coming forward as a result.

* * *

All those who have the reputation of the industry at heart will agree with Mr. Langdon-Davies when he says:—

> "It would also help if the trade associations concerned were strong enough to insist on certain standards and to assert the immorality of taking advantage of public ignorance. The public cannot know whether a medical prescription is correctly made up and therefore its interests are safeguarded by dispensers with a professional code of morals; could we not have electrical apparatus dispensed in the same way?"

The remedy which has been put forward in the industry many times is the establishment of a proving house for appliances. This has, as a corollary, a ban on the sale of non-approved appliances which would achieve Mr. Langdon-Davies's object of protecting the uninstructed public. I have devoted a great deal of this week's space to this subject for I feel that Mr. Langdon-Davies, a well-informed layman, has raised a number of points to which the industry should continue to pay serious attention.

* * *

At last week's "Fuel and the Future" Conference, the Parliamentary Secretary to the Ministry of Health regretted the necessity for his Ministry's direction that only one solid fuel appliance must be installed in each of the new houses of urban local authorities. There has also been a protest by Edinburgh coal merchants because the Corporation is following this direction in two new blocks of flats. It is not up to an electrical man to sympathize but I can see their point of view. The coal merchants are not prejudiced, for I see that they do not mind the installation of electric lifts to carry coal to the top flats. They are on more debatable ground when they say that coal has the advantage over gas and electricity that it can be stored at the point of consumption. I have always thought that this was the trouble with coal.

* * *

As filmgoers know, the Americans find it difficult to master the intricacies of the British system of titles. Hollywood is not alone in this for I have just seen in an article on an American electronic computer, reproduced in the *New Zealand Electrical Journal*, a reference to "Lord William Thomson Kelvin."

—REFLECTOR.

Fuel and the Future

Papers at London Conference

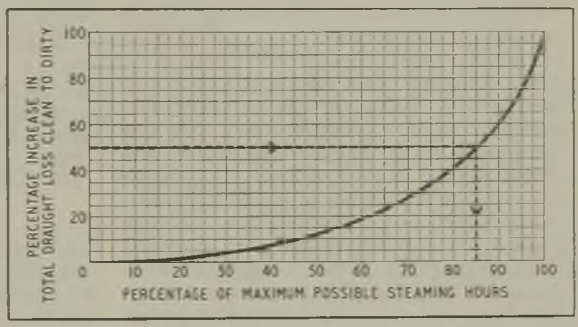
A THREE-DAY conference, arranged by the Fuel Efficiency Committee of the Ministry of Fuel and Power was held in London during last week. About 4,500 delegates and visitors from abroad were present at the eight sectional meetings. The chairman, DR. E. S. GRUMELL, estimated that the fuel-saving campaign had resulted in a reduction of 5 million to 10 million tons in coal used. MR. EMANUEL SHINWELL, Minister of Fuel and Power, said that the output of electricity was expected to be 8 per cent more this winter than last with a peak demand 15 to 20 per cent greater; he called for a voluntary all-round saving of 10 per cent, which in regard to domestic users would be only for electricity, the consumption of which had increased by 65 per cent between 1938 and 1945, and for gas, for which the increase had been 26 per cent.

In the afternoon, SIR JOHNSTONE WRIGHT (general manager, C.E.B.) presiding over Section A. (Generation of Steam) opened a symposium on the availability of water-tube boilers. The development of large boiler units, he said, introduced especially difficult problems in this country where coals of every known variety were mined within short distances of one another. British boiler manufacturers had spent largely on investigations and had probably obtained more advanced technical data than had foreign manufacturers.

With grid operation, boiler plant had to deal with much higher sustained loads and a serious divergency was revealed between the availability of turbo-alternators and of their associated boilers, largely owing to fouling of the furnaces and heating surfaces of the boilers. In 1938 a number of boiler plants had to be derated by 15 per cent, equivalent to a loss of 250,000 kW. In the following year the Boiler Availability Committee was set up. Efficient cleaning methods were evolved, which resulted in the periods between taking boilers off load for hand cleaning being improved from about 700 hours to 5,000 or 6,000 hours in many cases.

Steadily increasing ash content accentuated the difficulty of getting continued rated capacity from the plant installed, which had to meet a rapid growth of the national electrical load. Estimates for the current year were for a maximum demand of over 10 million kW and a consumption of 34,000 million kWh, which would entail the consumption of 23 million tons of coal in stations controlled by the Central Electricity Board.

MR. M. H. ADAMS (chairman, Boiler Availability Committee) demonstrated that thorough automatic cleaning of heating surfaces and gas passages throughout the plant was the most effective way of improving availability at the present time. He emphasized the importance of getting down to the metal, since on really clean surfaces deposits were built up slowly. Variation in the draught loss was the most practical indication of cleanliness. The accompanying curve shows that if cleaning left a loss of only 10 per cent, for example, 45 per cent of the availability would be sacrificed. Boilers should be taken out of commission when draught loss reached 50 per cent, after which only 15 per cent of the steaming hours remained, and a boiler that was not completely choked could be cleaned much more quickly. He referred to Bulletin M.C.'131 of the Committee, which summarized the various methods of off-load and on-load cleaning that had proved satisfactory and could be adopted in individual cases according to circumstances. Mr Adams was followed by MR. W. G. MARSKELL



Loss of boiler availability with reduction of draught

(Babcock & Wilcox), who dealt with practical problems of cleaning boilers under steaming and stand-by conditions and during overhaul.

Research of a longer range on external boiler deposits and corrosion was dealt with by DR. H. E. CROSSLEY (D.S.I.R. Fuel Research Station) and by MR. DOOLEY (British Coal Utilisation Research Association), who was represented by DR. G. WHITTINGHAM.

The influence of sodium and potassium in forming a binding cement for particles in furnace and flue gases in combination with small percentages of phosphorus and sulphur were clearly demonstrated. Investigations were described which established that the distillation of incombustible volatiles took place from the high-temperature coke zone and that those depending on their chemical structure sublimated on the heating surfaces, each selective as to temperature, and provided a sticky film for binding entrained dust.

Availability Committee's Research

Results of research work by the Boiler Availability Committee were summarized by Mr. R. LL. REES (London Power Co.). The fused-ash type of deposit ("bird-nesting" in lower generation banks and sometimes lower superheater parts) is bonded together by partial fusion of particles at high temperatures. Temperatures of gases leaving the combustion chamber should be below the limiting temperature of the softening point of the coal ash. The use of secondary air to shorten the flame is recommended. Fused-ash deposits can be removed by on-load water lancing. Pulverized fuel boilers suffer from deposits at least as much as stoker-fired boilers.

Fly-ash particles bonded by phosphates are especially troublesome in economizers. They are rare with p.f. boilers, as they are produced with deep fuel loads with high temperatures. Sulphate bonded deposits, which also affect stoker-fired units more seriously, are formed from SO_3 produced by decomposition of calcium sulphate in the fuel bed, by oxidation of SO_2 in flames and by catalytic oxidation of SO_2 at temperatures found in modern superheaters. SO_3 also combines with water vapour at lower temperatures to form H_2SO_4, causing corrosion of air heaters.

Another paper with a power-station bearing was "Coal Grading for the Electricity Industry" which was read by MR. J. D. PEATTIE (C.E.B.) before a Joint Session.

Applications of electricity in agriculture and horticulture formed the subject of an address to Section C. by MR. C. A. CAMERON BROWN (Edmundsons), who gave the number of agricultural holdings with main electricity supplies as 70,000—about 25 per cent of the total suitable for electrification. The average revenue, he said, was below £25 per annum, and at 1½d. per kWh and 4,000 kWh each (including domestic), the total annual consumption was 280 million kWh. Within ten or fifteen years, 250,000 holdings could be connected, taking 2,000 million kWh per annum, which at 1½d. per kWh would produce a revenue of £10 million.

The main sphere of expansion would be in milk production, for which self-contained steaming chests and hot water supplies would require 8,000 kWh per farm, and where a three-unit recorder system was installed, up to 20,000 kWh.

Grain-drying presented the largest load demand. Although fewer than a dozen were now in use, the installation ultimately of 2,000 units with an average drying capacity of 150 tons per annum and a consumption of 50 kWh each, could be expected, giving a total of 15 million kWh. Hay drying could provide individual off-peak demands of the order of 10 kW or 40 kW with dehumidification. An aggregate total demand of 2·5 million kW and annual consumption of 1,000 million kWh might be the outcome.

Soil Heating and Irrigation

Unlike grass drying and glass-house heating, soil heating offered a very favourable case for electrification. For hot beds for early salad crops the loading was usually below 150 kW per acre, which during the January-March growing season required about 108,000 kWh off peak. Pre-warming of tomato-house soil for planting normally took about 5 W per sq ft continuously for 24 to 30 hr. Irrigation and fruit spraying were the largest users in horticulture in units up to 50 H.P. The former, which was continuous over long periods, required 60 to 80 kWh per acre per in. of "rain." Most of the incubators and other equipment required for the re-expansion of the poultry industry would be electrically operated. About 570 million table birds would be required, which would entail the use of 57 million kWh annually plus 19 million kWh during four weeks for the rearing of day-old chicks to table size.

New types of domestic heating appliances provided a theme for MR. J. I. BERNARD (E.D.A.) in an address to Section G. (Modern Heating and the Architect). He stipulated

that high-grade energy should not be wasted in structures which lost heat rapidly or in poorly designed water-heating systems. He mentioned reflector-type electric fires designed to radiate heat over a 120 deg arc and the desirability of associating thermostats with non-luminous convectors. A 1½- or 2-kW convector in the hall would provide a measure of central heating for the whole of a small house in the coldest weather. A new type of 20- or 30-gal water heater, which could be installed under the kitchen draining board, was fitted with two elements; one near the top kept 6 gal hot for ordinary domestic purposes, the other and larger element at the bottom was switched in when required for baths or household laundry. When working in conjunction with a solid-fuel boiler, a 30-gal boiler of this type (20 in. diameter by 47 in. high) made the most efficient method. The cardinal principle was that the dual system should be efficient from the electrical point of view and that the lay-out should be correct.

New models of cookers included oven thermostats, quickly heating ovens, rapid boiling plates, simmer controls, and increased grilling and warming space. If required an oven could be automatically switched on and off at predetermined times. New designs of refrigerators included a 4 cu ft model for fitting in cupboards at waist height.

Laundry Equipment

The latest washing machines needed no wringer as most of the water was removed by centrifugal force by running the tub at high speed. In one automatic model the whole sequence of operations was performed by the setting of a dial. A ventilated drying cupboard could be easily constructed, preferably with an extraction fan, with a heating element controlled by a three-heat switch. Other matters mentioned were the ring-main wiring system, the 3-kW universal plug and the minimum number of plugs required in each room of a house, the E.D.A. house-service unit and the fluorescent lamp.

Another paper on advances in design of domestic appliances was presented before Section H. (The Home and its Fuel Services) by MR. P. HONEY, who confirmed the particulars of post-war cookers given in the previous paper. He pointed out that space heating by electricity for less than four hours required a smaller amount of coal in the power station than was consumed by open fires.

Developments in the design of fires were mainly in securing better heat distribution through improved shaping of reflectors and higher temperatures and radiant efficiency of resistors. Oil filled thermostatically controlled convectors distributed over a wide area the heat from small elements. Provision had been made in the Ministry of Works heat-service unit for the fitting of an immersion heater, but expert advice should be taken before applying this to other installations. Less coal was used to provide hot water for a bath by an immersion heater than from solid fuel in a dual installation.

Fluorescent lamps (which provided more than double the light and of softer quality for a given energy consumption) were particularly desirable for long-hour use in living rooms. After a survey of advances in other domestic appliances, the speaker commented on the ability of the electrical industry to use low-grade fuel that was not required for other purposes with the possibility that district heating, heat storage and the heat pump might further increase efficiency.

Earthenware Firing

"Present Trends in the Ceramic Industry" were discussed by MESSRS. T. LOCKETT and L. BULLIN in Section F. (Special Industrial). Enamelling called for a temperature of only 700 deg C and had been carried out by electricity commercially since 1927. In 1939 the first high-temperature tunnel, firing earthenware biscuit and glost up to 1,140 deg C, was installed at the new Barlaston works of Wedgewoods (described in the *Electrical Review*). By 1942, three glost kilns had been electrified, consuming over 14 million kWh; twelve more were now under construction for the N. Staffs district in addition to twenty-nine other types of electrically-fired kilns in operation or on order.

Higher thermal efficiency in the kiln itself was achievable by electricity than by any other method, since it lent itself better to heavy insulation, entailed no exhaust-gas loss and required no containers (owing to its clean atmosphere), giving a ware efficiency three times that of a gas-fired kiln; also labour costs were less, and temperature could be automatically controlled to within 2 or 3 deg C.

Factors that would favour development of the high-temperature electric kiln were resistors capable of standing up to 1,300 to 1,350 deg C for considerable periods, improved air circulation, steel-band

conveyors in place of cars, and high-temperature resistant steel fittings in place of refractory settings.

Support for the statement regarding the superior utilization efficiency of electricity was given in a paper by MR. A. DINSDALE (British Pottery Research Association), while MR. E. ROWDEN (British Refractories Research Association) noted a tendency towards increased use of electricity.

A joint session was allocated to District Heating, the subject of an Interim Memorandum issued by the Heating Committee of the Building Research Association, of which an abstract was given in the *Electrical Review* of October 4th. As an addendum, the Westminster City Council has subsequently adopted in principle a scheme for the supply of central heating and hot water from Battersea power station to 1,600 flats on its Pimlico estate and Cambridge Street and Alderney Street estate.

Cotton-Mill Electrification

In a paper on "Power for Cotton Mills," Mr. R. H. HARRAL (borough electrical engineer, Blackburn) stated that losses in mechanical transmission in steam-driven mills amounted to from 20 to 25 per cent. A Committee set up by E.D.A. in 1945 had conducted a survey of 1,391 cotton mills in co-operation with 29 electricity undertakings. Of these, 349 were using public supply for power and lighting and 669 were taking part supplies, the total consumption being 363 million kWh per annum; 373 mills were still unconnected to the public mains.

Owing to steadier drive, production after electrification had increased by 3 per cent in spinning and up to 10 per cent in weaving. According to the Cotton Industry Working Party's report the industry consumed in 1937 a total of 4·6 million tons of coal and 500 million kWh (equivalent to 336,000 tons of coal at power stations). Conversion of all steam drives to electricity would save at least 750,000 tons per annum, valued at £2 10s. per ton.

Nearly 500,000 motors and starters of ½ to 30 H.P. would be required to modernize the industry. During the twelve months ended September 30th last, 19 mills had been wholly converted and 49 partly, while 100 were still under negotiation; for the 168 mills, about 51,000 kW would be required, making a saving of 90,000 tons of coal per annum.

Appropriately to the occasion, the Institute of Fuel held its annual social function on Wednesday, October 9th, which was attended by upwards of 700 members and guests. Despite catering difficulties, owing to a sudden extension of the hotels labour dispute to the Connaught Rooms, the evening proved an enjoyable one and, after full justice had been done to an improvised buffet, dancing continued until midnight with an intermission for a cabaret.

Institute's Royal Charter

During the evening DR. E. W. SMITH, the retiring president (after four years of office), proposing the loyal toast expressed thanks for the granting of a Royal Charter to the Institute. The present membership he gave as 3,000, compared with about 1,000 in 1938, and reported that a new headquarters had been acquired for £15,000. After a reference to the award of the Melchett Medal to Sir James Chadwick for his leading contributions to the development of fuel and assuring the Minister of Fuel and Power of the co-operation of the Institute in solving fuel problems, Dr. Smith installed Dr. C. H. Lander as the new president, at the same time congratulating him on his new Government appointment.

DR. LANDER paid a tribute to the interest displayed by the Minister in fuel research when a member of a previous Government and when he himself was director of the Greenwich Research Station.

MR. SHINWELL corroborated Dr. Lander's reference to the interest he took in fuel research and paid a tribute from personal knowledge to the president's own work.

SIR JAMES CHADWICK, DR. A. A. H. ALLEN (director B.C.U.A.) and MR. H. ROXBEE-COX also spoke.

British Railways' Plans

A BOOKLET "British Railways and the Future" issued by the main-line companies sets out what the companies have done towards achieving a new transport system and briefly details the improvements that are planned, including electrification projects. The companies consider that if they are permitted to carry out their plans the country will have one of the finest transport systems in the world. Further unification is considered to be undesirable; the present units are as large as can, in practice, be managed from a central headquarters. In a survey of conclusions, it is contended that examination of the results of State ownership of railways in other parts of the world shows that in no case is the service as good as that of the British railways. To make such a change here to-day would involve immense administrative and financial dislocation and would obstruct and seriously delay the carrying out of the practical problems of transport.

I.E.E. Radio Section Address

Training Courses : Dielectric Developments.

A TWO-PART inaugural address was delivered in London last week by PROF. WILLIS JACKSON (Imperial College, London University) as the new chairman of the Radio Section of the Institution of Electrical Engineers.

The first part was an account of the intensive wartime training on a large scale of radio personnel for the fighting forces, with remarks on civilian post-war educational needs.

In all some 5,000 scientific and technical officers passed through university courses of six terms' duration, for allocation to military establishments and the radio industry. In addition, upward of 70,000 recruits, including a small proportion of girls, completed courses of four months' duration in technical colleges, as radio (radiolocation) and wireless (communication) mechanics.

The university courses were of broader scope and more fundamental than those at the colleges; all were intended to satisfy highly specialized needs and were dominated by the time factor.

Prof. Jackson hoped that the applied science of radio, treated as a branch of telecommunication, would from now on find its proper place in university departments of electrical engineering. If it involved tightening the link between electrical and physics departments and some fundamental changes in curricula, then so much the better for the teaching of electrical engineering as a whole. He hoped, too, that much of the material of the wartime advanced courses would appear in text-book form at an early date, for it would bear comparison with the best published elsewhere. Much of the wartime teaching apparatus had become the property of the colleges and universities, which were acquiring more under the war disposals scheme. The Radio Industry Council might see fit in due course to create a new fund from which special educational needs for apparatus could be met.

A particularly noteworthy aspect of the war effort was the achievement of the valve industry. To train the graduates further, if needed, there was established at Manchester a high-vacuum and electronics laboratory, the courses provided being the first of their kind in this country. Some 75 per cent of the lectures were delivered by 20 men drawn from the industry and Prof. Jackson drew attention to the great need for similarly organized courses on other aspects of radio and electronic engineering.

New Dielectrics

The second part of the address dealt with some of the newer dielectrics for use at the higher frequencies which interested telecommunication engineers. Now that substances were being prepared synthetically by controllable processes, the time was approaching rapidly when chemists and ceramists would be able to produce new materials for specific mechanical and electrical needs. Much closer collaboration would be necessary between the electrical and chemical industries, and it was important that synthesis should be deliberate rather than accidental as in the past.

The three groups of substances reviewed were carbon, silicon and titanium compounds. In the first case Prof. Jackson differentiated between polythene, polyisolutylene, polystyrene, polytetrafluorethylene and polyvinyl chloride for moulded and machined insulators and the insulation and sheathing of cables.

Silicon Compounds

For the second case the silicates afforded a variety of structural types, including the micas which had been prepared synthetically in Germany. Another natural silicon compound was quartz; there were two ways of forming it synthetically, but its hardness limited its electrical uses. Much interest was therefore attached to the more recent commercial development of the "semi-inorganic" class of silicones, possessing the easy applicability of organic products and something of the thermal stability of inorganic substances.

Structural variation produced polysiloxane while cross-linking resulted in the poly-silsesquioxanes, which opened up new fields of chemistry and possibilities of considerable electrical importance. Thus dielectric liquids, greases, rubbers, resins and varnishes had been made. Reference was also made to the newer glass compositions for very high frequency insulation and complex glass-metal structures, prepared by sintering with h.f. induction heating.

Finally Prof. Jackson differentiated between the pre-war and more recent titania-ceramics. Only limited progress had been made towards satisfactory explanation of their behaviour, but they were being used for thin-walled cylindrical condensers. Two properties of these substances that might be useful in due course were the dependance of their permittivity on the magnitude of applied electric stress and their manifestation of electrostriction.

A possibly dominant cause of the poor power factor of the types of ceramics mentioned was reduction of some of the titania during the firing process, which must be avoided in condenser manufacture. But this factor might be useful in another connection, since the photo-sensitiveness of rutile ceramics and the titanates appeared to be due to slight oxygen deficiency. The precipitate drop of the surface resistivity of titania bodies when illuminated with visible light seemed to be greatly enhanced when the material was made thin enough to be translucent.

CORRESPONDENCE

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

Domestic Water Heaters

IN your issue of October 4th (page 529) you published a letter from Mr. G. Jones, introducing a new type of electric water heater which does away with the storage principle. It is a pity that no mention of loading or water temperature is made, but taking the statement that an approximate flow of three-quarters of a gallon of hot water per minute is obtained and assuming the temperature of the hot water is 140 deg F, we arrive at the following loading, working on 100 per cent efficiency:—

$\frac{3}{4}$-gal per minute = 45 gal per hour.
45 gal = 450 lb × 90 deg F rise = 40,500 B.th.u. per hour.
40,500 divided by 3,400 = 12 kW (approximately).
(Supply authorities please note !)

Apart from the high loading which would debar this type of water heater from being connected to the mains, how long would copper pipes 3 and 4 last with white heat; and what about furring?

Other points could be made regarding the design, but the above criticism should be sufficient to discount the high claims made for such apparatus. Incidentally it would take more than 20 minutes to fill a 30-gal bath at $\frac{3}{4}$-gal per minute, with consequent loss of heat.

J. MCNEIL,
Assistant Secretary,
Electric Water Heater Manufacturers' Association.

London, E.C.2.

[A copy of Mr. McNeil's letter was sent to Mr. Jones who replies as follows.—Editors, *Electrical Review*.]

I DO not dispute the calculations of the Electric Water Heater Manufacturers' Association. In the first paragraph of his letter Mr. McNeil hints that my principles apply only to a water heater without storage, but the illustration that was reproduced showed that the heater is definitely designed with storage and I mentioned that it could be connected to the main water supply, thus doing away with storage.

Mr. McNeil assumes that the water is at 140 deg F, but I myself have not yet been able to take a bath at this temperature. He also assumes that the loading of my water heater is 12 kW. The present model referred to has been in constant use for the past six years in various parts of the country and I have not had one complaint. The elements are still in perfect condition, there is no furring, and the copper pipe has not yet melted. It will be marketed when restrictions are lifted.

At present I am experimenting with a view to connecting my water heater direct to the main water supply whereby hot or cold water will be obtainable as required through the cold water tap.

G. JONES.

Westcliff-on-Sea.

French Power Supply

From Our Paris Correspondent

THE French Minister of Industrial Production has issued a general appeal for economy in the use of electricity in order to avoid cuts in the winter. He stated that the need was more urgent as France would not receive further imports of power from the British zone of Germany, thus depriving her of at least one million kWh a day.

Actually, the supply from the thermal plants at Cologne has not stopped, but it is of an unsatisfactory nature. After the Anglo-French meeting at Maestricht, the British decided to improve the quality of the supply but to reduce it by 15 per cent; 850,000 kWh will now be received instead of one million.

French thermal plants will now be required to make up the deficiency, and this will no doubt affect industrial production. An effort is to be made to distribute consumption evenly over the day, and the principal consumers in the Paris area (using over 1,000 kW) have agreed to adjust their needs to the 655,000 kW which will be allocated to Paris. They will also organize work so as to spread consumption over the afternoon instead of concentrating it in the morning.

The situation as regards the hydro-electric plants is still good. The reservoirs are 80 per cent full, and 1,500 million kWh is held in reserve, sufficient for 8 to 10 weeks' supply at present consumption levels. At the moment hydro-electric plants supply 13,000 million out of the 24,000 million kWh produced annually in the country.

Impregnated Pressure Cable

In the article on the above subject in our issue of October 11th, the figures given for the cost of transmission schemes with solid cable and pressure cable, respectively, should have appeared as the cost per 100 kVA instead of 1,000 kVA transmitted.

French Electrical Workers

Conditions of Employment

DETAILS are given in the September *Ministry of Labour Gazette* of the regulations governing employment in the recently nationalized French gas and electricity undertakings. National and local staff committees, representatives of the management and staff, are to deal with all questions of recruitment, promotions, disciplinary action, training, etc. It is stipulated that entrants to the lower grades must be between 18 and 40 years of age and to the higher grades between 18 and 45. Promotions in the lower grades will be made by the local committees and in the higher grades will be dealt with by the National Committee. Disciplinary punishments range from warning to dismissal without pension.

For the purposes of payment and promotion there are twenty grades, from unskilled workman to manager and to each grade a "co-efficient" is assigned, rising from 100 to 900. The rate of pay in Grade 1 (adult labourer or unskilled worker) is 4,400 francs (about £9 3s.) a month and the rates of higher grades are calculated by the application of the appropriate coefficients. Certain of the higher grade staff will have their salaries fixed by the board of directors without reference to the scale. Six increments are provided for in all cases. Women will receive equal pay when doing the same work as men, and juvenile workers between 14 and 18 years of age will receive from 70 to 85 per cent of the adult rate. A local living allowance, varying according to district from 7½ to 25 per cent of the wages, will be paid.

An annual bonus equal to the amount of wages due in December will be paid; half of it may be drawn before the annual holiday. Higher rates are to be paid for overtime and holidays with pay will be granted ranging from 18 days to one month a year.

Manx Water Power

Suggested Scheme Costing £723,000

GENERAL confirmation of the recommendations of Kennedy & Donkin and Sir Alexander Gibb & Partners, consulting engineers to the Isle of Man Electricity Board (engineer, Mr. L. Douglass), relating to the development of hydro-electric power in the Isle of Man has been given by the commission which recently investigated conditions on the spot. The members were Messrs. H. Nimmo (Electricity Commissioner), G. K. Paton (N. Wales Power Co.) and E. M. Bergstrom. The proposals are to intercept the head waters of the Laxey and Sulby Rivers and to form a reservoir to store 94 million cu ft of water (equivalent to 1·16 million kWh.). Water discharged from an associated 3,500-kW power station would be collected in a small reservoir (1·5 million cu ft, 6,000 kWh) for supplying a 1,750-kW station. An average output of 9·4 million kWh per annum is expected.

Capital expenditure was estimated at £640,000 in October, 1945, of which £74,500 represents power-house plant, but increased costs of labour and material since then would bring the total now to £723,000. Annual costs, at £29,500 (based on the original estimate), would be equivalent to 0·75d. per kWh generated with average rainfall. Interest is taken at 3 per cent, sinking fund at 3 per cent (compound), repairs and maintenance of civil engineering works at 0·4 per cent and of plant at 0·75 per cent. For management and wages, £2,600 is allowed and for rates £200 (on land assessments only).

At present the whole of the Board's load is carried by the Pulrose steam station of Douglas Corporation and represents 40 per cent of its maximum output. The 33-kV system of the Board would be more effectively used with joint steam and hydro operation. The cost of hydro power would be about 55 per cent of that at Pulrose at the same load factor with coal at 50s. per ton, but this comparison assumes that the hydro-electric power is firm (i.e., capable of performing, on the part of the load curve assigned to it, the same duties as an alternative steam plant) and that stand-by is provided by steam plant. In the absence of hydro-electric development. further plant would be necessary at Pulrose within three or four years.

The Science of Lighting

Overcoming Prejudice and Misconceptions

IN his presidential address in London last week to the Illuminating Engineering Society, MR. J. S. DOW pointed out that achievement of the aims of the Society involved frequent contact with users of light, from whom much could be learned, but patience needed to be exercised in order to overcome prejudice and dispel misconceptions.

Data were available for illustrating the greater ease and vision and better performance resulting from improved levels of illumination, but one was on less certain ground with regard to statistical data. It was for example most difficult to obtain direct evidence of the value of good lighting in diminishing accidents; in dealing with industrial and street lighting one had therefore to rely on "inferential" methods, based on comparison of data obtained during periods of daylight and darkness. Statements about the effect of lighting on eyesight should, however, be accepted with reserve. Although continuous work by inadequate lighting must lead to increased effort and contribute to strain, it was most difficult to get positive evidence of deterioration in eyesight due to that cause.

Of great importance was the basis of appraisal of "quality" of lighting according to the latest I.E.S. Code. The element of contrast, as exemplified in the familiar diagram due to

Lythgoe, was of vital importance. From it one concluded that for the best perception of light and shade the background brightness should be about one quarter of that of the object viewed. In no case should it be greater. The showing of films in complete darkness was one instance of departure from this principle. Naturally this rule did not apply invariably. If one were only concerned with outline, or silhouette, a background brightness very much greater than that of the object might be advantageous. Even in lighting installations one should not be too dogmatic about limiting brightness; many people preferred a mild degree of sparkle and extreme preoccupation with avoidance of glare could result in installations that were definitely dull.

While rules were of great value in preventing abuses, no code could completely secure "fitness" of an installation or convey all one desired from lighting. Especially was this true of natural lighting.

In future the Society should seek guidance from other bodies on such questions and take every opportunity of fraternization, so bringing into contact the user and the producer. A question of great importance was the provision of some form of hall-mark—as a distinction, not as a condition of membership—by which those with competent knowledge of illuminating engineering could be recognized and identified.

Electric Vehicles

Historical Survey

A COURSE of lectures on electric vehicles started this month at the Smithfield Institute, St. John's Lane, London, E.C.1. The first on the history, development, and characteristics of electric vehicles, was given by Mr. E. G. Rutter, of Crompton Parkinson, Ltd. (Morrison-Electricars), who mentioned their first large-scale use in 1897 when the London Electric Omnibus Co. had over 50 cabs running. In 1918 the total number of vehicles in service was only about one hundred.

Between 1934 and 1939 there was an intensive period of development and the number of vehicles in use increased three and a half times; many firms built up fleets, a notable example being the Bristol Co-operative Society, which now operated 300 battery driven vehicles. Mr. Rutter suggested that the comparatively small number of electrics now in use was due mainly to prejudice. He compared petrol and electric vehicles for daily collection and delivery transport within scheduled areas, showing that because of the vital difference between their characteristics it was wrong to regard the electric vehicle as a rival to the petrol vehicle. The adoption of one or the other was simply a question of applying the most suitable form for a particular job.

Of some 480,000 petrol commercial vehicles used in this country, 60 per cent covered less than 10,000 miles a year. Since the electric was capable of a daily run of 30 to 40 miles under average conditions, there was an extremely large potential field of application where it could be adopted with advantage. Troubles had occurred in the past because of use in unfavourable circumstances and lack of maintenance. There had been some criticism of the design of bodies. They were purposely built on functional lines to accommodate every sort of load to be handled and manufacturers set out to make bodies suitable for the trade concerned.

Forthcoming Events

Monday, October 21st.—LONDON.—At the Institution of Electrical Engineers, 7 p.m. I.E.E. London Students' Section. Chairman's address, "The Power Transformer," by R. V. Darton.

BIRMINGHAM.—Grand Hotel, 6 p.m. I.E.E. South Midland Centre. Chairman's address by C. F. Partridge. Short address by the President, V. Z. de Ferranti.

Tuesday, October 22nd.—LONDON.—E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2, 7 p.m. Electrical Power Engineers' Association. "Gas Cushion Super-tension Cables," by T. R. P. Harrison.

LEEDS.—Corporation Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre (Installations Group). Inaugural address by J. G. Craven.

Wednesday, October 23rd.—EDINBURGH.—Heriot-Watt College, 6 p.m. I.E.E. Scottish Centre. "Rural Electrification: The Use of the Single-Phase System of Supply," by J. S. Pickles and W. H. Wills.

Thursday, October 24th.—LONDON.—South-East London Technical Institute, 7.15 p.m. Association of Supervising Electrical Engineers (S. E. London Branch). "Medium Sized Electric Motors," by A. N. D. Kerr.

Friday, October 25th.—LONDON.—Institution of Electrical Engineers, 5.30 p.m. I.E.E. Measurements Section. Chairman's inaugural address by L. J. Mathews.

Cafe Royal, Regent Street, London, W.1. Old Cromptonians' Association. Annual dinner.

BIRMINGHAM.—Grand Hotel, 7.30 p.m. Birmingham Electric Club. Ladies' evening and dance.

Monday, October 28th.—BIRMINGHAM.—James Watt Institute, 6 p.m. I.E.E. South Midland Centre (Radio Group). Chairman's address by J. Aspin.

Grand Hotel. Birmingham Electric Club. "Major Electronic Developments," by Dr. W. Wilson.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North Eastern Centre. "The Extinction of Arcs in Air-Blast Circuit Breakers," by A. Allan and D. F. Amer.

GLOUCESTER.—I.E.E. Western Centre. "Steel Tower Economics," by P. J. Ryle.

Tuesday, October 29th. — MANCHESTER. — Engineers' Club, Albert Square, 6 p.m. I.E.E. North Western Centre. (Transmission Group). "Rural Electrification: The Use of the Single-Phase System of Supply," by J. S. Pickles and W. H. Wills.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT was announced last week that **Lord Reith** had been appointed British representative and chairman of the Commonwealth Communications Council. In 1944 Lord Reith undertook a mission at the request of the Government to Australia, New Zealand, India, Southern Rhodesia, South Africa and Canada to discuss the future organization of the wireless and cable systems of the British Commonwealth. In 1945 he presided over the Commonwealth Telecommunications Conference in London which submitted unanimous recommendations for the Government ownership of the systems.

Mr. E. B. Palmer, whose appointment as electrical engineer and manager to the Leek Urban District Council Electricity Department we recently reported, was educated at King Edward VI Grammar School, Birmingham, and served an indentured apprenticeship with the Shropshire, Worcestershire and Staffordshire Electric Power Co., with which company he subsequently became junior engineer and charge engineer. After periods at Smethwick, Dudley and at Guest, Keen & Nettlefolds' power station he joined Warrington Corporation Electricity Department last year as chief technical assistant, a position which he is now vacating to go to Leek. Mr. Palmer is an associate member of the I.E.E.

Mr. E. B. Palmer

Mr. A. L. Starkey has resigned from the post of Midland Area office manager with Benjamin Electric, Ltd., to take up an appointment with Priory Electric Services (Coventry), Ltd., and is succeeded by **Mr. G. A. Smithson.** Mr. Starkey, who received his initial training with the Wimbledon Corporation Electricity Department and Wilton-James, Ltd., Hendon, has been in the Midlands since 1937, and was for some years at the Coventry Branch of Electrical Installations, Ltd.

The G.E.C. Swimming Club held its twelfth annual gala at the St. George's Baths, Victoria, London, on October 1st. Teams drawn from the five London establishments of the company competed in eighteen events and decided the destination of six challenge cups and numerous individual prizes. Outstanding performances were those of E. T. D. Smith, who completed seven lengths in grand style to retain the Sir Hugo Hirst challenge cup for Fraser & Chalmers, and H. Pepperall (Osram Works) who again took the Veterans' challenge cup. The men's relay race and diving competition were both won by Head Office; similar events for women went to the Osram Works team. The **Hon. Mrs. Leslie Gamage** presented the prizes after which there was a water polo match between the G.E.C. and the City of Westminster S.C., which ended in a draw.

Mr. W. I. Hodgkins, manager of the Leicester sub-branch of the General Electric Co., Ltd., has retired. He joined the company in 1923 as manager of Radio Department, Birmingham, and went to Leicester in 1929 to open the sub-branch there. He has been succeeded by **Mr. R. H. Phillips,** who joined the company in 1926 and who was previously at the Birmingham branch. The retirement is also announced of **Mr. Sydney Allen,** who for twenty-four years has been in charge of the traction section of the Contract Works at the Witton Works, and **Mr. P. F. Harris,** who has been in charge of switchgear liaison at Witton since he joined the G.E.C. in 1929.

Mr. A. H. Khan, superintendent, Electrical Department, Tata Iron & Steel Co., India, who has been on a visit to this country to study the latest practice in power generation and distribution, is shortly leaving for the United States before returning to India. He wishes to thank his friends in the electrical industry who spared their time to take him round the various works and generating stations. Mr. Khan was educated at the University of Glasgow and obtained his practical training with the British Thomson-Houston Co., Ltd.

Mr. A. H. Khan

Mr. William Watt, W.S., has joined the board of Bruce Peebles & Co., Ltd.

The recently formed Music and Drama Section of the Siemens Sports Club (Siemens Bros. & Co., Ltd.) has set itself a high standard to maintain by the very excellent performance of its first venture, the farce, "Tons of Money," which was given at the Club Pavilion, Charlton, on October 5th. The parts of husband and wife were played respectively by R. F. Luff and Margaret Coffey, admirably supported by Irene Loveless, Doreen Kenchington, Marjorie Killick, L. F. Garrett, W. Cornwall, R. F. Chapman, C. W. Nearn, and G. Millard. Stage management was in the hands of W. Womack, E. Raby

and Nancy Cockburn. The Mayor and Mayoress of Greenwich were among the audience, which included Mr. S. W. Lumb, secretary of the company and several of the company's senior officials.

Mr. John H. Bunting, British manager of the A.C.E.C. (Ateliers de Constructions Electriques de Charleroi, Belgium), who has been in charge of the company's London office since it was opened in 1921, is to retire at the end of this year. **Mr. W. H. Wadmore,** who has for many years been associated with the management of the London office will, as from January 1st, assume the position of British manager.

On October 3rd the London Office staff of Crompton Parkinson, Ltd., celebrated the revival of the Crompark Social Club by a re-union dance at Victoria House, Southampton Row, W.C. This was the first occasion since the beginning of the war that the staff had been

Mrs. Parkinson and Mr. F. Harwood Fryer (managing director, Crompton Parkinson, Ltd.) with Mrs. Fryer and Mr. Arthur Burke at the Crompark Social Club re-union dance

able to meet socially. It was, in fact, a re-union of those who during the war left the London Office for the Forces, or elsewhere, and those who had to stay behind. More than 200 members and guests were present for a very enjoyable evening.

On relinquishing his appointment as Controller of Light Metals in the Ministry of Supply at the end of August last, **Mr. C. G. McAuliffe,** B.A., has taken up an appointment as a departmental manager in the sales division of the British Aluminium Co., Ltd., at the head offices, Salisbury House, London Wall, E.C.2.

Mr. T. K. A. Douglas, generation engineer in the Hull Electricity Department, has been appointed assistant consulting engineer to the Anglo-American Corporation of South Africa.

The *Financial Times* reports that **Mr. F. H. Roberts,** assistant mechanical engineer with the State Electricity Commission of Victoria (Australia), has reached England on a visit to Europe in connection with electrical plant.

Portuguese press delegates on a recent visit to Great Britain were unable to spare the time to visit the works of Automatic Telephone & Electric Co., Ltd., Liverpool. Instead they were shown the company's film " Where There's a Will " at a London hotel. The showing of the film followed a luncheon given by the company and presided over by **Sir Thomas Eades,** vice-chairman and managing director.

Mr. W. J. Jefferson, who has been appointed deputy borough electrical engineer and manager at Leyton, received his training with the Carlisle electricity undertaking, and his technical education at Carlisle Technical College. He held various positions with the Carlisle electricity undertaking, including assistant meter superintendent and district mains engineer, before joining the Chesterfield Corporation Electricity Department in 1944 as distribution assistant. In March last year he was promoted to technical assistant and in December became consumers' engineer and meter superintendent, a position which he is vacating to go to Leyton. He is an associate member of the Institution of Electrical Engineers and an associate of the Institute of Industrial Administration. Mr. Jefferson takes up his appointment at Leyton on November 4th.

Mr. J. H. J. Richards, of Barnsley, district engineer with the Yorkshire Electric Power Co., has been promoted to deputy operations superintendent and **Mr. J. D. Harrison,** assistant district engineer, has succeeded him as district engineer.

Sir Claude Gibb, chairman and managing director of C. A. Parsons & Co., Ltd., has returned to this country after a visit to Australia. While in Australia he met the heads of various electricity undertakings both private and public.

Mr. J. H. Butler, M.I.Mech.E., A.M.I.E.E., has resigned his position as chief engineer of the Consett Iron Co., Ltd., and will be leaving later in the year to take up the appointment of chief engineer to the Stanton Ironworks Co., Ltd.

Mr. R. W. Birch has been appointed a director of the B.E.T. Electricity Supply Co., Ltd., in place of **Sir Bruce G. White,** who has resigned.

Mr. H. D. Weeks, assistant technical engineer in the Torquay Electricity Department, has been appointed distribution engineer.

Obituary

Ald. H. Leese.—We regret to record the death of Alderman Harry Leese, J.P., vice-chairman of the North West Midlands Joint Electricity Authority, which occurred on October 6th at the age of eighty-four years. Ald. Leese was chairman of the Electricity Supply Committee of Stoke-on-Trent from 1910 to 1927 and from 1928 to 1931, and he was also chairman of the Conference of Electricity Undertakers in North Staffordshire from its formation after the 1914-18 war to 1929. He was the first Labour Mayor of Stoke-on-Trent, and was a freeman of the city.

Municipal Reports

Derby.—The past year saw a rising scale of activity in the installation and wiring sections of the undertaking, states the annual report of the chief engineer and general manager (Mr. F. H. Pooles). As soon as building progress allowed, a start was made on the installations in the first groups of municipal permanent houses, totalling about 330 dwellings. These, like all the temporary houses, are to be "all-electric" except for a solid fuel fire. The kitchen at Derby School was converted to electric cooking, and at Parkfields Cedars School a new all-electric kitchen capable of dealing with 1,000 meals was built.

Lighting, cooking and heating consumption rose by 7 per cent to 92·5 million kWh, but power supplies fell steeply (by 15 per cent) to 56·3 million. Altogether, including public lighting and traction, 156·8 million kWh was sold, a reduction of 2·3 million (1·5 per cent.) The average price received per kWh sold was 0·943d. (against 0·907d.). The Department itself generated 246·7 million kWh (247·8 million in 1944-45).

Total revenue increased by £21,723 to £661,166 and working expenses by £42,708 to £532,716. Capital charges, etc., were lower and the net profit was £5,072 (against £1,866) in spite of the £20,985 fall in the gross figure. "Other income" of £6,870 (£3,618) is added, and a sum of £10,467 (£11,826) has been utilized for capital expenditure.

During the year the Electricity Commissioners authorized a scheme for increasing the capacity of the Allenton main substation to meet additional load in the southern district. This, together with the laying of two 33-kV cables and other works, is estimated to cost £90,000.

Wimbledon.—A 12·8 per cent increase in sales is recorded in the report of the Electricity Supply Department for the past year submitted by Mr. Norman Elliott (now chief engineer and general manager of the London and Home Counties J.E.A.). This considerable expansion, despite a fall of 3·2 million kWh in industrial power supplies, brought the total sales for the first time above the pre-war level with an aggregate of 92·4 million kWh (against 82·1 million in 1938-39). The lowest figure recorded during the war was 68·7 million kWh in 1940-41.

The report includes comparative load curves from which it is seen that last winter the maximum demand on the undertaking occurred at about 1 p.m. on Sunday, January 20th, when 41,280 kW was recorded against 32,200 kW in the previous year, and the load factor on kWh sold in consequence deteriorated from 29 to 25·5 per cent.

Revenue for the year amounted to £527,758, an increase of £63,916, and there was a net profit on the year's working of £2,236 (against £200). The average price received per kWh sold was 1·28d (1·27d).

It is pointed out that the undertaking is one of the largest ratepayers in Wimbledon, the rating assessment for 1945-46 being £30,898 compared with the gas company's assessment of £1,561. In addition, in Malden and Coombe the undertaking's assessment is £7,406 (gas company £1,742) and in Merton £5,955 (gas company £1,950).

Street Traction

Case for Electrical Operation

URBAN passenger transport was the subject chosen by MR. W. T. WARDALE (consulting engineer) for his address as chairman of the Sheffield Sub-Centre of the Institution of Electrical Engineers. Having been concerned for most of his career with supplying electrical energy to town tramways, Mr. Wardale first outlined the start and progress of electric traction and the competition it had encountered and still must face. He said it was not going to be an easy task in future to prevent urban electric traction from being superseded by vehicles driven by internal combustion engines.

For towns with populations of less than 70,000 the provision of omnibuses, petrol or electric trolley, was correct practice; on the whole the electric trolley-bus was the better vehicle for towns of 30,000 inhabitants.

Admitting his prejudice in favour of tramcars, Mr. Wardale contended that obstruction was caused, not by the type of vehicle, but by the manner in which it was "worked." He was of the opinon that more obstruction would occur (in Sheffield) if the tramways were abolished. For every three tramcars displaced, five motor buses would be needed to carry the same traffic; tramcars could clear dense crowds more quickly than any other public vehicle.

Apart from the revenue earned, the traction load was in several ways most valuable though too few engineers engaged in supplying electricity seemed to appreciate that fact. Traction systems were both large consumers and most convenient customers, with a load factor of 25 per cent and a power factor of 0·92 and, moreover, they could not develop their peak demand on top of the general system peak load. High charges for energy supplied to traction vehicles from municipal generating stations were not warranted. Those vehicles were "tied" consumers without alternative sources of energy; hence the anti-electrical complex which afflicted so many transport men.

Mr. Wardale paid for his household consumption of 6,041 kWh per year at a rate of just under 0·51d. per kWh with a load factor of less than 4 per cent. By contrast the local transport undertaking was charged 0·87d. per kWh for 40 million kWh per year with a load factor of 25 per cent and, moreover, much of the traction demand occurred outside ordinary load periods. If the traction load was to be retained, the price of electricity must approximate more nearly to the close-cut rates offered to many industrial users.

Electricity in Gasworks

Up to 14 kWh Used Per Ton of Coal Carbonized

THE extent to which electric power is employed by the gas industry was indicated by MR. H. C. WIDLAKE (Plymouth & Stonehouse Gas Co.) in his inaugural address as chairman of the Devon and Cornwall Sub-Centre of the Institution of Electrical Engineers.

Mr. Widlake commenced by describing early methods of stoking retorts, pointing out that the performance of stoking machines of Continental design convinced British gas engineers of the advantages of modern electrically driven plant.

Thirty years old stoking machines of the British built Fiddes-Aldridge electrically driven type under Mr. Widlake's care were still ejecting 6 cwt of coke and depositing 8 cwt of coal in a retort in 45 seconds. But prejudice and conservatism died hard, so electricity continued for some years to be regarded as a necessary evil without which certain types of stoking and transporting plant could not be enjoyed.

The services of qualified electrical consultants were rarely made use of, so attempts were made to satisfy changing conditions by extending the duty of existing power plant instead of undertaking comprehensive schemes of modernization, which reacted unhappily on the finances of many undertakings.

Factors Favouring Private Plant

Many parts of gas-making plant were so interdependent that unheralded failure of power could cause dangerous conditions and might be costly. The fear of failure of public power supplies had now disappeared, but there still were many other factors, varying in importance in different works, which favoured privately installed steam generating plant. The general tendency was to standardize a.c. driving equipment for all new plant, with the exception of exhausters and compressors, which were regarded as natural steam loads.

Supply compressors were used for sending gas to the rural areas and the drift of population to those areas caused a heavy compressor load at times of maximum demand. The cumulative effect of that load and of the electricity generating plant load on the works' steam system could become very serious and often furnished the final argument in favour of taking electrical energy from the public service mains.

The relief so obtained might be only temporary as, with an increasing demand on the high pressure gas system, the compressor load itself could become an embarrassment and the steam situation would again deteriorate. Many engineers were laying down electrically driven compressors working in conjunction with a system of automatic control.

Apart from power the works processes required a considerable amount of steam, but in a works equipped with vertical retorts the associated waste-heat boilers might be capable of supplying all the steam required for a 24-hour basic load. That condition could rarely be achieved if the steam plant had to meet a substantial power demand. Boiler fans made a steady 24-hour demand for power which only varied seasonally and, from a load building point of view, was very attractive. Stoking machines were not used in a house of that type as the coal gravitated down through the retorts.

The pumping load was very attractive; in works near wells, a river, or a canal, it was cheaper to pump and to treat than to buy water.

The load factor as a whole was an actuarial rather than an engineering consideration. The manufacturing process was carried on at a uniform rate which varied seasonally, the wide variations between "make" and demand being taken care of by storage capacity.

The electrical precipitator was becoming a standard unit of plant for the separation of tar fog in the initial stage of gas purification. The extremely high efficiency of these 30,000 to 40,000-V equipments had a marked influence on the entire process of purification.

Of the many types of informative instruments used in a modern gas undertaking, the distant pressure transmitter was of particular interest. Some 24 years ago Mr. Widlake built and put into operation what he believed to be the first to be used in this country. Those instruments had since become general, either as indicators or recorders, or in association with automatic control which maintained an unvarying pressure at strategic points in the area of supply. In their modern form they were known as "Evershed-Widlake gas control equipment."

District storage of gas under pressures was often used to reduce the load on the works compressors and mains at times of maximum demand. Charging was by electrically driven compressors at off peak periods, which came into action either automatically or under hand control, and bid fair to revolutionize distribution practice.

Consumption of Energy

The amount of electrical energy used in manufacturing plant in relation to output varied widely, even in works of comparable size, depending on the type of carbonizing plant used, the manner of driving induced draught and blast fans and the source of water supply.

A provincial gas undertaking carbonizing 80,000 tons of coal per year used about 11 kWh per ton carbonized. Steam was used for exhauster and compressor driving, the fan load was electrical and about 120 motors totalling

1,200 H.P. were in daily use. The maximum demand was 270 kW and a little over one million kWh was purchased annually. A Continental undertaking of similar capacity, but equipped with a different type of plant, used 7 kWh per ton of coal carbonized. The fan load was carried by steam turbines, but a steady continuous pumping load accounted for 12 per cent of the electrical energy used. Four large stations in this country equipped with different types of plant used respectively 6, 8, 11 and 14 kWh per ton of coal carbonized.

Mr. Widlake's experience was that in all matters calling legitimately for joint action the relations between the officers of the two great industries were good and sincere.

Railway Electrification

Advocacy Based on Traffic and Financial Results

THE high cost of fuel, which was likely to be permanent, was the most important factor in the financial consideration of railway electrification. That was the opinion expressed by MR. R. VARLEY (general manager and engineer, Mersey Railway Co.) in his address last week at Liverpool to the Mersey and North Wales Centre of the Institution of Electrical Engineers. The size of the railway industry in this country was not generally realized; 800,000 people had invested £1,200 million in it; there were 52,500 miles of track, including sidings; the 625,000 persons employed represented an annual pay bill of £180 million.

One of the primary considerations was that the efficient utilization of raw coal had become of national importance and the steam locomotive was a prolific waster of coal. Fuel economy, representing a substantial monetary saving, would result from the purchase of electricity from the Central Electricity Board as suggested by the Weir Report of 1931, delivered to the d.c. busbars in traction substations, which should be operated by the railway employees.

Predominance of Third-Rail System

The Railway Electrification Order, 1932 specified the system to be used. So far only 29 track miles of the Manchester and Altrincham line (joint L.M.S. and L.N.E. property) operated on the 1,500-V overhead collector system, whereas the 650-V third-rail system had been applied to over 1,700 track miles (S.R.), in addition to 526 track miles made up by the Liverpool-Southport, Wirral, and Euston-Watford (all L.M.S.) lines, on Tyneside lines (L.N.E.) and the London Passenger Transport Board network.

It was questionable whether the additional cost of overhead equipment was justifiable in a small country like England. The advantages of a single system throughout were evident, while the third-rail system was undoubtedly the cheapest that could be provided; it was easily installed and simple to maintain.

Electrification enlarged the capacity of existing track and traffic considerations, particularly suburban, were advantageous. Multiple-unit rolling stock (saloon coaches with air-actuated sliding doors) would probably be most satisfactory for suburban services. Existing corridor coaches hauled by electric locomotives (or motor coaches) would suit longer journeys.

For heavy freight services electric locomotives could haul existing wagons, but continuous braking would eventually be required to improve running schedules. The present type of loosely coupled freight trains were not really good enough for modern requirements. It was practicable to employ one standardized type of electric locomotive for passenger and freight services, as had been demonstrated by the very satisfactory service of the two recently built by the Southern Railway Co., which embodied uncommon features of electrical control.

Turning to financial considerations, Mr. Varley statistically illustrated the remarkable increases of traffic and consequential improvement of net revenue that electrification had brought about on the Mersey, Wirral and Southern railways. He concluded that a great deal could be said for the electrification of railways in Britain. A low rate of interest on the capital involved and electricity at a reasonable price would, he felt certain, ensure financial success. Whether the railways were to be nationalized or not, a bold policy of electrification would be satisfactory both to the travelling public and to the railway authorities.

Registration of Engineers

IN a paper read before the Engineers' Guild held at the Royal Society of Arts on October 9th Mr. C. L. CHAMPION dealt with the registration of professional engineers. In advocating statutory registration for inclusion among the objects of the Guild, he said that three points should be proved. First, it must be shown that registration was likely to benefit the individual engineer, secondly, that it would be in the public interest ; and thirdly that it was a possible objective.

The extremely lax use of the word " engineer " in this country had had a most prejudicial effect on the status of the profession. One result was that the general public had no clear idea of the scope of the profession,and was not generally aware of the very high practical and theoretical qualifications that it required.

In Canada, the United States, New Zealand, the Union of South Africa, and in other countries, registration was already firmly established and had had a healthy effect upon the status of the professional engineer.

Electricity Supply Organization

Presidential Address to A.S.E.E.

THE more important administrative phases of electricity supply legislation were outlined in general terms by Mr. H. NIMMO (Electricity Commissioner) in his inaugural address as the new president of the Association of Supervising Electrical Engineers in London this week.

The provisions of various Acts of Parliament were briefly surveyed, including the powers and duties of the Electricity Commissioners and the functions of the Central Electricity Board, all of which left untouched the problem of distribution which at present was carried out by 570 authorized undertakers.

Electricity was now supplied publicly by the C.E.B., the North of Scotland Hydro-Electric Board, 365 local authorities, 169 distribution companies, 26 power companies, 5 Joint Boards and 3 Joint Electricity Authorities, a total of 570 with £800 millions of capital expenditure. Electricity was one of the few commodities that was generally cheaper to-day than it was twenty years ago, the average price having fallen from about 2·5d. to just over 1d. per kWh.

Wartime Record

The war caused something like £10 million damage to generating plant, substations, transmission lines and distribution networks. The quite remarkable speed with which supplies were restored was a worthy record of a great industry which it would be well to remember.

With the aid of statistical tables, organizations in other countries were briefly surveyed, with particular reference to the value of water power. The primary object of legislation in Canada was the production of cheap power, 97 per cent being hydro-electric. In the United States the industry was largely privately owned, federal and municipal shares of the output being nearly 20 per cent of the total, one-third of which was from water power.

Sweden was proud of a system which allowed free competition between the State, municipalities and companies; but the two largest companies were of mixed ownership, one of them being controlled by six municipalities holding 51 per cent of the shares. There was abundant water power, but it was some 500 miles away from the consuming centres.

In Germany before the war energetic efforts were being made to reduce more than 9,000 concerns to 50. The mixed company system represented over one-third of the total output and joint company-municipal ownership had made remarkable progress; the capital was usually equally divided.

In France the output was below that of the United Kingdom, though half of it was hydro-electric. The industry was almost entirely company owned, but it was nationalized on June 1st, 1946. During a recent visit to Paris, Mr. Nimmo was told by engineers of the new organization that they were striving to save the industry from control by the Ministry of Finance, which they feared might be very hampering. Distribution was to be regionalized, but details had not yet been worked out.

In Japan the pre-war industry was company owned, over 80 per cent being generated by water power. In 1939 a Government-controlled concern was set up to take over the generating and transmission systems of 33 companies, the latter to retain distribution.

In Italy there was 90 per cent company ownership with 96 per cent of the output derived from water power.

In Belgium there was company ownership with, more recently, intercommunal companies of mixed ownership controlling distribution in one or more municipal areas.

In Holland company ownership had practically ceased; six of the seven provinces had their own municipal systems, publicly owned, but in the legal form of companies to ensure supple operation.

Russia was the only country (in 1937) with State-owned production, distribution being regionalized under central control.

British Water Power

In spite of strong opposition, authorized undertakers in the United Kingdom had built 57 water power stations, of 350,000 kW, less than 3 per cent of the total installed capacity. Repeated Parliamentary rejection of proposed schemes must have caused "tremendous national loss," but the North of Scotland Hydro-Electric Board would now assure orderly development as quickly as labour and materials permitted. The following water-power outputs (in millions of kWh) represented a saving of six million tons of coal per annum:—

	1944 actual	1966 estimate
Scotland	1,064	10,225
England	15	25
Wales	97	750
Totals	1,176	11,000

For the time being the United Kingdom was dependent on coal for the production of electricity. Comparisons with other countries must be made with the greatest caution and it would be fairer to judge the industry on its wartime record and present results rather than on past conditions.

COMMERCE and INDUSTRY

Appointments Registers. Electricity Output in September.

FROM time to time correspondence appears in the newspapers criticizing or (rarely) praising the work of the appointments registers. There are two of these. The first, the Technical and Scientific Register, looks after applicants for employment who have University degrees or are members of the appropriate recognized professional associations; it covers electrical and mechanical engineering among other professions. During the four weeks to August 12th, according to the *Ministry of Labour Gazette*, 656 vacancies were notified, additional to 4,362 outstanding at the beginning of the period. Of these 303 were filled (including 124 filled by ex-Service men) and 560 were withdrawn so that at August 12th 4,155 vacancies remained unfilled. At the same time the number of unemployed registrants was 1,479, of whom 616 were ex-Service men and women. There were thus more outstanding vacancies than applicants.

As regards the Appointments Register, for people with professional, administrative, managerial or executive experience and those having technical qualifications not appropriate to the other register, the number of applicants on the books at August 12th was 42,393 (3,188 women) of whom more than half were ex-Service. Of the total 22,306 (1,700 women) were already in employment. Only 1,297 vacancies were filled during the four-week period and at August 12th outstanding vacancies numbered 6,027 (1,361 for women).

Electrical Employment

The accompanying table, compiled from statistics published in the September *Ministry of Labour Gazette*, shows the employment position in the principal branches of the electrical industry of Great Britain in July compared with previous dates.

EMPLOYMENT DURING JULY (Thousands)

Branch	Males (14-65)			Females (14-60)			Total		
	Mid-1939	Mid-1945	July, 1946	Mid-1939	Mid-1945	July, 1946	Mid-1939	Mid-1945	July, 1946
Electrical engineering	105·9	106·1	104·7	28·0	69·7	46·5	133·9	175·8	151·2
Electrical wiring and contracting	38·9	32·0	41·3	9·8	12·9	13·1	94·7	52·3	68·7
Electrical apparatus, cables, etc.	116·4	112·2	123·8	79·5	167·7	116·6	195·9	279·9	240·4

Unemployment figures for August 12th (United Kingdom) include the following:— Electrical engineering 2,713 (745 females); electrical wiring and contracting 1,530 (70 females); and electrical apparatus, cables, lamps, etc., 3,582 (1,502 females).

Health Insurance

The National Joint Industrial Council for the Electricity Supply Industry has issued a notice to constituent undertakers drawing the attention of employees to the stamping of health insurance cards during holidays. Since April 1st, 1946, it is possible for shift workers to be absent on holiday for three complete weeks in a year. The notice advises employees to take particular care to preserve their insurance benefits by making the one week's arrears of payment so that the minimum of fifty contributions for the year shall be made.

Large Increase in Output

The official returns rendered to the Electricity Commissioners show that 3,105 million kWh was generated by authorized undertakings in Great Britain during September, as compared with the revised figure of 2,707 million kWh in the corresponding month of 1945, representing an increase of 398 million kWh or 14·7 per cent.

During the past nine months (up to the end of September), the total number of kWh generated was 29,197 million as compared with the revised figure of 26,966 million for the corresponding period of 1945, representing an increase of 2,231 million kWh, or 8·3 per cent.

The total number of kWh sent out from the generating stations of authorized undertakings during September (i.e., kWh generated less consumption in the stations) was 2,929 million, the figure for the past nine months being 27,534 million kWh.

Rubber Production and Consumption

Figures presented in the September *Rubber Statistical Bulletin*, compiled by the London Rubber Secretariat, indicate the rapid recovery of rubber production. Up to August the world production of natural rubber this year is estimated at about 407,000 tons, which compares with 240,000 tons for the whole of 1945. World consumption this year up to July is put at about 215,000 tons (210,000 tons for 1945). Stocks in June were estimated at 650,000 tons (600,000 tons at the end of 1945). Great Britain's imports in August were 29,606 tons, only about 7,000 tons less than for the whole of 1945; stocks at the end of that month amounted to 110,806 tons.

Production of synthetic rubber, very largely American, totalled about 70,000 tons in August, making about 467,000 tons for the first eight months of the year against 866,000 tons for 1945. Consumption up to the end of July was 570,000 tons (845,000 tons in 1945). United Kingdom consumption for the first eight months of this year was about 26,000 tons (63,722 tons in 1945).

The United Kingdom cable industry is shown to have consumed 43,270 tons of natural rubber and 23,874 tons of synthetic (a total of 67,144 tons) in the first seven months of 1946. Consumption in 1945 was: Natural 27,275 tons; synthetic 63,768 tons; total 91,043 tons.

Purchase Tax Refunds

The National Chamber of Trade, on behalf of the Committee of National Retail Trade Associations, has submitted to H.M. Customs and Excise proposals for the refund of tax paid on goods left in the hands of retailers when reductions or withdrawals of tax are made. It is proposed that claimants should be entitled to a full refund of purchase tax paid on goods in stock at the time when tax remissions are announced, and the Commissioners of Customs and Excise should arrange to provide a specially designed claim form incorporating or supported by a statutory declaration. The claimant would be legally bound to reduce his selling prices by an amount not less than the tax refund.

Contracts for River Erne Scheme

Our Dublin correspondent reports that contracts for about £950,000 worth of hydro-electric generating plant for the River Erne power development scheme have been placed by the Electricity Supply Board, Eire. Equipment valued at approximately £750,000 for the Cathaleen's Falls power station has been ordered from A.S.E.A. (Swedish General Electric Co.). The contract for equipment for the Cliff power station has been placed with Brown Boveri (Ireland), Ltd., for plant manufactured in Switzerland, the approximate value being £200,000. In addition to furnishing this information the Electricity Supply Board states that it has been arranged to have certain portions of this equipment, amounting in value to about £200,000, manufactured by sub-contractors in Britain.

Portsmouth Electricity Service

In 1939 the Portsmouth Corporation Electricity Department formed an Electricity Service Association with the object of promoting and fostering good fellowship among all employees. The war naturally curbed its activities, but the Executive Committee is now endeavouring to make the Association worth while for every member. Its social activities cover a wide range and in order that employees may be better acquainted with these the Association has now produced its own magazine. The first number gives details of the various sports sections and there are a number of interesting articles, including a message from Mr. R. H. Coates, the engineer and manager, who is president of the Association.

Cable Orders from South Africa

Orders to the value of £36,000 have been received by Standard Telephones & Cables, Ltd., from the Johannesburg Municipality. The material to be supplied comprises 39,000 ft of 0·25 sq in. 3-core 20-kV cable and 42,000 ft of pilot and telephone cable, together with the requisite joints. The 20-kV cable is for use between the city and Parkhurst 20-kV busbars and the pilot cable between John Ware and Parkhurst substations. In view of the particularly difficult gradients to be encountered on the route the company is supplying its "Styrene" type of joints and terminations, which are specially designed to overcome the problems of compound migration.

An order with a total value of £7,350 has also been received by the company from the Port Elizabeth Municipality for 1,320 yd of 0·1 sq. in. 3-core "H.S.L." solid type 44-kV p.i.l.c. single wire armoured and taped cable, with requisite accessories. These materials are required in connection with extensive developments by the Municipality for feeding various outlying districts.

Rubber and P.V.C. Cable Specification

During the war, a number of modifications to the British Standard Specification for rubber cables were made in view of the introduction of polyvinyl-chloride as an alternative insulation. Some of these modifications are to be retained as permanent revisions of the specification, others are being temporarily retained or have now been cancelled. These changes are covered in a new edition of B.S.7, which is accompanied by a supplement relating to p.v.c. cables and a leaflet regarding transitory relaxations. The main specification and the supplement are issued as a single volume (B.S.7: 1946), at 3s. 6d. net; the transitory relaxations are issued separately under reference PD.540; both are obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1.

B.S. for Discharge Lamps

In 1945 the British Standards Institution issued a schedule of dimensions for various types of electric discharge lamps, including mercury, mercury fluorescent, mercury dual, mercury tubular fluorescent, and sodium types. A new edition of this Schedule, including minimum average figures for the nominal efficiencies and life of the lamps now available, has been issued as B.S. 1270:1946, copies of which may be obtained from the Institution, at 2s. net.

U.S. Electrical Appliance Trade

Chaotic conditions in the near future in the United States electrical appliance industry were forecast by Mr. H. M. Kelley, of the Frigidaire division of the General Motors Corporation, in his address to the International Association of Electrical Leagues recently.

According to *Reuter's Trade Service* (New York), Mr. Kelley said that the present sellers' market would probably come to an earlier end than many people at present anticipated, while there had been a tremendous increase in the number of appliance dealers (to one per 435 homes, against the estimated dealer's subsistence level of 1,000 homes). He attributed the rapid change-over from a sellers' to a buyers' market to the increasing prices of appliances and the fact that higher costs of food and clothing were reducing the purchasing power of a large proportion of the population.

Some appliances were already experiencing substantial "buyer resistance." Many brands of vacuum cleaners and table radio sets had already entered a buyers' market with consoles following closely behind. Other than branded electrical merchandise was proving difficult to move.

He forecast, however, a sellers' market for refrigerators until the middle of 1947 at least, while the potential market for electric water heaters was greatly improved over the pre-war level.

Torquay and Cooking Utensils

The Torquay Electricity Committee recently received a deputation from the local Chamber of Trade regarding the proposed sale of non-electric cooking utensils at its showrooms. The Committee decided that arrangements should be made to sell to electricity consumers or intending consumers non-electric utensils where requests for such facilities were made, and that the same conditions for sale to traders as were in force in the case of the sale of fittings and apparatus should be put into operation. These arrangements were to be for a period of twelve months; in the case of the Torquay showrooms only, they would operate until a list of traders who stocked the requisite non-electric cooking utensils was received from the local branch of the Ironmongers' Association which was being formed.

Henley's Art Show

The first post-war show of art and craftsmanship by members of the staff of W. T. Henley's Telegraph Co., Ltd., held last week maintained the high level reached in earlier years. This was largely due to some of the old stagers, notably J. Dunford Smith and A. S. Brewer, who again contributed some fine examples of water-colour and black-and-white work, and, with C. J. Baggott and F. L. Mitchell, secured the approval of the judge (Mr. W. M. Gillies). On the photographic side O. R. Heath took the principal honours, although his work was closely followed up by H. S. Henley, A. S. Lowe and others. Children of staff members, led by Audrey Charman and John Baker, put in some remarkable paintings. In the handicrafts section there was a good variety—model boats, woodwork, leatherwork, needlework, knitting, crochet, gloves and slippers, all of outstanding merit.

"A Factory at War"

Evershed & Vignoles, Ltd., have recently issued a booklet entitled "A Factory at War," which tells the story of the part played by the company in the war effort. The booklet, which is for private distribution only, is the company's tribute to its employees and the humorous as well as the grimmer facts are told. A tribute to the Home Guard is paid by Lt.-Col. F. W. Walsh, commanding the 7th County of London Battalion, in which Evershed's had their own unit. There are stories of spotters and wardens, of the firm's N.F.S. unit and the work of fire-guards and first aid detachments. The booklet is a record of how the personnel of the company triumphed over difficulties and played their part in winning the final victory.

International Tin Conference

At the International Tin Conference held in London from October 8th to 11th, the estimated world mine production of tin for 1946 was given as 94,000 tons against a consumption of 137,000 tons. World production in 1947 might be about 142,000 tons, and it was not expected to reach a rate of over 200,000 tons per annum until some time during 1949. If restrictions were removed, consumption might be at an annual rate of about 190,000 tons. There was not likely, therefore, to be an excess supply of tin during the next two years, but after that there was the possibility of the productive capacity of the mines exceeding the world demand for metal. Bearing in mind that the existing International Tin Agreement was due to expire on December 31st, the representatives agreed to recommend to their Governments the establishment as soon as possible of an International Tin Study Group. They also agreed to recommend the continuance of the Combined Tin Committee in Washington to make allocations of tin metal during the period of shortage, and to recommend discussions between the principal interested countries concerning the continuation of the Tin Research Institute.

The Bury Vacancy

At the third attempt in the past six months, the Bury (Lancs) Electricity Committee announces a final short list of seven applicants for the vacant position of electrical engineer. When the post was advertised at a salary of £1,000, rising to £1,100, the A.M.E.E.-E.P.E.A. Joint Committee put on a ban, as the salary was below the recognized scale. The Council decided to defy the ban but could not reach agreement on the choice of candidates. It then put up the salary to £1,208, rising to £1,422, and the eight original candidates were augmented to thirty. The seven on the short list are to be interviewed on October 29th.

Contract Price Adjustment Formulæ

The British Electrical and Allied Manufacturers' Association has notified us of its latest figures for its contract price formulæ; they are as follows:—Rate of pay for adult male labour (October 13th) 103s. (no change). Cost o material: The index figure for intermediate products published by the Board of Trade on October 12th was 198·8, which is the figure for the month of September (against 198 0 for August).

Scientific Films

A catalogue of films of general scientific interest available in Great Britain has been compiled by the Scientific Film Association and published by the Association of Special Libraries and Information Bureaux at 5s. 3d. post free. This is the first printed catalogue of scientific films to contain appraisals based on a definite system of grading, as well as full details of content and availability. It explains the method of appraisal and grading and give lists of film distributors, hints to film borrowers and a catalogue of films. Reference is facilitated by a classified subject index.

Illumination Design Courses

The 45th Illumination Design Course (an evening course) will commence at the Lighting Service Bureau on November 7th at 7 p.m., and will be held on subsequent Thursday evenings up to December 12th. The lectures to be given are as follows:—November 7th: "The Fundamental Principles of Lighting,"

by E. B. Sawyer. November 14th: "The Development of Modern Lighting Practice," by A. D. S. Atkinson. November 21st: "Illumination Design for Interiors," by C. J. King. November 28th: "Fluorescent Lamps," by C. R. Bicknell. December 5th: "The Decorative Possibilities of Lighting," by T. O. Freeth. December 12th: "Lighting Applied to Production," by W. Robinson.

The 46th (day) Course will be held from November 19th to 22nd. The programme is similar to that of the 44th Course, particulars of which were given in our issue of September 27th.

French Contract with Poland

A group of French electrical construction companies have signed an agreement with Poland for the construction of a certain number of power plants and transmission lines. The material will be bought in France and will cost 2,400 million francs. The generators will have a total capacity of 300,000 kW, and a 220-kV line will link Warsaw and Lodz with the Silesian coalfields.

Reports on German Industry

Among the latest reports upon German industry prepared by British and Allied investigating teams are the following:—B.I.O.S. 409. "D.C. Cup Type Motors by Siemens Schuckert Zaehlerwerk, Nuernberg" (1s. 6d.). B.I.O.S. 606. "The Design of German Telephone Subscribers' Apparatus" (5s. 6d.). B.I.O.S. 687. "The Design of German Line Telecommunications Transmission Systems" (15s.).

Molybdenum Steam Pipes

The reference number of the report issued by the British Electrical and Allied Industries Research Association on the cracking in service of steam pipes made of molybdenum-steel is J/T.141, not S/T.141 as stated in our issue of October 4th, p. 537.

New Brush Factory

A factory is being built at Wishaw, Lanarkshire, by Scottish Industrial Estates, Ltd., for the Brush Electrical Engineering Co., Loughborough. It is intended to transfer plant valued at about £250,000 from England to Wishaw when the new factory, which will at first be of 100,000 sq ft, is completed.

Trade Publications

British Thomson-Houston Co., Ltd., Bridle Path, Watford, Herts.—Illustrated and priced folder (L.798/M) detailing equipment for fluorescent lamps for industrial and commercial uses.

Tufnol, Ltd., Perry Barr, Birmingham, 22B.—Catalogue in illustrated booklet form containing information about products of many kinds and shapes, gears, bearings, insulators, varnish, cement and three methods of printing "Tufnol."

Trade Announcements

The London Lamp Sales Department of the Metropolitan-Vickers Electrical Co., Ltd., is now at 132-135, Long Acre, London, W.C.2 (telephone: Temple Bar 3444; telegrams: "Metviclamp, Rand, London").

The Hoffmann Manufacturing Co., Ltd., is opening a branch office at 4, Salisbury Square, Salisbury Road, Cardiff. (Telephone: Cardiff 9318; telegrams: Hoffman, Cardiff).

Alfred Graham & Co., Ltd., announce that as from October 31st, their address will be Washer Lane Works, Halifax, Yorks (telephone: Halifax 61656).

Farrs Wholesale (Midlands), Ltd., has opened a new branch at Farr House, Queen Street, Peterborough.

Electric Crematorium

Lanarkshire County Council has approved a scheme for a crematorium near Broomhouse with four electric furnaces each costing £3,000.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within one month from October 9th :—

ALCO. No. 641814, Class 7. Electrical generating plant.—Arthur Lyon & Co. (Engineers), Ltd., Africa House, Kingsway, W.C.2.

MONITOR. No. 635623, Class 7. Pneumatic and hydraulic presses, air compressors, pumps included in Class 7, water motors and turbines, electric motors (not for land vehicles), steam and oil driven engines (not locomotives and not for land vehicles), cranes and hoists.—"Monitor" Patent Safety Devices, Ltd., "Monitor" Works, King's Road, Wallsend-on-Tyne.

KEROHMEX. No. 638979, Class 9. Electricity conductors and electric resistances. Also No. 638980, Class 17. Electrical insulating materials and electrical insulation parts made therefrom, and electrical insulation.—Steatite & Porcelain Products, Ltd., Wexham Road, Slough.

AMPCO-TRODE. No. 639995, Class 9. Arc-welding electrodes principally of copper base alloys.—Ampco Metal, Inc., Milwaukee, Wis. Address for service: c/o Stevens, Langner, Parry & Rollinson, 5-9, Quality Court, Chancery Lane, W.C.2.

VANDO. No. 640984, Class 9. Electric welding electrodes.—Bertrand Turner, 23, Iverna Gardens, Kensington, W.8.

PALANREADA. No. 641568, Class 9, and STENOREADA, No. 641569, Class 9. Electrical apparatus for use in training students on stenographic writing machines and for teaching persons to read.—Polantype (Patents & Trade Marks), Ltd., King's Bourne House, 229, High Holborn, W.C.1.

CITENCO (design). No. 641757, Class 9. Electrical apparatus and appliances, all included in Class 9.—City Engineering Co. (Boreham Wood), Ltd., Manor Way, Boreham Wood, Herts.

BLEECO. No. 641348, Class 11. Electric lighting fittings and parts thereof, not included in other classes, electric switches and electric fusible cut-outs.—Brighton Lighting & Engineering Co., Ltd., 35, Wellington Road, Brighton, 7.

AEROLIAN. No. 642360, Class 11. Hair-drying appliances.—D. G. Vosser, trading as Hairdressers' Electrical Service Co., 81 Dean Street, Oxford Street, W.1.

South Wales Venture

Switchgear Company Now Making Domestic Appliances

FEW manufacturers can claim a greater expansion of output and scope of their products in such a short period than South Wales Switchgear, Ltd. Commencing operations at the end of 1941, on the Treforest Estate, the company has not only acquired two adjoining factories to increase production of switchgear and transformers, but has also just launched out into an entirely new market by the opening at Blackwood, ten miles away, of a new factory of 85,000 sq ft floor area, for the manufacture of domestic electrical appliances.

At present production at Blackwood is confined to wash-boilers and house service panels but 2- and 3-kW immersion heaters will shortly be added to the range and by the beginning of next year manufacture should be in full swing of electric cookers, principally for the National Housing Drive scheme. Most of the wash-boilers now being made are for inclusion in the Government's aluminium houses, but production has already started on both round and square types for supply to the general public.

Assembling wash-boilers and (below) some of the finished boilers

At every stage of manufacture each operation is broken down as much as possible to achieve the highest degree of mass production. On one of the wash-boiler component sub-assembly lines, for instance, the connecting terminal brackets are assembled, the small interconnecting leads are cut and sleeved with asbestos, the main connecting leads are prepared and their terminals added, the connection strips are drilled and bent, and the handles and cocks are assembled. On another assembly line the elements are made up and mounted on mild steel plates, the terminals and switches are screwed on, and the wiring and soldering carried out and inspected, the complete heating unit then being fixed to the tubs and the external flex added ready for final inspection and test before the covers are put on.

Extensive use of jigs facilitates the cutting, folding and soldering of the sheet-metal bodies, and spot welding is employed for the element cover plates. The copper tubs are electro-tinned and the outer casings are shot blasted and galvanized. The heating element and method of attachment has been developed by the company. Other types are available either with or without safety cut-outs. Shortly production of wash-boilers will reach 500 a week to increase to 1,000 per week by the end of the year.

An output of 500 cookers per week will be reached next year. The design of the model on which the company will concentrate its energies has been finally settled and tooling up is now in process. A description appeared in our September 6th issue. Plans have been made to introduce a larger " family " model later. In addition to service panels for Government houses a model is being developed specially for the trade.

Apart from the production side the new Blackwood factory has two other specially

noteworthy features, a large drawing office capable of accommodating ultimately a hundred draughtsmen, and a training school for apprentices. The training of employees is a matter in which Mr. A. J. Nicholas, director and general manager of the company, takes a very keen interest and the scheme he introduced a few years ago is bearing fruit, two boys having recently obtained the Higher National Certificate, one in electrical and the other mechanical engineering. Over a hundred apprentices are employed by the company, one third of them being secondary school boys with school certificates. All the latter, and for deserving cases trade apprentices as well, have one day off a week to attend technical colleges.

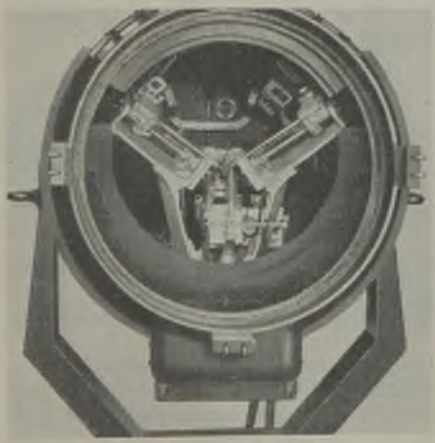
Assembling kitchen control units

The company's school is divided into two sections: one for apprentices run under the guidance of an ex-Government training instructor, and the other for advanced courses which are conducted by the company's own engineers in connection with special short-term training schemes.

Film Studio Lighting

Double-Negative Arc Lamp

A 150-A arc lamp for use in film studios is a new product of the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. It has one positive carbon and two negative carbons, each of the latter being 8 mm. in diameter. The positive carbon, 16 mm. in diameter, has been specially developed for use with the new lamp in order to ensure that the light emitted is correct for colour photography.



Interior of G.E.C. double-negative arc lamp showing carbon feed mechanism

Hitherto, film studios have used arc lamps each fitted with one negative per positive. Lamps employing this carbon arrangement consume about 150 A and are prone to emit a bubbling or "frying" noise which may be reproduced on the sound track of the finished film. The production of the interference is dependent upon the current flowing through the negative carbon and the intensity of the noise increases with the increase of current. The disproportionate increase of noise at 90 A suggested that a more silent arc at higher currents could be produced if the load were shared between more than one negative.

Subsequent experiments which were carried out with a 150-A arc employing two negatives each carrying 75 A resulted in an appreciable decrease in the noise emanating from the arc. The noise was still further reduced when the negatives were set at an angle of 100 degrees to each other and pointing downwards toward the positive at an angle of 30 degrees.

The use of two negatives also has the effect of reducing the voltage drop across the arc from 65 V, which is normal for a single-negative arc lamp, to 48 V, and this enables a considerable saving in electricity to be made when a given amount of light is required. Two double-negative arc lamps can be run in series, so as to light two lamps for the same power consumption used by the one lamp and its ballast resistance. The lamp is intended to be used with a refractor of the Fresnel type and will take any make of refractor 20 in. in diameter.

PARLIAMENTARY NEWS

By Our Special Reporter

THE Atomic Energy Bill is designed to enable the Government to control development in this country and to institute and assist research on the subject. In moving the second reading on October 8th the Prime Minister (Mr. C. R. Attlee) said that the Bill was an earnest of the Government's intention to play its full part in any international scheme for the control of atomic energy.

The Bill would give the Minister of Supply the powers necessary for him to discharge his responsibilities. The Government had already approved a research programme involving an expenditure of about £30 million and it might be that a far greater expenditure would be necessary.

The Bill was read a second time and the Money Resolution attached to it was approved.

On October 11th the Bill was read the third time and passed to the House of Lords.

Shop-window Lighting

In the House of Commons on October 8th Lt. Col. Sharp asked the Minister of Fuel and Power when he proposed to relax the general restrictions on shop-window lighting; and if he would give an assurance that such relaxations would be made before the Christmas period.

Mr. Shinwell said he regretted that the fuel position did not justify any relaxation of the lighting restrictions at present. He could not predict the position at Christmas, but if there was any substantial improvement, he would consider the matter again.

Scottish Rural Electrification

Mr. Thornton-Kemsley asked the Minister of Fuel and Power if he would make a statement, arising from his recent inspection of hydro-electric undertakings in Scotland, as to the intention of His Majesty's Government with regard to rural electrification in that country.

Mr. Shinwell replied that the Government's policy, as had already been announced, was to promote rural electrification not only in Scotland but throughout Great Britain generally. He was glad to see that the hydro-electric schemes in Scotland would be able to make a contribution towards carrying out that policy.

Refrigerators and Fuel Economy

Mr. Collins asked the Minister of Supply if he was aware that refrigerators which depended for their action on a heating unit consumed three times as much electricity as the compressor type; and what steps he was taking in the interests of fuel economy to encourage the manufacture of compressor-type refrigerators.

Mr. Arthur Woodburn said that only a very small proportion of refrigerators now being produced depended for their action on a heating unit. The remainder employed the compressor system.

Pole Supplies

Mr. Heathcoat Amory asked the Minister of Fuel and Power in what quantities concrete poles were now available for electricity supply extensions in rural areas; also how many wooden poles and how many concrete poles were expected to be available for extensions of electricity supplies in rural areas during the next twelve months.

Mr. Shinwell said that so far as he was aware, sufficient concrete poles were now being produced to meet the current demands of electricity undertakers and sufficient capacity was available to meet their expected demands over the next twelve months. He hoped that there would be at least 80,000 wooden poles available for electricity undertakers in 1947.

On October 9th Mr. Thornton-Kemsley asked the President of the Board of Trade, if he would state the number and country of origin of timber poles, suitable for use in connection with the extension of electricity supplies, which had been imported into this country since the end of the war in Europe.

Mr. Belcher, Parliamentary Secretary, Board of Trade, replied that between the end of the war in Europe and August 31st last, 47,658 poles suitable for use in connection with the extension of electricity supplies were imported from Sweden and 25,009 from Norway.

Electric Motor Production

Sir Ernest Graham-Little asked the Minister of Supply, whether, in view of the increasing shortage of electric motors, he would give further consideration to the suggestion now re-submitted to him, for setting up a mass production factory for their manufacture.

Mr. Arthur Woodburn, Parliamentary Secretary, Ministry of Supply, said that substantial expansions of factory capacity for electric motor production were already taking place. Production was limited by other factors, including a shortage of raw materials, which a scheme such as that to which the hon. member referred would unfortunately not relieve.

Appliances for Temporary Houses

On October 14th the Minister of Supply informed Major P. Roberts that the stocks of domestic electrical appliances for temporary houses held on October 2nd were as follows:—Cookers 5,213; wash-boilers 4,624; immersion heaters 8,437; and refrigerators 727. No stocks were held for other housing schemes. These stocks represented at the most three weeks' supply at the present rate of construction.

Spanish Railways

Over 2,800 Miles to be Electrified

By Charles J. Webb

IN a decree of the Government of Spain, dated January 25th of this year, it was announced that it had been decided to electrify the State controlled standard-gauge railways in two stages. In the first stage preference is to be given to those sections of the system which are urgently in need of modernization, leaving the remainder of the lines to be subsequently dealt with. The first stage comprises the electrification of 2,810 miles of line, with actually about 3,290 miles of track, which is to be completed within twelve years, i.e., by 1958. As far as possible the development of the electrical engineering industry in Spain is to be encouraged so that all the electrification material, both fixed and mobile, shall be of the country's own construction.

Conversion Plans

Twenty-eight different railways are down for electrification during the first stage. Of these ten are in the north, ten in the eastern and eight in the central and southern sections. The lengths of the different lines range from a short stretch of 11¼ miles serving the port of Almeria to 160 miles in the Valencia area.

A standard overhead system, operated at 3,000 V, d.c., with rail return is to be employed, with a maximum outgoing voltage at the substations of 3,600 or 4,000 V. The few existing electrified railways, which are practically all in one area of Northern Spain, which operate on 1,500 V, d.c., will not be altered.

As a general rule, the electricity will be delivered to the substations on the three-phase, 50-cycle a.c. system at 6, 20, 45, 80 and 150 kV, subject to a maximum variation of 7 per cent in voltage and 2 per cent in frequency.

While the majority of the substations will be of the semi-automatic variety, they will, as far as possible, be equipped for automatic operation where this does not involve undue complication or excessive cost. The substations are to be provided with accumulators for lighting and emergency control of the auxiliary equipment. Conversion to d.c. is to be effected by means of mercury-arc rectifiers, which must be capable of carrying a 50 per cent overload for two hours and one of 200 per cent for five minutes after having run at normal load for 24 hours and after an interval of one hour.

There will be five main types of propulsion, viz. high-speed and medium-speed locomotives, self-contained motor trains, combined engines and luggage vans for the haulage of light trains, and shunting engines. As regards the first two types the weight on each axle will not exceed 20 metric tons, and three types of brakes are to be provided—hand-operated, regenerative electric or rheostatic brakes and vacuum. The trains will be electrically heated. Express locomotives will have a top speed of 68¾ m.p.h. and will haul 550 metric tons at 37½ m.p.h. on gradients. The medium-speed locomotives are to be capable of a maximum speed of 50 m.p.h. and of hauling a 600 metric-ton train at 31¼ m.p.h. on gradients. Self-contained motor trains will consist of a motor coach permanently coupled to a trailer, and designed for the maximum speed of 68 m.p.h. Both vehicles are to be mounted on two-axle bogies and each motor coach will be equipped with four motors, one on each axle, with a total one-hour rating of 1,000 h.p.

Power Requirements

When the first stage of electrification is completed it is estimated that the annual power requirements will amount to about 700 million kWh. In view of steps that are being taken to increase the output of electricity in Spain no difficulty is expected in meeting the railway requirements as well as the normal growth of the country's consumption of power. In 1942 the total output was 4,438 million kWh, of which 4,064 million kWh (91 per cent) came from hydro-electric plants and 374 million kWh from thermal stations. Owing to the unusual dry period in 1945, the hydro-electric output dropped to 3,022 million kWh, or 76 per cent of the aggregate production for that year of 3,966 million kWh.

In order to meet the requirements of the railways, and to utilize as far as possible the mineral fuel resources of the country, as a provision against a continuance of water shortage, it is planned to establish near the mines a number of steam-operated generating

plants. New hydro-electric stations are also to be constructed as a result of which it is expected that by the end of 1956 the electric power producing capacity of Spain will be equal to 11,272 million kWh each year.

A 64-page brochure sent out by the Spanish Embassy in London gives particulars of the scheme and of the requirements to be met by contractors. Although it is intended that as far as possible all materials shall be of Spanish manufacture, British electrical engineers interested could no doubt obtain copies of the brochure, the full title of which is " Plan General de Electrification de los Ferrocarriles Españoles " on application to the Commercial Attaché.

ELECTRICITY SUPPLY

London School Lighting. Stockton Hire Schemes.

Brighouse. — EXTENSIONS. — The Electricity Committee proposes a low-voltage interconnection with the substation at Woodvale Mills, improvement of supply in the Birds Royd and Gooder Lane areas, and the erection of an additional substation for John Smith & Sons (Badger Hill Mills), Ltd.

Burton-on-Trent. — IMPROVEMENT SCHEME. — The Corporation Electricity Committee is to extend the mains and provide substations to improve the supply in the Winshill, Woodville and Barton districts at a cost of £143,030.

Chanctonbury (Sussex).—CEMENT WORKS SCHEME.—It was recently reported to the Rural District Council that British Portland Cement Manufacturers, Ltd., proposed to rebuild their works at Upper Beeding and greatly increase production. The R.D.C. agreed to make representations to the County Council that all proposed electricity lines injuriously affecting the amenities of the immediate locality should be placed underground where reasonable facilities existed, subject to no unwarrantable delay in the supply of electricity resulting.

Cheltenham.—BULK SUPPLY AGREEMENT.—Agreement has been reached between the Shropshire, Worcestershire and Staffordshire Electric Power Co. and the Cheltenham Corporation for a revision of the terms for bulk supply under Section 12 of the 1926 Electricity (Supply) Act, which will result in a lowering of the charges and save the Corporation approximately £15,000 per annum. These reduced charges will be retrospective to January 1st, 1945, and the savings will offset increased costs, so enabling the Corporation to maintain its present tariffs, which are now lower than at the outbreak of war.

REPLACEMENT OF SWITCHGEAR.—The Corporation has approved a scheme submitted by the borough electrical engineer, to replace most of the existing 11,000-V circuit breakers, which are now of inadequate rupturing capacity by switches having a rating of 150 mVA. The opportunity is also being taken to improve the protective gear, and the total cost of the scheme is estimated at £36,000.

Colchester.—LOAD DEVELOPMENT.—Presenting the results of the past year's working of the Electricity Department, which showed a surplus of £684 compared with £3,804 in the previous year, the chairman of the Electricity Committee (Councillor L. M. Worsnop) said that the undertaking would have to face large developments in the next few years. Some £300,000 would have to be spent to make the network of cables adequate to carry the load.

Douglas (I.O.M.).—CONTROL SYSTEM.—The borough electrical engineer reported that the existing ripple control system had ceased to function satisfactorily. He considered that the 200 relays at present in use should be replaced either by time switches or by the more flexible system of injection relay control. It was decided to obtain a firm estimate for the injection relay system.

STREET LIGHTING. — The Electricity Committee is to purchase equipment at a cost of £1,061 for the completion of the Derby Castle street lighting.

Gateshead.—ELECTRICITY FOR ESTATES.—The Town Council has discussed with the North-Eastern Electric Supply Co., Ltd., the question of supplying electricity to housing estates. It has been agreed that the company should provide ducts at its own expense to be laid by the Corporation where cables are to cross roads, on the understanding that these arrangements will not establish a precedent to be followed when supply conditions become normal. The Corporation will delay as long as possible the paving of footpaths to give the company an opportunity of laying cables. Where this is not practicable, the Corporation will not accept responsibility for future reinstatement.

Guildford.—RATES RELIEF.—The Corporation Electricity Committee is contributing £3,579 from the profits of the electricity undertaking towards the relief of the rates.

Hastings. — HOUSING DEVELOPMENT. — The Electricity Committee is to provide a supply at a cost of £2,100 to the Mountfield estate which is to be developed by Gyplands Housing Association, Ltd.

Hull.—ROAD LIGHTING.—On the recommendation of the city engineer the Works Committee has agreed that Sutton Road shall be lighted in accordance with Group A standard for traffic routes, utilizing reinforced concrete standards with underground cabling and " Rythmatic " master switch control. With G.E.C. (Hull) type fittings the total cost is estimated at £3,425.

INSTALLATIONS IN SCHOOLS.—It was recently reported to the Education Committee that the cost of electrical installations at Courtney Street and Chapman Street schools was estimated at £3,040. The education director was instructed to report with regard to the possibility of installing fluorescent lighting.

Ilkley.—BULK SUPPLY CHARGES.—The Urban District Council has applied to the Electricity Commissioners for a determination of the amount to be charged by the Yorkshire Electric Power Co. for bulk supply.

Lichfield.—LOANS SANCTIONED.—The Corporation Electricity Committee has obtained sanction to borrow £4,911 for an electricity supply to the Trent Valley estate and £2,972 for supply to Little Hay pumping station.

HIRE-PURCHASE SCHEME.—The Corporation Electricity Committee has approved a scheme for the hire purchase of immersion heaters, storage heaters and cookers, repayment to be spread over a period of five years.

London.—SCHOOL LIGHTING.—Having considered whether the provision of fluorescent lighting at John Ruskin School at an additional cost of £580 would be justified, the L.C.C. Education Committee states that while it would seem that fluorescent lighting may have some advantages over lighting by filament lamps of the same intensity, it is advised that the advantages may prove to be more apparent than real. It proposes therefore to proceed with filament lighting at John Ruskin School and to take the opportunity of comparing the results with those of fluorescent lighting at Amberley Road and Berkshire Road Schools and report further thereon.

Mansfield.—SUPPLY EXTENSIONS.—The Electricity Committee is planning a number of mains extensions, including one to Mansfield Colliery, which hitherto has generated its own supply. Two new substations are to be erected at a cost of £5,799.

Morecambe.—INCREASED CHARGES PROPOSED.—A proposal for the increase of electricity charges has been adopted by the Town Council and is to be submitted to the Electricity Commissioners for approval. It is proposed to reduce the rural area surcharge from 25 per cent to 12½ per cent.

Richmond (Yorks).—REBATE.—A rebate of 20 per cent is to be allowed on the past quarter's electricity accounts.

Sheffield.—WATER HEATERS IN CORPORATION HOUSES.—Alderman A. Smith, chairman of the Estates Committee, said recently that the wiring of all new permanent Corporation houses for standard immersion water heaters was being considered jointly by the city architect and the general manager of the Electricity Department.

Stalybridge.—STREET LIGHTING.—The Corporation Highways Committee has invited the Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board to carry out experimental street lighting.

Stockton-on-Tees.—HIRE AND HIRE-PURCHASE ARRANGEMENTS.—Proposals relating to hire and hire-purchase submitted to the Electricity Committee by the general manager and engineer (Mr. N. Hunter) have now been approved by the Town Council. Cookers, kettles, immersion heaters, water heaters, etc., on hire and which are now practically worn out and beyond repair, will be replaced by new appliances, subject to limitation of supplies, at the following revised quarterly rentals:—Cookers 10s. (standard model) and 12s. 6d. (large model); kettles 2s.; immersion heaters 4s.; and wash-boilers 4s. After considering the engineer's report on the question of supplying electrical appliances to new "permanent" houses, the Committee decided that cookers, immersion heaters, etc., should be made available, subject to limitation of supplies, on hire-purchase terms over a period of three or five years in quarterly instalments as follows:—Cookers, £1 12s. and £1 respectively; and water heaters, 15s. 6d. and 9s. 6d. The assisted wiring scheme which was suspended during the war is to be reintroduced, the figures being adjusted to meet the increased cost of components and materials.

Stone.—HIGHER CHARGES.—The Urban District Council has approved a 10 per cent increase in electricity charges, making a total advance of 25 per cent since 1941.

Tonbridge.—RATE AID FROM PROFITS.—Out of a net profit of £5,649 on the past year's working of the electricity undertaking, £900 has been allocated to the rate fund. The chairman of the Electricity Committee (Councillor R. Norton) said that the sum was approximately the legal limit allowed. The undertaking last year sold over 12 million kWh, twice as much as in 1938. The loan debt was only just over £65,000, although the Council was entitled to borrow to the extent of a quarter of a million pounds for the undertaking.

Torquay.—EMERGENCY LIGHTING.—In view of the unsatisfactory gas emergency lighting in the Assembly Hall the Corporation has decided to install battery lighting capable of providing three hours' lighting at a time to 18 points at a cost of £397.

SUPPLY TO ESTATES.—The Electricity Committee is to provide a supply to an estate at Buckfastleigh where 68 houses are to be built, and is seeking sanction to borrow £1,898 for cables to the Bridgetown estate, Totnes.

Tunbridge Wells.—EXTENSION TO ASHURST.—The Town Council has approved a scheme for supplying electricity to Ashurst. The borough electrical engineer reported that the cost would be £1,996 and the estimated revenue, based on the results of a canvass, was £200 per annum, giving a return of only 10 per cent on the outlay.

West Hartlepool.—LOAN APPLICATION.—The Town Council has applied to the Electricity Commissioners for sanction to borrow £5,000 for electricity meters.

Wilton.—IMPROVED LIGHTING.—When the tender of the Wilton Electricity Supply Co., Ltd., was accepted for street lighting at a recent meeting of the Town Council, the chairman of the Finance Committee (Alderman A. F. Marks) said that for an additional £200 a year in running costs they were getting a five times better system of lighting. The total cost of the installation will be £5,066.

York.—EXTENSIONS.—Electricity is to be provided to Mowthorpe Dale and Ganthorpe (£1,080), and Heslington (£3,164).

Overseas

Eire.—CLONSAST PROJECT.—Preparatory work has commenced on the foundations for the generators and the cooling towers in connection with the new turf-fired generating station at Clonsast. The main work on the actual buildings will begin towards the end of the year or early in 1947.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Aluminium Tubular Heaters

TUBULAR heaters made of aluminium, in addition to those constructed of steel, are being manufactured by UNITY HEATING, LTD., Chilworth Manor, Southampton. The advantages of the new variety are the lighter weight, about one-third the total of the steel type, and rust resisting property. An improved diecast aluminium terminal end is also provided.

Twin-ring Boiling Plate

A strongly constructed boiling plate with two rings that can be used either by itself or as an addition to existing appliances by caterers in snack and milk bars, cafeterias and restaurants is made by the JACKSON ELECTRIC STOVE CO., LTD., 143, Sloane Street, London, S.W.1. It is included in the "Britain Can Make It" Exhibition.

The unit, which is finished in cream vitreous enamel, weighs 36 lb and measures 2 ft 4 in. wide by 12 in. deep over the hob and 5 in. high. There is one 8 in. and one 6½ in. enclosed boiling

Twin three-heat boiling plate

plate, each controlled by a separate 3-heat switch mounted at each end of the front panel.

A removable drip tray is provided and the total loading is 2·8 kW, the smaller ring being rated at 250/500/1,000 W and the larger at 450/900/1,800 W.

Improved Television Set

In the first post-war television model announced by the PHILCO RADIO & TELEVISION CORPORATION OF GREAT BRITAIN, LTD., Wadsworth Road, Perivale, Middlesex, the pressing of a button in the centre of the cabinet causes the lid to swing up and reveal the cathode ray tube. Controls have been reduced from the pre-war four to three—one for adjusting "picture" brightness, and the other two for sound and tone volume. When closed the set resembles a sloping front writing desk or radiogram. To simplify installation work, all the installation controls have been arranged in a hidden recessed panel directly beneath the loudspeaker grille.

Known as model A. 1707, the new set comprises a 16-valve T.R.F. receiver with a synchronizing unit coupled to a 12-in. diameter cathode ray tube, giving a picture 10 in. by 8 in., which is viewed direct. There is a sound output of 3½ watts.

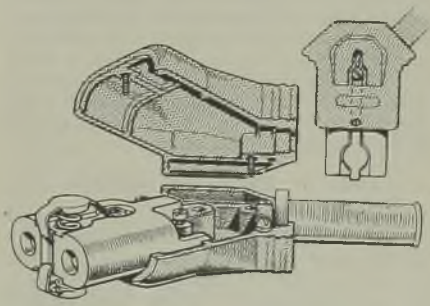
Plastic Table Lamp

An all-moulded desk lamp named "Plastalite" is announced by E. K. COLE, LTD., Princes Avenue, Southend-on-Sea, Essex. It has a ball-socket shade and a curved swivel arm attached to a weighted base incorporating a luminous press-button switch, which can be easily seen in the dark. The light is adjusted by simply tilting the shade or arm without overbalancing the lamp in any position. It is equally well suited to either home or business use, being obtainable in several plain colours, and it is displayed at the "Britain Can Make It" exhibition.

Coloured all-plastic desk lamp

Ceramic Iron Connector

A connector for household clothes irons manufactured by LOBLITE, LTD., Third Avenue, Team Valley Trading Estate, Gateshead-on-Tyne, is of the "safety" variety in that over-



Iron connector with ceramic insulating body and (smaller sketch) external earthing terminal

heating troubles are reduced by mounting all current-carrying parts on a steatite body, which projects from the moulded bakelite casing.

There is a high partition " wall " between the pillar type terminal screws, and the 7·5-A contact tubes within the ceramic sockets as well as the earthing plates are spring loaded. A screwed cord grip is provided for the angle-entry cable; there are no loose parts and good space is allowed for wiring. The connector bears the B.S.I. " National Mark " to indicate compliance with B.S. 562.

Patterned-Reflector Fire

A room heater of the reflector type that differs from the usual designs is the " Sunnyglow " made by the ARTIC FUSE & ELECTRICAL MANUFACTURING CO., LTD., George Street, Birtley, Co. Durham. The combination of focused

Perforated reflector screen fire

elements with a patterned reflector of special construction is claimed to diffuse golden coloured light " and interwoven " heat rays, part of the latter passing through the patterned reflector to create convection currents of warm air, which are circulated through a patented venturi nozzle. This fire is fitted with a single element of either 1·25 or 1·5 kW and at present is being finished in gold colour.

Two- or Three-Pin Sockets

Socket outlets of the multi-plug design rated at 15 and 5 A are shortly to be produced under the trade name of " IRL " by IMP RADIO, LTD., 37b, New Cavendish Street, London, W.1. Their patented feature is that three screwed tappings are provided so that the plug may function either as a three- or two-pin type. Thus the larger socket will accommodate one 15-A plug, either three- or two-pin, or two 5-A two-pin plugs. Similarly the smaller socket will take one 5-A three-pin, or three 5-A two-pin plugs.

South African News

From Our Cape Town Correspondent

A PLAN involving a capital outlay of £2,000,000, which may eventually lead to the electrification of the whole of the Natal sugar industry, was set in motion when an agreement was reached for the merger of the Tongaat Sugar Company, which owns one of the largest mills in Natal, and the Central Factory, Verulam. This merger is the first step in a plan brought about by Dr. H. J. Van der Bijl, chairman of the Electricity Supply Commission. It involves the construction of a power station at Tongaat which will feed electric power and steam to the sugar mills in return for the supply of bagasse—a waste fibre from sugar cane which can be used as fuel.

RADIO SET SHOCK RISK.—A warning against certain radio sets on sale in Cape Town has been issued by the city electrical engineer, who says that when they are wired to the electricity supply they may become " alive." One of these models has an incoming mains terminal permanently connected to the receiver chassis either directly or through a resistance of very low value. This type of receiver is not approved for installation within the municipal area unless it is isolated from the supply mains by a double wound transformer. According to the Radio, Refrigerator and Domestic Appliances Association, the sets complained of are of a standard American type and large numbers of them have been sold in South Africa.

DURBAN TELEPHONES.—Durban is to retain its municipal telephone system, a new ten-year agreement between the Corporation and the Government having been approved by the City Council. Durban is to pay the Government £25,000 a year for the next five years, and £30,000 thereafter. So as to be in line with the rest of the Union, the charge of 1d. per call is to be raised to 1½d.

PROPOSED LEGISLATION.—To foster regional and other development, the Minister of Economic Development and Mines is to introduce a Bill to amend the Electricity Act of 1922. The Act requires the Electricity Supply Commission to operate so far as possible on the basis of neither profit nor loss, and the Commission is thus debarred from making electric power available in a developing area if the service is not immediately remunerative.

ELECTRICAL APPARATUS SUPPLIES.—Generally in South Africa dealers' stocks of large and small domestic electrical appliances are much better. Stocks of electric refrigerators have been arriving, but not in sufficient quantity to meet the large demand, and the supplies of washing machines are also adequate to meet only a small part of the large market. Prices of models so far landed do not show any great increases. In fact, current prices are said to compare favourably with those ruling in pre-war days. Smaller appliances like kettles are rather higher in price than in the past.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Adelaide Electric Supply Co., Ltd.—Following upon the vesting of the company's property in the Electricity Trust of South Australia, as from September 1st, the Trust has circularized the company's stockholders stating the amounts payable to them for their holdings. These are based on the market price of the stocks on August 1st, 1945. The Trust expresses the hope that stockholders, instead of taking cash, will convert their holdings into the Trust's 4 per cent debentures at the same rate. It is pointed out that the stated payments will only be made in full if the assets outside South Australia are transferred to the Trust. The amount payable to stockholders will be reduced to the extent to which this is not done.

The Midland Counties Electric Supply Co., Ltd., is to raise £875,000 by the issue of 500,000 ordinary £1 shares at the price of 35s. each to ordinary stockholders in the proportion of one new share for every £6 of stock held. The issue is being underwritten by the Power Securities Corporation. The proceeds of the issue will be utilized by the company in financing the requirements of its subsidiaries, one of which is the Derbyshire & Nottinghamshire Electric Power Co., which is constructing a new power station at Staythorpe, Nottinghamshire. The scheme will involve an expenditure of about £7,000,000 and the station will have an ultimate capacity of not less than 300,000 kW. The new ordinary shares are the 500,000 unissued ordinary shares of the authorized capital of £6,500,000.

Brush Electrical Engineering Co., Ltd.—A fall in trading profits from £252,875 for 1944 to £61,217 last year is shown in the accounts just published, the cancellation or curtailment of almost all the Government contracts having resulted in a reduction in turnover of about £750,000. A sum of £170,000 (nil) is transferred from general reserve and £72,964 (nil) is receivable under break clauses in respect of Government contracts. Deductions include £163,006 (nil) for turbine rectification, losses of subsidiary companies £31,500 (£14,937), depreciation £63,983 (£58,947), war risks, etc., £670 (£11,700), A.R.P. £3,349 (£5,181) and fees £2,000 (£2,250), the net profit being £45,447 (£136,980). A sum of £32,088 is brought in from tax reserve freed (against taxation provision of £50,000). There are no allocations to general reserve (last year £40,000) or the welfare fund (last year £3,611). An interim ordinary dividend of 4 per cent was paid but it is not proposed to recommend a final dividend; last year the total distribution was 10 per cent. A sum of £56,744 is carried forward, against £11,560 brought in.

The turbine rectification item in the accounts refers to the Ljungstrom turbine manufactured under licence from a Swedish company. Technical problems arose during the war and now the war is over and contact with Sweden re-established a complete survey has been made of the modifications necessary to eliminate the basic faults.

Explaining the fall in earnings, the chairman, Sir Ronald Matthews, states that in addition to the cancellation of Government contracts there were other contributory factors, the main one being the disruption caused by the change-over to peace-time production. The company was faced with the problem of restarting, at the earliest possible date, the manufacture of products to pre-war design, or alternatively facing up to the further delays involved in the introduction of extensive modifications and, in a number of outstanding instances, completely new designs. It was decided to adopt the latter course. As a result, production throughout the latter half of 1945, and in fact, the first half of 1946, was adversely affected by the extensive development, re-tooling and new shop layouts necessitated by a range of new products which the directors have every reason to believe will ensure the financial well-being of the company.

Enfield Cables, Ltd., is reducing its interim dividend on the ordinary stock from 6¼ to 3¼ per cent. The decision has been taken by the directors in view of the present limitation in supplies of raw materials, particularly lead, the possibility of restriction of coal and electric power this winter, and the fact that no estimate can be made of the profit the company is earning. Moreover, costs of all kinds have risen and are rising.

Electric & Musical Industries, Ltd., in a preliminary statement, shows that the group's profit for the year ended June 30th is £195,810, an increase of £10,108 as compared with the preceding year. The balance is struck after providing £562,226 for taxation, £481,618 less than a year ago. The profit of the parent company is £165,000 (against £150,085). The dividend for the year on the ordinary capital is 6 per cent, plus a bonus of 2 per cent (unchanged).

Ferranti, Ltd.—Preliminary results for the year ended June 30th last show that the net profit, after crediting £225,000 E.P.T. recovery, was £77,007, compared with £95,678 for the preceding year when there was no corresponding tax credit. It is proposed to pay an unchanged dividend of 6 per cent tax free on the ordinary stock.

Peto Scott Electrical Instruments (Holdings), Ltd., reports a trading profit for the year to March 31st of £41,310, as compared with £62,400 for the preceding year, before crediting dividend of £1,100 from a subsidiary and providing £33,665 for taxation. After deducting new issue expenses, etc., the net retainable profits are £7,554 (against £5,505). The dividend for the year is maintained at 25 per cent, and £10,451 is carried forward (against £9,084 brought in).

The Dubilier Condenser Co. (1925), Ltd.—Presiding at the annual meeting held on October 10th, Mr. W. H. Goodman (chairman) said that the work in connection with the rehabilitation of the Acton factory was not yet finished owing in a large measure to the difficulties in obtaining the necessary labour and materials. They were incurring substantial expenditure on rehabilitation and re-equipment, and in addition had acquired land and buildings

in the Liverpool area where productive capacity would be established to supplement the output from the factory at Acton. This course was necessary in view of the acute shortage of female operatives in the Acton area.

The Victoria Falls & Transvaal Power Co., Ltd., reports a profit for the year ended December 31st last of £582,050, as compared with £575,921 for the previous year, to which is added £342,240 brought in, making £924,290. Reserve receives £150,000 and the ordinary dividend for the year is 19 per cent (against 15 per cent). The balance carried forward is £351,790.

The report states that the sales of electricity during 1945 showed a small increase over those for 1944, but the cost per kWh sold continued to rise. On the other hand the average amount received per kWh sold was slightly better than in 1944. The Vaal generating station came into service early in 1945 and continued to operate satisfactorily during the year. The station is the property of the South African Electricity Supply Commission, but has been erected and will be operated by the company, which will take the whole of the output at cost.

In his statement issued with the report and accounts, Mr. A. E. Hadley (chairman and managing director) says that up to the present the sales of electricity during the current year have continued satisfactorily and with a rising tendency. The company's undertaking can be taken over two years after an official notice has been served and this notice can be given at the end of 1948. So far the company has had no authoritative intimation of the present intention of the South African Government on this subject.

Trafford Park Estates, Ltd., reports a profit for the year ended June 30th (before providing for taxation) of £78,564, to which is added £70,931 brought in, together with profits on sale of land and on realization of investments, making £162,987. Taxation requires £56,927, and it is proposed to pay a final dividend of 5½ per cent, less tax, making 8 per cent for the year. The balance carried forward is £78,273.

Kalgoorlie Electric Tramways, Ltd.—The undertaking is to be taken over by Kalgoorlie Municipalities as from January 1st next. The amount receivable will be nominal and the chairman states that in view of the large amount of £212,000 due to "B" debenture holders and the small amount which will be available when the assets are fully realized, no payment can be made to shareholders.

Richard Johnson, Clapham & Morris, Ltd., are raising the total distribution on the ordinary shares from 20 to 25 per cent by paying a bonus of 10 per cent (5 per cent) in addition to the final dividend of 11¼ per cent. The net profit for the year to June 30th was £59,363, compared with £48,606 for 1944-45, of which provision for taxation absorbs £36,000 (£31,500).

Bennis Combustion, Ltd., reports a net profit for the year to April 30th last, before taxation, of £21,458 (£21,095), and the ordinary dividend is maintained at 10 per cent. It is stated that the exceptionally strong demand for the company's products continues and the outlook for the current year is favourable. The Government's policy of recommending industrial undertakings to convert their steam-raising plant from coal to oil is receiving close attention by the directors, both as regards manufacture of such equipment and the prospects of oil as a permanent fuel of industry.

Holophane, Ltd., reports a trading profit for the year to June 30th of £24,375 (against £17,749 for 1944-45), the net profit being £9,503 (£9,076) after providing £14,000 (£9,000) for taxation. A dividend of 12½ per cent is recommended, leaving £20,993 (£18,657) to be carried forward.

The Britannia Electric Lamp Works, Ltd., proposes to pay a bonus of 3 per cent in addition to the usual first and final ordinary dividend of 7 per cent. The net profit for the year to April 30th, after deduction of depreciation and tax, was £27,034; this compares with £8,433 for the preceding eleven months.

The Marconi International Marine Communication Co., Ltd., has declared an interim dividend of 2½ per cent (same).

The Ever Ready Trust, Ltd., is again paying an interim dividend on the ordinary and deferred shares of 3 per cent.

The Pressed Steel Co., Ltd., has announced an interim dividend of 10 per cent (same).

New Companies

Progress Electrical Co. (Eastham) Ltd.—Registered October 3rd. Capital, £1,000. Electrical engineers and general electrical installation contractors, etc. Directors: J. E. Vaughan, F. A. Savidge and S. H. Rugg. Regd. office: Park Road Estate, Park Road, Eastham, Wirral, Cheshire.

Tubelight Signs, Ltd.—Registered September 30th. Capital, £1,000. Electrical engineers and general electrical installation contractors, lighting specialists, etc. Directors: J. A. Pickering and F. G. Power. Regd. office: 16, Campbell Street, Leicester.

Timms-Roe, Ltd.—Registered September 23rd. Capital £2,000. Manufacturers of, and dealers in, dynamos, motors, armatures, magnetos, batteries, etc. Directors: W. E. Timms, T. V. Roe and J. V. Timms. Regd. office: 34, Curzon Street, Derby.

Parbruk, Ltd. — Registered October 2nd. Capital, £600. To acquire the business of electrical contractors carried on by J. H. Parker and J. W. Bruce as "Parbruk" at 12, Markfield Road, Bootle. Directors: A. Tearle and H. Livermore. Regd. office: 30, Hamilton Square, Birkenhead.

R. H. Sweeney, Ltd.—Registered October 2nd. Capital, £5,000. Manufacturers of, and dealers in, dynamos, motors, armatures, magnetos, batteries, etc. Directors: R. H. Sweeney and E. E. Williams. Regd. office: 61/2, Wind Street, Swansea.

Bankruptcies

K. E. Bader, lately carrying on business at Westmoreland Road, Hendon, electrical equipment manufacturer.—Application for discharge to be heard on October 24th at Bankruptcy Buildings, Carey Street, London, W.C.2.

STOCKS AND SHARES

STOCK Exchange markets have been violently disturbed by the outlook for coal, as defined by Mr. Shinwell, and by serious breaks in prices in the New York and Johannesburg Stock Exchanges. Investors also became uneasy as to whether the Government will be able to maintain for much longer its cheap money policy. This latter consideration has lowered the prices of British Government securities, although the gilt-edged stocks of the Central Electricity and London Transport Boards are better on the week. The falls are noticeable mostly in the ordinary shares of the equipment and manufacturing companies, the market in which has been unpleasantly surprised by a reduction in the final dividend on Enfield Cables. Few sections escaped the prevailing tendency. Markets steadied towards the end of last week, but the majority of movements remained downward.

Home Electricity Supply

The market for electricity supply ordinary shares suffered no harm in the malaise which shook Stock Exchange departments all round the House. It was recognized that Mr. Shinwell's latest lucubrations did little more than re-echo the arguments and statements set out in August by the Public Relations Committee of the Electricity Supply Companies, which Mr. Shinwell had previously characterized as being "a lot of nonsense."

Prices are mostly better where changes have occurred. Rises of 6d. to 1s. are marked in British Power, 33s., County of London, 45s., Electrical Distribution of Yorkshire, 45s., Yorkshire Electric, 46s. 3d., Electric Finance, 63s., Lancashire, 32s. 6d. and Llanelly, 27s.

Dividend Calculations

These prices demonstrate how comparatively few shares have come to the market, which has stood up to the recent shakeout more stoutly than any other in the industrial groups. County of London ordinary can be bought at 45s. 3d., to give a return of £4 8s. 3d. Edmundsons are on offer at 28s. 6d., yielding at that price four guineas per cent, while London Associated Electricity ordinary, available at 26s., pay £4 12s. 3d. per cent. These yields are calculated, of course, upon the last-paid dividends. It may happen that when the next dividend time comes along, in March, 1947, the distributions which have been announced as bonus, may be cut. But perhaps this suggestion is leaning to the ultra-cautious side.

Price Fluctuations

Enfield Cable shares reacted sharply, from 54s. 6d. to 51s. 6d., on the decision to reduce interim dividend from 6¼ to 3¾ per cent.

Associated Electrical ordinary fell to 65s. and the preference to 42s. 6d., Automatic Telephones weakened to 71s. 6d., Electric Construction to 63s. 6d., Falk Stadelmann to 42s. 6d. Metal Industries "B" gave way to 57s., Revo to 51s. and Reyrolle to 73s. 9d. Burco stand out as a bright exception with a rise to 27s. 6d., and Murex recovered to 91s. 3d. The cable stocks have held their prices fairly well. Canadian Marconi at 15s. are 1s. 3d. higher. Globe ordinary eased off to 40s. 9d. International "Tel. and Tel." at 20, showing a drop of 3 points, reflect the flatness of New York.

Midland Counties New Issue

The Midland Counties Electric Company has announced its intention of issuing half a million ordinary shares of £1 each at 35s. The present shares went back 1s. to 46s. on the assumption that new shares would probably come to market before the issue settled down into permanent hands. Surprise was expressed at the New Issues Committee allowing an offer at a price so much as 11s. below that of the existing shares, giving a premium of about 1s. 9d. per old share. However, the New Issues Committee has shown itself on several recent occasions to be more amenable to common sense than it was at the time when Johnson & Phillips tried to make their original new issue and were refused. It is thought that other electricity supply companies may follow the Midland Counties example in the near future.

E.M.I. and Brush

Electric & Musical Industries fulfilled expectations in again declaring a dividend of 6 per cent, with a bonus of 2 per cent, which makes 8 per cent for the year to June 30th. The disposable profit of £195,810 is a little more than £10,000 better than that of the previous twelve months. The parent company's profit is £15,000 up. The price of the shares remained stationary at 28s. 6d.

Brush Electrical ordinary were unchanged at 7s. 6d. by the issue of the report and balance sheet to the end of December, 1945. The report, and the chairman's statement, enter into reasons for the disappointment caused by the non-payment of a final dividend for the year. The difficulties arose wholly through the transition from wartime conditions to those of peace, dislocating the company's efforts and causing a cancellation and/or curtailment of Government contracts. The net profit of £45,447, as already announced, goes against £136,980 in 1944. Associated British Engineering are 2s. 6d. down, at £2.

Victoria Falls

The Victoria Falls Co. reports a modest increase in net profit, and the price of the shares is ⅛ better at 5⅜. The dividend was raised from 15 per cent to 19 per cent, but, owing to a change in the method of taxation, the actual difference in payment to the holders of ordinary shares is trifling.

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.

A. ABBEY (Ohio Carbon Co.).—" Electrical resistance elements." 19720. October 12th, 1944. (580909.)

A. P. Anello.—" Electric marine cable strippers." 14931. August 4th, 1944. (580954.)

N. C. Barford.—" Means for tuning hollow electric resonators." 14684. September 7th, 1943. (580964.)

British Thomson-Houston Co., Ltd.—" Carrier current systems." 14335/44. July 27th, 1943. (580930.) " Elastic fluid turbines." 14420/44. July 29th, 1943. (580933.) " Aircraft employing jet propulsion." 1635/45. January 21st, 1944. (580995.)

British Thomson-Houston Co., Ltd., and A. Roxburgh.—" Gas blast electric circuit breakers." 14657. August 1st, 1944. (580943.)

Budd Induction Heating, Inc.—" Heat treatment of metal plates." 9581/42. November 8th, 1941. (580976.)

Burndept, Ltd., and R. P. Richardson.—" Voltaic batteries." 11085. June 9th, 1944. (581029.)

J. Carter.—" Control of radio-receiving sets." 18860. October 3rd, 1944. (580905.)

Cinema Television, Ltd., K. A. R. Samson and R. B. Head.—" Luminescent powders and methods of manufacturing such powders." 11462. June 15th, 1944. (581030.)

E. K. Cole, Ltd., and J. N. I. Evans.—" Low pressure mercury-vapour discharge lamps." 980. January 12th, 1945. (580994.)

Creed & Co., Ltd., and R. D. Salmon.—" Printing telegraph apparatus." 803. January 15th, 1944. (580882.)

A. G. Crossland.—" Detachable connection of reflectors, globes and other components of electric lighting and gas fittings to their supports." 14818. August 3rd, 1944. (580952.)

G. W. Davidson and Metropolitan-Vickers Electrical Co., Ltd.—" Electric circuit breaking apparatus." 2927. January 27th, 1939. (580972.)

G. W. Davidson, W. A. Coates and Metropolitan-Vickers Electrical Co., Ltd.—" Electric circuit breaking apparatus." 4549. March 11th, 1940. (580974.)

J. M. Debski.—" Time-base generators for cathode-ray tubes." 12251. June 28th, 1944. (580891.)

General Electric Co., Ltd., and A. Bloch.—" Magnetic or electrostatic separators for ores and similar materials." 15615. November 5th, 1942. (581004.)

General Electric Co., Ltd., A. J. Biggs and C. C. Jones.—" Arrangements for automatic volume control in thermionic amplifiers." 446. January 12th, 1942. (580880.)

General Electric Co., Ltd., N. A. Wooster, W. A. Wooster and E. A. Fielding.—" Manufacture of piezo-electric crystals." 15090. September 14th, 1943. (580965.)

General Motors Corporation.—" Resistance assemblies for ignition circuits of internal-combustion engines." 9045/44. May 24th, 1943. (581024.) " Refrigeration apparatus." 15599/44. August 20th, 1943. (581056.)

H. J. Grose (Telefon Fabrik Automatic A/S.).—" Terminal banks and distributing frames for automatic telephone exchange and like systems." 8626. March 17th, 1939. (Convention date not granted) (580920.)

Hazeltine Corporation.—" Signal clipping system particularly for television." 5845/44. May 14th, 1943. (581018.)

Hoover, Ltd.—" Suction cleaners." Cognate applications 21957/44 and 21958/44. November 11th, 1943. (580914.) " Suction cleaners." 14936/44. August 7th, 1943. (580955.) " Suction cleaners." 14937/44. August 7th, 1943. (580956.)

V. Hope.—" Push-pull electric switches." Cognate applications 14884/44 and 4215/45. August 4th, 1944. (581048.)

Imperial Chemical Industries, Ltd.—" Electrodeposition of tin." 13399/44. July 13th, 1943. (581034.) " Electrodeposition of tin." 13404/44. July 13th, 1943. (581036.)

Landis & Gyr Soc. Anon.—" Temperature regulating installations." 26777/45. November 24th, 1941. (Divided out of 577744.) (580959.) " Indicator calling installations." 15488/43. October 31st, 1942. (580967.)

H. G. Lybszynski.—" Apparatus for embodying cathode-ray tubes." 4889. March 16th, 1944. (580887.)

Press Wireless, Inc.—" Frequency discrimination systems." 15905/43. September 9th, 1942. (580968.)

Radio Transmission Equipment, Ltd., and C. E. G. Bailey.—" Radio navigational aids." 9978. May 23rd, 1944. (580985.)

Sangamo Weston, Ltd., and F. R. Butherus.—" Bearing for use in electric meters and like instruments." 14960. August 4th, 1944. (580896.)

Sangamo Weston, Ltd., and M. G. McBride.—" Transmitting arrangements." 4317. February 20th, 1944. (580998.)

Siemens Bros. & Co., Ltd., and B. A. Hensler.—" Electric signalling systems." 6986. April 15th, 1944. (581021.)

Sperry Gyroscope Co., Ltd., and R. H. Nisbet.—" Apparatus for locating objects by means of radio waves." 16260. November 8th, 1940. (580975.) " Directional radio transmitting or receiving systems." 12807/42. December 8th, 1941. (Divided out of 580975.) (580977.) " Radio-locating systems." 12808/42. December 8th, 1941. (Divided out of 580975.) (580978.)

Standard Telephones & Cables, Ltd.—" Radio pulse receiver system." 16740/44. September 9th, 1943. (581057.) " Arrangements for selecting electric pulses according to duration." 21026/44. December 1st, 1942. (581068.)

Standard Telephones & Cables, Ltd., and W. F. Glover.—" Circuits for repeating square shaped wave forms." 817. January 15th, 1944. (581011.)

Standard Telephones & Cables, Ltd., and C. T. Scully.—" Demodulation of time modulated pulse trains." 7983. May 19th. 1943. (581005.)

Standard Telephones & Cables, Ltd., and J. D. Weston. " Wide frequency band thermionic valve amplifiers." 3161. February 7th, 1945. (581074.)

Standard Telephones & Cables, Ltd., and H. P. Williams.—"Harmonic generators." 14492. July 28th, 1944. (580990.)

Standard Telephones & Cables, Ltd., L. C. Baker and J. F. Haines.—" Manufacture of bulbs for electron valves and the like." 14312. July 26th, 1944. (580928.)

A. H. Stevens (Gibson Electric Refrigerator Corporation).—" Absorption refrigeration apparatus." 20081. December 1st, 1943. (581009.)

Telegraph Condenser Co., Ltd., and P. A. Sporing.—" Electric terminals and the like." 15044. August 8th, 1944. (581051.)

Telegraph Construction & Maintenance Co., Ltd., E. W. Smith and R. Sear.—" High-frequency electric conductors." 14678. August 1st, 1944. (580944.)

J. B. Tucker, J. E. Gaffney and H. Fawke.—" Electric tumbler switches particularly for alternating current." 14714. August 2nd, 1944. (580946.)

Veritys, Ltd., and J. W. Forth.—" Fluorescent electrical lighting fittings." 22948. November 18th, 1944. (580915.)

C. D. H. Webb, F. H. Burgess and the Plessey Co., Ltd.—" Sealed electric plug and socket connections." 11934. June 23rd, 1944. (581031.)

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.

Australia.—VICTORIA.—State Electricity Commission. November 20th. Six water-tube boilers for Yallourn, Spec. 46-47/1.

December 4th. Conductors for 264-kV transmission lines, Spec. 46-47/35.

January 22nd. Two 50,000-kW steam turbo-generators, with condensing, feed-water heating and evaporating plant, Spec. 46-47/11.

Batley.—October 31st. Corporation. L.v. armoured cables. (October 11th.)

Belfast.—November 1st. Electricity Department. 33-kV and 6·6-kV armoured switchgear and cabling for Harbour power station. (See this issue.)

Cardiff.—December 10th.—Electricity Department. 11-kV switchgear, 500-kVA transformers and 11-kV and l.v. underground cables. (See this issue.)

Cumberland.—County Council. Electric heating, wiring and equipment of St. John's Boys' and Infants' School at Workington.—J. H. Haughan, county architect, 4, Alfred Street North, Carlisle.

Doncaster.—October 21st. Town Council. Electrical installations in 72 houses on the Wheatley Park estate (in two contracts).—Estates surveyor, 15, South Parade.

Dorset.—November 1st. Hospital Visiting Committee. Modification of existing electrical installation, change over from d.c. to a.c. and lighting and power at Dorset Mental Hospital, Herrison, Dorchester. (See this issue.)

Farnworth.—November 13th. Electricity Department. 1,000-kVA transformer and e.h.v. switchgear. (See this issue.)

London.—Metropolitan Water Board. Diesel driven alternator plant. (October 4th.)

Middlesex.—November 4th. County Council. Applications are invited from contractors for the inclusion of their names in the Council's approved list for the following works:—Electric lighting and power installations; X-ray apparatus; refrigerators; electric lifts, laundry equipment, etc. Forms from C. W. Radcliffe, clerk of the County Council (Reference C/GP/G), Guildhall, Westminster, S.W.1,; a stamped addressed envelope must be enclosed.

New Zealand.—November 29th. Trolley-bus chassis, and/or bodies; town clerk, Dunedin.

Plymouth.—November 2nd. Electricity Department. Meters, time switches, underground joint boxes, underground disconnecting boxes and two 6-kV outdoor transformers. (October 11th.)

Salford.—November 11th. Electricity Department. 6,600/415/240-V three-phase power transformer. (See this issue.)

Selkirk.—October 31st. Town Council. Electrical work in connection with 120 houses at Philiphaugh site.—Rowland Anderson and Paul & Partners, architects, 16, Rutland Square, Edinburgh, 1.

Southend-on-Sea.—November 11th. Electricity Department. 11-kV metalclad switchgear, and e.h.v. and l.v. cable. (October 11th.)

Southport.—October 26th. Corporation. Electric lighting installation, Floral Hall. (September 27th.)

Spalding.—November 12th. Rural District Council. Two centrifugal pumps, complete with electric motors and automatic switchgear. (Deposit: £5).—Silcock & Simpson, consulting engineers, 10, Park Row, Leeds, 1.

Woking.—November 1st. Urban District Council. Installations in 22 houses to be erected on Well Lane site, Horsell (deposit: £2 2s.).—Surveyor, Council Offices.

Orders Placed

Battersea.—Electricity Committee. Accepted. Superheater (£3,233).—Babcock & Wilcox.

Hastings.—Welfare Committee. Accepted. Electric hot-cupboard for hospital (£50).—Jackson Electric Stove Co.

Hull.—Housing Committee. Accepted. Electrical installations in 62 council houses (£3,418).—Accumulator & Contracting Co.

Electricity Committee. Accepted. Chlorinating plant (£3,069).—Wallace & Tiernan.

Northumberland. - Education Committee. Accepted. Electrical installation at Hartley Burn (Midgeholm) Council School (£767).—A. Moffett & Son

Sedgley.—Housing Committee. Accepted. Electrical installations in 96 Council houses.—D. L. Moss.

Salford.—Light, Heat and Power Committee. Accepted. Electric lift at Regent Road gasworks (£1,311).—W. Wadsworth & Sons.

Swindon.—Town Council. Accepted. Electrical installations in 100 houses (£2,909).—Teesdale & Jones.

Westminster.—Contracts Committee. Accepted. Electric vehicle batteries (£545).—Chloride Electrical Storage Co.

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.

Acton. — Dwellings (318), Vale estate (£411,000); W. Nicholson & Son (Leeds), Ltd.

Rebuilding 14 flats, Southfield Road; W. J. Lewis, architect, Cranbrook Road, Ilford.

Birkenhead.—Houses (257), Woodchurch estate; H. J. Rouse, architect, Martins Bank Building, Water Street, Liverpool.

Birmingham.—Municipal restaurant extensions, Newhall Street (£20,450) and baths, Handsworth; city engineer.

Bolton.—Houses (51), Eastfield (£50,730); Drapers, Ltd., builders, Bury Road.

Bootle.—Temporary bungalows (141), various sites (£89,000); borough engineer.

Brecknock.—Houses (50) for R.D.C.; J. Merton Jones, architect, St. Mary's Chambers, Abergavenny.

Bromsgrove.—Houses (72), Rigby Road, for U.D.C. (£98,615); Shipway & Partners, builders, Northfield.

Chingford.—Schools, Friday Hill (£102,505) and Grange Hill (£104,250); Commercial Structures, Ltd.

Colchester.—Extensions, Technical College (£9,693); Henry Everett & Sons.

Dudley. — School, Holly Hall; borough engineer.

Dumfries.—New factory at Lincluden for Hollins, textile manufacturers; manager.

Easington.—Houses for the R.D.C. at Blackhall (46), Horden (90), Easington (24), and Murton (50); C. W. Clarke, surveyor.

Edinburgh.—Houses (130), at Craigmillar; secretary, Thistle Foundation.

Erith.—Houses (96), Lesney Farm housing estate; A. J. H. Sprague & Son, surveyors, 72, New Cavendish Street, London, W.1.

Falkirk.—Blocks of houses (£162,400) for Town Council; burgh surveyor.

Gateshead.—Junior and infants' school at Lobley Hill; borough engineer.

Extensions to Sunderland Road School; J. Sutton & Son, Tinn Street, Gateshead.

Glasgow.—Five blocks of flats, 263 houses, for Corporation; city architect.

Hastings. Houses (100), laundry and community centre, Mountlands estate: Gyplands Housing Association, Ltd.

Hebburn-on-Tyne. Houses (200) at Campbell Park for the U.D.C.; Page, Son & Hill, architects, 75, King Street, South Shields.

Hull.—Houses (126), West Villa estate, Anlaby Park Road; Kettlewell, Son & Co., Ltd.

Keighley.—Extensions to works; G. Emmott (Pawsons), Ltd.; Wadsworth Mill, Oxenhope.

Kidderminster.—Houses (100); J. Cochrane & Sons, Ltd., builders, Ironstone Road, Rawnsley.

Lanarkshire.—Crematorium, Daldowie estate (£70,000); county architect, 34, Albert Street, Motherwell.

Leamington Spa.—Children's block at Warneford Hospital (£60,000); clerk to the Committee of Management.

Manchester.—Houses (111), Baguley Hall area; houses (129), Newall Green area; flats (143), New Cross area and flats (135), Ardwick area; Housing Department, Town Hall.

School building, St. Clement's C.E. School, Hyde Road; Daniel Eadie & Co., Ltd., builders, Short Street, Heaton Norris.

Morayshire.—Houses (256) for County Council; county clerk, Elgin.

Northumberland.—Extensions, St. Andrew's Mental Colony; county architect.

Penistone.—Houses (66) on six sites for R.D.C.; Noel Heppenstall, architect, 39, Market Street, Milnsbridge, Huddersfield.

Redcar.—Houses (52), Stockdale Avenue, on the Dales estate; R. Hilton, borough engineer.

South Shields.—Works canteen for James Shaffer, Ltd.; P. L. Browne, Son & Harding, architects, Pearl Buildings, Newcastle-on-Tyne.

Spennymoor.—Houses (168) at Tudhoe Moor, for the U.D.C.; Gray & Kinghorn, architects, Camden Street, North Shields.

Sunderland.—Maternity hospital (£100,000); borough engineer.

Houses (12), Seaforth Road; G. Porteous, builder, West Sunniside.

Cinema, Durham Road, for W. Bernstone; Stephenson & Gillis, architects, 2, Saville Place, Newcastle-on-Tyne.

Swansea.—Crematorium, Morriston Park; borough architect.

Torquay.—Houses (122), Watcombe estate (£152,136); Staverton Builders, Ltd., Totnes.

Towyn.—Houses (50), Aberdovey, for U.D.C.; Nichol, Nichol & Thomas, architects, 111, New Street, Birmingham.

Wallsend.—Houses (100) for Town Council (£112,796); R. W. Carlisle, Manor Terrace, Tynemouth.

Walsall. — Factory, Wallhouse Road (£100,000); J. A. Crabtree & Co., Ltd.

Wellington (Salop).—Houses (64) on various sites for the R.D.C.; J. Brian Cooper, architect, Coleridge Chambers, 177, Corporation Street, Birmingham, 4.

West Hartlepool.—Offices and garage, Avenue Road, for J. E. Johnson & Sons; C. L. Heslop, architect, 7, Upper Church Street.

Which Stop Nut will you choose—Simmonds or Pinnacle—fibre collar or metal diaphragm? The Pinnacle is the newer product and has some advantages over its older brother. But there are still many conditions which are best satisfied by the fibre collar of the Simmonds Nut. Simmonds have learned the virtues and limitations of Stop Nuts in the only school that matters—the school of experience; ten solid years of it. In that time 90% of Stop Nuts used in British Industry have been supplied by Simmonds. We don't need to tell you that all we know, all we have learned is at your service. And you can be sure of an unbiased opinion because we design and make both types of nut; and—in our modest way—have no doubt at all that we make the best of both.

SIMMONDS STOP NUTS

Simmonds Aerocessories Limited · Great West Road · London · A Company of the Simmonds Group

20

CLASSIFIED ADVERTISEMENTS

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

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

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

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

CARDIFF RURAL DISTRICT COUNCIL ELECTRICITY DEPARTMENT

THE Council invite separate tenders for Works in the Parish of Whitchurch, as follows:—

Specification No. 1—The supply and erection of 11-kV Switchgear.

Specification No. 2—The supply and delivery of 500-kVA Transformers.

Specification No. 3—The supply and laying of 11-kV and L.V. Underground Cables.

Specifications, with Forms of Tender, may be obtained from the Electrical Engineer and Manager, 20, Park Place, Cardiff, upon payment of a deposit of one guinea each, which will be refunded, after a contract has been entered into, to those who submit a bona fide tender. Additional copies of the Specification may be obtained on payment of 5s. each (not returnable).

No tenders will be received except in plain envelopes, bearing no mark indicating the sender, sealed and endorsed "Tender for Switchgear," "Tender for Transformers" or "Tender for Cables" as the case may be. Tenders are to be delivered to me not later than noon on 10th December, 1946. The Council do not bind themselves to accept the lowest or any tender.

W. T. PARR,
Clerk of the Council.

20, Park Place, Cardiff.
October, 1946. 3006

CITY AND COUNTY BOROUGH OF BELFAST ELECTRICITY DEPARTMENT

TENDERS are invited for the supply, delivery and erection of:—

33 kV and 6.6 kV Armourclad Switchgear and Cabling for Harbour Power Station.

Specification (No. G.71) and Form of Tender may be obtained from the City Electrical Engineer and General Manager, East Bridge Street, Belfast.

Each tender, in sealed envelope marked "Tender for Switchgear, Electricity Department," and endorsed with the name and address of the person tendering, must be lodged with the undersigned not later than 4 p.m. on Friday, 1st November, 1946.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
11th October, 1946. 3038

BOROUGH OF FARNWORTH ELECTRICITY DEPT.

TENDERS are invited for the following:—

E.D.7. 1,000-kVA TRANSFORMER.
E.D.8. E.H.T. SWITCHGEAR.

Specifications may be obtained upon application to the Electricity Department, Electricity Works, Albert Road, Farnworth, Lancs.

No tender will be received except in a plain sealed envelope bearing the word "Tender" and followed by the reference number and subject to which it relates. The Corporation do not bind themselves to accept the lowest or any tender.

Tenders must be addressed to the Town Clerk, Town Hall, Farnworth, Lancs, and delivered not later than Wednesday, 13th November, 1946.

(Signed) H. CUNLIFFE,
Town Clerk.

Town Hall,
Farnworth, Lancs.
October, 1946. 2979

COUNTY OF DORSET

Dorset Mental Hospital, Herrison, Dorchester

Electrical Installation

THE Visiting Committee of the Dorset Mental Hospital invite tenders from electrical contractors for the modification of the existing Electrical Installation and change-over from D.C. generated supply to A.C. mains supply lighting and power at the above hospital.

The scope of the contract will include for all switchgear, motors and starters, wiring and fittings, etc., all in accordance with the specification and drawings prepared by the consulting engineers, Messrs. Hoare, Lea & Partners, 39, Broad Street, Bristol, 1.

Applications to tender must be received by the Consulting Engineers not later than the 1st November, 1946, and must be accompanied by a deposit of £10 10s., which will be returned on receipt of a bona fide tender. Specification and drawings will be dispatched to applicants as soon as possible after the above date.

The successful tenderer will be required to provide approved security for the due performance of the contract in a sum not exceeding 25% of the contract sum. The Visiting Committee do not bind themselves to accept the lowest or any tender.

PHILIP H. MORTON,
Clerk to the Visiting Committee.

51, High West Street,
Dorchester.
11th October, 1946. 3053

CITY OF SALFORD ELECTRICITY DEPT.

TENDERS are invited for the supply of 6,600/415/240 volt, 3-phase Power Transformers.

Copies of specification and tender forms can be obtained from the City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6, Lancs.

Offers should be addressed to the Chairman, Light, Heat and Power Committee, Electricity Department, Frederick Road, Salford, 6, and be received by 12 noon on Monday, 11th November, 1946.

H. H. TOMSON, Town Clerk.
3027

SITUATIONS VACANT

BOROUGH OF LOUGHBOROUGH ELECTRICITY DEPARTMENT

Appointment of Assistant Mains Engineer (Junior)

APPLICATIONS are invited for the above appointment at a salary in accordance with Grade 9, Class F, N.J.B. Schedule, at present £358, rising to £373 per annum.

Candidates must have had good technical education and training, with practical experience in the installation and maintenance of E.H.T. and L.T. underground distribution systems and equipment, together with some experience in mains drawing office work and mains records. The post is superannuated and the appointment is subject to the successful candidate passing a medical examination.

Applications, stating age, training and experience, to be sent to the undersigned not later than October 31st, 1946.

J. P. TUCKER, M.I.E.E.,
Borough Electrical Engineer and Manager.

Electricity Offices,
Baxter Gate, Loughborough.
10th October, 1946. 3068

BOROUGH OF LEYTON ELECTRICITY DEPT.

APPLICATIONS are invited for the appointment of a Distribution Draughtsman at a salary in accordance with the National Joint Board Schedule, Grade 9, Class F, plus 5% London Area (at present £375 18s. rising to £391 13s. p.a.), and applicants should have a sound experience in the design and erection of substation buildings, the layout of distribution networks, and the keeping of records connected therewith. It should be noted that at the present rate of growth of load the undertaking is likely to transfer to Class G in the near future.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to satisfy the Council's Medical Officer of Health as to his medical fitness. Applicants must not be more than 40 years of age at date of appointment, and it will be a condition of appointment that the successful candidate must be a member of a trade union.

Applications in the candidate's own handwriting, stating age, qualifications, experience, particulars as to membership of a trade union, and when able to take up duties, accompanied by copies of not more than three recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than first post on Saturday, 26th October, 1946. Canvassing in any form will be a disqualification.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 2945

BOROUGH OF LEYTON ELECTRICITY DEPT.

APPLICATIONS are invited for the appointment of a Chief Demonstrator (Female) from persons who have had a good general education, hold a Diploma in Cooking and/or Electrical Housecraft, and have a thorough knowledge of electrical domestic apparatus.

In the absence of a recognised scale for this class of appointment, the salary will be £350 p.a., plus cost-of-living bonus, at present £48 5s. p.a.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to satisfy the Council's Medical Officer of Health as to her medical fitness. Applicants must not be more than 40 years of age at date of appointment, and it will be a condition of appointment than the successful candidate must be a member of a trade union.

Applications in the candidate's own handwriting, stating age, qualifications, experience, particulars as to membership of a trade union, and when able to take up duties, accompanied by copies of not more than three recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than first post, Saturday, 26th October, 1946. Canvassing in any form will be a disqualification.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 2944

BOROUGH OF LEIGH ELECTRICITY DEPT.

Appointment of Junior Mains Assistant

APPLICATIONS are invited for the appointment of Junior Mains Assistant in the above Department. The salary will be in accordance with the N.J.B. Schedule, Grade 9a, Class E, at present £317 per annum, rising to £324 per annum in four years.

Applicants must, as a minimum of qualifications, possess the Higher National Certificate in Electrical Engineering, be a Graduate of the Institution of Electrical Engineers, practical experience in the installation and maintenance of E.H.T. and L.T. switchgear and an underground distribution system, together with mains records.

The appointment, which will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate passing satisfactorily a medical examination, to be conducted by the Council's Medical Officer of Health, will be determinable by one month's notice on either side.

Applications, endorsed "Junior Mains Assistant," stating age and containing particulars of education, qualifications and experience, accompanied by copies of not more than three recent testimonials, must be delivered to T. S. Parkinson, Esq., A.M.I.E.E., Borough Electrical Engineer and Manager, Electricity Offices, Charles Street, Leigh (Lancs.), not later than October 28th, 1946.

ALBERT JONES, Town Clerk.

Town Hall, Leigh. 2925

CITY OF WINCHESTER

Appointment of Chief Electrical Engineer and Manager

APPLICATIONS are invited from qualified Electrical Engineers for the position of Engineer and Manager of the City Council's Electricity Undertaking.

The salary and conditions of appointment will be in accordance with the agreement made by the National Joint Committtee of Local Authorities and Chief Electrical Engineers dated 9th July, 1941, but in accordance with Clause 10 of that Agreement the Council reserves to itself the option to pay 85% of the salary for the first year and 92½% for the second year, the full salary being payable in the third and subsequent years. On the unit assessment for the last complete year, the full salary is at present £824 per annum. A cost-of-living bonus will also be payable at the rate of £59 16s. per annum.

Applicants must be Members or Associate Members of the Institution of Electrical Engineers.

The person appointed will be responsible to the Electricity Committee and the City Council for the control and management of the undertaking, and he will be required to devote his whole time to the duties of the office and will not be allowed to engage, either directly or indirectly, in private work of any kind. He must live within the city.

The appointment, which will be terminable by 3 months' notice in writing on either side, will be subject to the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination to the satisfaction of the Council's Medical Officer.

Applications, stating age, previous experience and present position, and accompanied by not more than three recent testimonials, should be delivered to me not later than Thursday, October 31st, 1946. Envelopes should be endorsed "Chief Electrical Engineer and Manager." Applicants are required to state in their applications whether to their knowledge they are related to any member of the Council or to the holder of any senior office under the Council. Failure to disclose this information will disqualify the candidate for the appointment. Canvassing members of the Council, either directly or indirectly, will be a disqualification.

F. W. KEMPTON,
Town Clerk.

The Guildhall, Winchester.
4th October, 1946. 2931

BOROUGH OF BROMLEY ELECTRICITY DEPT.

Appointment of Junior Mains Assistant

APPLICATIONS are invited for the above post at a salary in accordance with Grade 10 of the National Joint Board Schedule, at present Class F, £321 6s., rising to £325 10s. per annum.

Applicants should have received a sound technical training and should hold the Higher National Certificate or equivalent qualification in electrical engineering, and have practical experience of the distribution side of an electricity supply undertaking, including the keeping of mains records and the preparation of drawings and plans.

Applications, endorsed "Junior Mains Assistant," stating age, full particulars of training and experience, and accompanied by copies of any testimonials held, should be delivered to W. G. Trend, Esq., A.M.I.E.E., Borough Electrical Engineer, 1, West Street, Bromley, Kent, not later than Friday, November 1st. Canvassing, directly or indirectly, will be a disqualification.

S. CRITCHLEY AUTY,
Town Clerk.

Municipal Buildings,
Bromley, Kent. 2997

BOROUGH OF ACCRINGTON ELECTRICITY DEPT.

Mains Assistant

APPLICATIONS are invited for the position of Mains Assistant in the Electricity Department at a salary in accordance with the National Joint Board Scale, Class F, Grade 8b/1, at present £386 per annum.

Candidates must possess the Higher National Electrical Engineering Certificate and have had experience in the laying of 33 kV high tension mains, three-phase distribution and maintenance and operation of static substations.

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

Applications and copies of three recent testimonials to be forwarded to the undersigned not later than Thursday, the 31st October, 1946, endorsed "Mains Assistant."

P. D. WADSWORTH,
Town Clerk.

Town Hall,
Accrington. 2975

BOROUGH OF LEYTON ELECTRICITY DEPT.

APPLICATIONS are invited for the appointment of a Substation Attendant at a salary in accordance with the National Joint Board Schedule, Grade 9, Class F, plus 5% London Area (at present £375 18s. p.a. rising to £391 13s. p.a.).

Candidates should have had suitable technical training and experience in the control of high and low tension switchboards in a main substation receiving a bulk supply. Experience with rotary plant and glass bulb rectifiers will be an added advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to satisfy the Council's Medical Officer of Health as to his medical fitness. Applicants must not be more than 40 years of age at date of appointment, and it will be a condition of appointment that the successful candidate must be a member of a trade union.

Applications in the candidate's own handwriting, stating age, qualifications, experience, particulars as to membership of a trade union, and when able to take up duties, accompanied by copies of not more than three recent testimonials, to be sent to the Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11, not later than first post on Saturday, 26th October, 1946. Canvassing in any form will be a disqualification.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 2943

BOROUGH OF EALING ELECTRICITY SUPPLY DEPARTMENT

REQUIRED, Static Substation Attendant. Applicants should have had experience in the operation of switchgear and instruments up to 22 kV. The appointment will be in accordance with the conditions of the D.J.B. No. 10 Area.

Applications should contain the following particulars: Age, qualifications, whether married or single, education, training, experience, present position and salary, when free to commence, and be accompanied by copies of recent testimonials.

A Corporation-owned house will be available for renting by the successful applicant.

Canvassing will be a disqualification and applicants should disclose whether to their knowledge they are related to any members or chief officers of the local authority.

Applications, endorsed "Static Substation Attendant," must be delivered to the undersigned by Monday, October 28th, 1946.

RONALD BIRT,
Borough Electrical Engineer and Manager.

Electricity House,
Ealing, W.5.
10th October, 1946. 3001

HEBDEN ROYD URBAN DISTRICT COUNCIL

Substation Assistant

APPLICATIONS are invited for the appointment of Substation Assistant. The salary and conditions of service will be in accordance with N.J.B. Scale, Class A, Grade 8b, at present £300 per annum, with an expected increase in the near future when the undertaking becomes scheduled in Class B.

Applications, stating age, qualifications, particulars of training and experience, together with copies of not more than two recent testimonials, to be delivered to the undersigned not later than October 22nd, 1946.

R. ASHWORTH,
Clerk of the Council.

Council Offices,
Hebden Bridge.
4th October, 1946. 2889

WEST GLOUCESTERSHIRE POWER COMPANY LIMITED

Power Station Superintendent

APPLICATIONS are invited for the above position. Salary and conditions of service in accordance with the N.J.B. Schedule, Grade 3, Class F (£640). Applicants will be required to join the Company's superannuation scheme and must be qualified mechanical engineers with experience in power station work and control of men. Applications must be made on the Company's form, which can be obtained from—The Secretary, West Gloucestershire Power Company Limited, 126, London Road, Gloucester. 2995

METROPOLITAN BOROUGH OF STOKE NEWINGTON

Appointment of Borough Electrical Engineer

APPLICATIONS are invited for the Appointment of Borough Electrical Engineer of the Council's Electricity undertaking from persons experienced in the management and administration of such undertakings.

The salary will be in accordance with the agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers dated 9th July, 1941, but in pursuance of clause 10 of this agreement 85% of the salary will be paid in the first year and 92½% in the second year, the full salary being paid in the third and subsequent years. On the present unit assessment of the undertaking this will be £831, £905, and £978 per annum respectively.

Applicants must be Corporate Members of the Institute of Electrical Engineers.

Recent experience in Electricity Supply undertaking is essential and applicants must have a thorough knowledge of design and operation of 11 kV and L.T. underground distribution networks and A.C. and D.C. substations. Applicants must also be thoroughly conversant with the Management of Showrooms, Hire and Hire Purchase, Assisted Wiring Schemes, and the General Administration of an Electricity Department. The appointment will be terminable by three months notice in writing on either side, and will be subject to the Council's Superannuation Act and to a satisfactory medical examination.

Applications, on forms to be obtained from the Town Clerk and accompanied by copies of three recent testimonials, must be delivered to the undersigned by 1st November, 1946. Canvassing directly or indirectly will disqualify, and any relationship to Officers or Members of the Council must be disclosed.

C. KENT WRIGHT,
Town Clerk.

Town Clerk,
Stoke Newington Church Street, N.16. 2916

MILFORD HAVEN URBAN DISTRICT COUNCIL ELECTRICITY UNDERTAKING

Meter and Test Superintendent

APPLICATIONS are invited for the above appointment from candidates who are capable of taking complete charge of a Type A Non-Polyphase Testing Station as covered by Grade 6, Class B, of the N.J.B. Schedule (present salary £402-£417).

Applicants must have had experience in the use of Potentiometer equipment and be familiar with the requirements of the Electricity Supply (Meters) Act, and must be capable of repairing and calibrating all types of meters and instruments required in an undertaking supplying both D.C. and A.C.

Forms of application and details of duties are obtainable from the undersigned, to whom the completed forms must be returned by November 1st, 1946.

A. J. DALTON, A.M.I.E.E.,
Electrical Engineer and Manager.

Town Hall,
Milford Haven. 2900

WHITWORTH U.D.C. ELECTRICITY DEPARTMENT

ELECTRICAL Engineer required to take charge of and manage the Council's Undertaking. The Council purchases in bulk from Rochdale Corporation. The person appointed will be required to submit to a medical examination and if appointed to contribute to the Superannuation Scheme. The salary offered will be commensurate with the recommendations of the National Agreement. Candidates should be Corporate Members of the Institute of Electrical Engineers or possess equivalent technical qualifications. Applications, marked "Electrical Engineer," to be delivered to the undersigned by 19th October, 1946.

HARRY HOYLE,
Clerk of the Council.

Council Offices,
Whitworth, nr. Rochdale. 2792

ALTRINCHAM ELECTRIC SUPPLY LTD.

Plumber-Jointers

APPLICATIONS for employment are invited from Plumber-Jointers. Wages and working conditions in accordance with the N.J.I.C. No. 3 District Schedule; present rate 28.45d. per hour.

Applications, stating age and experience, should be addressed to The Engineer and Manager, Altrincham Electric Supply Ltd., 60, Stamford New Road, Altrincham, Cheshire. 2996

COUNTY BOROUGH OF EAST HAM ELECTRICITY DEPARTMENT

Appointment of Installation Engineer

APPLICATIONS are invited for the above appointment from persons with sound technical training and who have had considerable experience in the installation and maintenance of all classes of electrical lighting, heating and power installations. Applicants must be able to initiate schemes and prepare complete estimates and specifications for all classes of installation work for new public buildings, schools, canteens and housing programmes, and to supervise the carrying out of the work and control staff. Preference will be given to corporate members of the I.E.E.

The salary will be in accordance with Class F, Grade 7, of the National Joint Board Schedule, at present £502 19s. per annum.

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

Applications, stating age, whether married or single, present appointment and salary, experience and qualifications, with copies of not more than three recent testimonials, to be sent to reach the undersigned, and endorsed "Installation Engineer," not later than 1st November, 1946. Canvassing in any form will be a disqualification.

H. A. EDWARDS,
Town Clerk.

Town Hall,
East Ham, E.6.
8th October, 1946. 2974

MANCHESTER CORPORATION ELECTRICITY DEPT.

WANTED for duties in power station:—

ONE COMBUSTION ENGINEER, at a salary in accordance with Class J, Grade 9, of the N.J.B. Schedule, which is equivalent to £425, rising by two biennial increments to £445 per annum. Applicants must have had previous experience in power station operation and in efficient combustion of low grade fuel in water tube boilers fitted with mechanical stokers.

ONE CONTROL ROOM ASSISTANT ENGINEER, at a salary in accordance with Class J, Grade 10a, which is equivalent to £335, rising by two biennial increments to £350 per annum.

Candidates for both positions must have served a workshop apprenticeship and have the Higher National Certificate in Electrical Engineering, or equivalent. Applicants without these qualifications because of service in H.M. Forces will be considered.

The appointments are subject to the City Council Superannuation Scheme, and the successful candidates will be required to pass a medical examination.

Applications, giving full particulars of age, technical training and experience, together with copies of recent testimonials, should be endorsed "Combustion Engineer" or "Assistant Engineer, Control Room," and addressed to Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, not later than Monday, 28th October, 1946. Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester, 2.
October, 1946. 2862

METROPOLITAN BOROUGH OF BERMONDSEY ELECTRICITY DEPARTMENT

Junior Mains Assistant

APPLICATIONS are invited for the above appointment from persons whose age does not exceed 45 years. Applicants must possess a sound knowledge of A.C. and D.C. distribution systems, and preference will be given to those possessing the Higher National Certificate or its equivalent.

Salary and conditions of service will be in accordance with the N.J.B. Schedule, Class F, Grade 9 (at present £375 18s. per annum, inclusive of current cost of living bonus).

The appointment will be subject to the Council's Superannuation Acts, and the successful applicant will be required to pass satisfactorily a medical examination.

Applications, stating age and whether single or married, together with details of technical training, qualifications, etc., and copies of not more than three recent testimonials, should reach the Borough Electrical Engineer not later than Saturday, 2nd November, 1946.

S. E. FREEMAN,
Town Clerk.

Municipal Offices, Spa Road,
Bermondsey, S.E.16. 2961

COUNTY BOROUGH OF BOLTON ELECTRICITY DEPARTMENT

Appointment of Mains Engineer

APPLICATIONS are invited for the position of Mains Engineer from engineers who are Corporate Members of the Institution of Electrical Engineers and who have had considerable experience in the organisation of the distributing system of an electricity supply undertaking, and in the design and layout of three-phase, E.H.T. and L.T. networks, including transformer substations.

The salary and conditions will be in accordance with Grade 3, Class H, of the N.J.B. Schedule, at a commencing basic salary of £662 per annum. The appointment is subject to the provisions of the Local Government Superannuation Acts, and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the Engineer and Manager, Back o' th' Bank Generating Station, Bolton, and when completed must be returned to him in envelopes endorsed "Mains Engineer" not later than 24th October, 1946. Relationship to any member of the Council or senior officer of the Corporation must be disclosed and canvassing will be a disqualification.

PHILIP S. RENNISON,
Town Clerk.

Town Hall,
Bolton. 2902

BOROUGH OF CHESTERFIELD ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Consumers' Engineer and Meter Superintendent in the Borough of Chesterfield Electricity Department. The salary scale for the position will be that of Grade 3, Class F, as prescribed by the National Joint Board for the Electricity Supply Industry and will commence at £640 per annum.

Candidates (preferably Corporate Members of the Institution of Electrical Engineers) must have had considerable experience in the industrial and domestic use of electricity, and also be capable of supervising the operation of a Class A Polyphase Meter Testing Station. Some experience in change-over work is also desirable. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the Electrical Engineer and Manager, W. W. Grimes, Esq., A.M.I.E.E., A.M.I.Mech.E., M.Inst.F., 172, Chatsworth Road, Chesterfield, and should be returned to the undersigned not later than 10 a.m. on Friday, 1st November, 1946, in envelopes marked "Consumers' Engineer and Meter Supt."

RICHARD CLEGG,
Town Clerk.

Town Hall, Chesterfield. 2927

BOROUGH OF BARKING ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Deputy Borough Electrical Engineer and Manager at a salary in accordance with Class F, Grade 1, of the National Joint Board Schedule of Salaries, commencing at £823 per annum, plus car allowance of £72 per annum.

Applicants must be Corporate Members of the Institution of Electrical Engineers, or equivalent standard, and have had a sound technical education, and technical, administrative and commercial experience of a progressive electricity undertaking. The appointment will be subject to the Local Government Superannuation Act, 1937, and a satisfactory medical report.

Applications must be submitted in the appropriate form, which may be obtained from the undersigned, and should be returned, together with three recent testimonials, by Monday, the 28th October, 1946. Canvassing, either directly or indirectly, will be deemed a disqualification.

E. R. FARR,
Town Clerk.

Town Hall, Barking, Essex.
26th September, 1946. 2849

WARWICKSHIRE COUNTY COUNCIL

Rugby College of Technology and Arts

A full-time Lecturer is required for Physics to Final B.Sc. standard. Salary according to Burnham Technical Scale. Application form and further particulars may be obtained by sending a stamped addressed envelope to the undersigned, by whom applications should be received as soon as possible.

P. I. KITCHEN,
Organiser of Further Education in Rugby.

College of Technology and Arts,
Eastlands, Rugby. 2952

COUNTY BOROUGH OF WARRINGTON ELECTRICITY DEPARTMENT

Appointment of Technical Assistant

APPLICATIONS are invited for the above appointment from persons with experience of the operation and maintenance of a modern selected generating station and of an underground and overhead high and low tension distribution system, with modern substation equipment. Some sales development and commercial experience will be an advantage. Preference will be given to corporate members of the I.E.E.

The appointment will be subject to the provisions of the Agreement of the National Joint Board of Employers and Members of Staff for the Electricity Supply Industry, being in Grade 5, Class H, in the schedule to that agreement. The basic salary will be £558 per annum for two years, £568 per annum for the third and fourth years, rising to £579 per annum after the fourth year; the present value of the salary according to the cost-of-living adjustments provided for in the above-mentioned agreement is £620 per annum for two years, £630 per annum for the third and fourth years, rising to £641 after the fourth year.

The appointment will be subject to satisfactory medical examination by the Council's Medical Officer, to the provisions of the Local Government Superannuation Act, 1937, and to determination by one month's notice on either side. Canvassing will disqualify, and candidates, when making applications, must disclose in writing whether to their knowledge they are related to any member of the Council or any co-opted member of a committee or any officer of the Council. Failure to do so will disqualify or may lead to dismissal without notice.

Applications, on forms to be obtained from the undersigned, must be accompanied by copies of not more than three recent testimonials and returned in sealed envelopes, endorsed "Application for Technical Assistant," not later than first post on Wednesday, 30th October, 1946.

NORMAN T. SMITH, M.I.E.E., A.M.I.Mech.E.,
Borough Electrical Engineer.

Electricity Works,
Warrington. 3026

SHIPLEY URBAN DISTRICT COUNCIL ELECTRICITY DEPARTMENT

Appointment of Rotary Substation Attendant

APPLICATIONS are invited for one vacanacy for a Rotary Substation Attendant for shift duties in this undertaking.

Conditions of service and rates of pay (at present £6 per week) are in accordance with 2,001-4,000 kW Grade, Section A, D.J.I.C. No. 2 Area, and the position will be superannuated, subject to the passing of a medical examination.

Applicants, who should have had experience in the control of high and low pressure switchboards and the operation of rotary converting plant, should send details of present and previous employment, age and other particulars, together with (if available) copies of two recent testimonials, to the undersigned by not later than Saturday, 2nd November, 1946.

NIGEL L. DUNCAN,
Engineer and Manager.

Electricity Works,
Dockfield, Shipley, Yorkshire.
7th October, 1946. 3021

STRETFORD AND DISTRICT ELECTRICITY BOARD

Appointment of Technical Assistant

APPLICATIONS are invited from engineers with sound technical and practical generation, transmission and distribution experience for the position of Technical Assistant at a salary in accordance with Grade 4, Class H, of the N.J.B. Schedule (starting salary £666 per annum). Applications, endorsed "Technical Assistant," stating age and giving full particulars of experience, and accompanied by copies of testimonials, should be received by the undersigned not later than 31st October, 1946.

The engineer appointed will be required to pass a medical examination and to join the Board's Superannuation Scheme. The appointment will be terminable by one month's notice on either side. Canvassing, directly or indirectly, will be deemed a disqualification.

H. G. BELL,
Chief Engineer and Manager.

Trafford Power Station,
Trafford Park, Manchester, 17. 3019

COUNTY BOROUGH OF SOUTHAMPTON ELECTRICITY DEPARTMENT

Various Appointments

APPLICATIONS are invited for the following positions:

(a) SENIOR LADY DEMONSTRATOR at a salary in accordance with the Higher Clerical Division of the National Scale of Salaries (£304—£340 per annum, plus war bonus). Applicants must have had a good general education up to Matriculation standard, hold a recognised diploma in Domestic Science and preferably have an E.A.W. Diploma in Electrical Housecraft, and be experienced in Salesmanship and in the demonstration and use of electrical domestic apparatus.

(b) TWO DOMESTIC DEVELOPMENT ASSISTANTS at a salary in accordance with the Clerical Division of the National Scale of Salaries £315—£360 per annum, plus war bonus). Applicants should have had experience in the ordering of all electrical domestic apparatus, dealing with Consumers' applications for same and in acting as liaison with all the other sections concerned in connection with installation, including wiring; also in canvassing builders and prospective consumers and in developing to the fullest extent the use of electricity.

The salaries are subject to the National increments and adjustments and a deduction for Superannuation. The successful applicants must pass a medical examination.

Applications on forms to be obtained from Mr. W. G. Turner, M.I.C.E., M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Civic Centre, Southampton, and accompanied by not more than three testimonials and endorsed with the name of the appropriate position applied for, must reach the undersigned not later than 2nd November, 1946. Canvassing directly or indirectly will disqualify.

R. RONALD H. MEGGESON,
Town Clerk.

Civic Centre, Southampton.
10th October, 1946. 3046

COUNTY BOROUGH OF EAST HAM ELECTRICITY DEPARTMENT

Rotary Substation Attendant

APPLICATIONS for the above position are invited from Engineers having a sound experience in the operation of La Cour Converters, and should have had experience in the operation of high tension control switchgear controlling a high distribution system.

Salary in accordance with the National Joint Board Schedule Grade 8(b), Class E (plus 5% London Area), at present £378 per annum.

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

Applications, stating age, whether married or single, and stating qualifications, with copy of recent testimonials and date of release to the undersigned.

G. W. ABLITT, A.M.I.E.E.,
Engineer and Manager.

Electricity Offices, Nelson St.,
East Ham, E.6.
October 12th, 1946. 3036

NORTHAMPTON POLYTECHNIC, ST. JOHN STREET, LONDON, E.C.1

Senior Assistants in the Electrical Engineering Dept.

APPLICATIONS are invited for vacancies as Senior Assistants in the Electrical Engineering Department of the Polytechnic.

Salary in accordance with the revised Burnham Scales for Technical Teachers will be £600 × £25—£750 p.a. plus the London allowance and a training addition where applicable.

Candidates should be qualified to teach general electrical technology and either Electrical Machine Design or Electrical Power.

Form and further particulars can be obtained from the Secretary, to whom completed applications should be returned by 8th November, 1946. 2987

THE KING EDWARD VII. WELSH NATIONAL MEMORIAL ASSOCIATION

NON-Resident Fitter, with electrical knowledge, required immediately at the Sully Tuberculosis Hospital, near Barry, Glam. Inclusive wage 2s. 6d. per hour (£6 per 48-hour week). Form of application and particulars of the appointment can be obtained from the Secretary, The Temple of Peace and Health, Cathays Park, Cardiff. 3043

COUNTY BOROUGH OF WARRINGTON ELECTRICITY DEPARTMENT

Appointment of Junior Shift Charge Engineer

APPLICATIONS are invited for the above appointment from persons with a sound mechanical and electrical training. Technical education up to Higher National Standard is essential and previous experience in modern generating station practice will be an advantage.

The appointment will be subject to the provisions of the Agreement of the National Joint Board of Employers and Members of Staff for the Electricity Supply Industry, being in Grade 8b, Class H. in the schedule to that agreement. The basic salary will be £368 per annum for two years, £377 per annum for the third and fourth years, rising to £386 per annum after the fourth year: the present value of the salary according to the cost-of-living adjustments provided for in the above-mentioned agreement is £429 per annum for two years. £438 per annum for the third and fourth years, rising to £447 per annum after the fourth year.

The appointment will be subject to satisfactory medical examination by the Council's Medical Officer, to the provisions of the Local Government Superannuation Act, 1937, and to determination by one month's notice on either side. Canvassing will disqualify, and candidates, when making applications, must disclose in writing whether to their knowledge they are related to any member of the Council or any co opted member of a committee or any officer of the Council. Failure to do so will disqualify or may lead to dismissal without notice.

Applications, on forms to be obtained from the undersigned, must be accompanied by copies of not more than three recent testimonials and returned in sealed envelopes, endorsed "Application for Junior Shift Charge Engineer," not later than first post on Wednesday, 30th October, 1946.

NORMAN T. SMITH, M.I.E.E., A.M.I.Mech.E.,
Borough Electrical Engineer.

Electricity Works,
Warrington. 3025

COUNTY BOROUGH OF BIRKENHEAD ELECTRICITY DEPARTMENT

Junior Draughtsman in the Mains and Distribution Department

APPLICATIONS are invited for the position of Junior Draughtsman in the Mains and Distribution Department at a salary in accordance with Class H, Grade 10B, of the National Joint Board Schedule of Salaries, at present £300-£305-£311 per annum, and subject to a deduction in respect of the Local Government Superannuation Act, 1937.

Applicants must have had a good experience in an engineering drawing office. The duties will include the production and preparation of plans for mains and switchgear extensions and alterations, the filing of underground and overhead mains and services records, and general drawing work. Members of H.M. Forces are eligible to apply for the position.

The successful applicant will be required to pass a medical examination and reside within the Borough.

Applications, stating age, whether married or single, present appointment and salary, experience and qualifications, accompanied by copies of not more than three recent testimonials, are to be delivered to the Borough Electrical Engineer, Craven Street, Birkenhead, not later than noon on Saturday, November 2nd, 1946. Canvassing, directly or indirectly, will disqualify.

E. W. TAME,
Town Clerk.

Town Hall, Birkenhead.
3rd October, 1946. 2989

BRACEBRIDGE HEATH MENTAL HOSPITAL, NEAR LINCOLN

APPLICATIONS are invited for the appointment of Chief Engineer. Applicants must have mental hospital experience and be capable cinematograph projector operators.

Salary in accordance with the Mental Hospitals' Association and Institution of Hospital Engineers' Joint Conciliation Committee as follows: £550 per annum plus £50 per annum (own generating plant) and inclusive of cost-of-living bonus and emoluments. The emoluments consist of unfurnished house, coal, light and vegetables, valued for superannuation purposes at £90 per annum. The appointment is subject to the provisions of the Asylum Officers' Superannuation Act, 1909.

Applications on the prescribed form must be addressed to the Medical Superintendent to reach him not later than 31st October, 1946. Form of application may be obtained from the Clerk of the Hospital at the above address. 3018

CITY OF BATH

APPLICATIONS are invited for the following appointments:

(a) DEPUTY CITY ELECTRICAL ENGINEER. Candidates must have had experience in the operation of a selected Generating Station, and in Distribution, Administration and Commercial work of an electricity supply undertaking.

Salary and conditions in accordance with Grade G.1 of the National Joint Board Schedule—present value £833 rising after four years to £870.

(b) ASSISTANT MAINS SUPERINTENDENT. Candidates must have had good practical experience of installation, maintenance and operation of E.H.T. and M.T. distribution systems, including substations. Experience of D.C. to A.C. change-over will be an advantage.

Salary and conditions in accordance with Grade G.5 of the National Joint Schedule—present value £573 rising after four years to £604.

(c) TESTING ENGINEER (Mains). Candidates must have had good experience in the routine testing of mains, transformers and fault localization—knowledge of chemistry will be an advantage.

Salary and conditions in accordance with Grade G.7 of the National Joint Board Schedule—present value £494 rising after four years to £524.

Candidates must have had a sound technical training and be corporate members of the Institution of Electrical Engineers or possess exempting qualifications. Successful candidates will be required to pass a medical examination and to contribute to the Council's Superannuation Scheme under the provisions of the Local Government Superannuation Act 1937.

Applications, stating age, and giving full particulars of technical qualifications and experience, accompanied by copies of not more than three recent testimonials are to be endorsed with the appropriate appointment and addressed to the City Electrical Engineer, The Old Bridge, Bath, so as to be received not later than the 4th November, 1946.

J. BASIL OGDEN,
Town Clerk.

Guildhall, Bath. 3044

URBAN DISTRICT COUNCIL OF FAREHAM ELECTRICITY DEPARTMENT

APPLICATIONS are invited for the position of Junior Technical Assistant Engineer at a salary in accordance with Class C, Grade 9, of the N.J.B. Schedule (at present £300 per annum).

Applicants should have had a sound technical and practical training in electrical engineering. Experience in keeping mains records would be an advantage. Technical qualifications should be up to I.E.E. Graduate standard.

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

Applications, stating age, qualifications and experience, together with copies of not more than three recent testimonials, are to be delivered to the Electrical Engineer, Fareham Urban District Council, Westbury Manor, Fareham, Hants, not later than twelve o'clock noon on the 28th October, 1946.

HERBERT A. WATTS,
Clerk to the Council.

"Merton," 5 Grove Road,
Fareham.
9th October, 1946. 3005

BOROUGH OF LUTON ELECTRICITY DEPT.

APPLICATIONS are invited for the position of Switchboard Attendant. Applicants must have had sound experience in the control of high and low pressure switchboards and the operation of rotary converting plant.

Conditions of service and rate of pay will be in accordance with the National Joint Board Schedule. Class G, Grade 9a (present salary commencing £343 per annum).

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

Applications, giving age, details of training and experience, and accompanied by testimonials, must be delivered not later than Monday, 28th October, 1946, to C. T. Melling, M.Sc.(Tech.), M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Electricity Offices, St. Mary's Road, Luton. Canvassing, directly or indirectly, will disqualify.

W. H. ROBINSON,
Town Clerk.

Town Hall, Luton, Beds.
12th October, 1946. 3050

WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

Appointment of Two Meter Repairers (Mechanician) Grade 1

THE above-named Authority have vacancies for two Meter Repairers (Mechanician) Grade 1, at their Meter Repair Depot, Shrewsbury.

Applicants must have had practical experience in the repair and testing of all types of meters, both A.C. and D.C. single-phase and polyphase, and of time switches. A knowledge of general electrical instrument and trivector meter repairs would be an advantage.

The rate of pay and conditions of service are in accordance with the District Industrial Council for the Electricity Supply Industry (No. 5 West Midlands Area, Zone B). The rate is at present 29.28d. per hour.

Applications, stating age and full particulars of experience should be addressed to the undersigned.

H. F. CARPENTER,
Clerk and Manager.

Phœnix Buildings,
Dudley Road, Wolverhampton.
12th October, 1946. 3051

CITY OF SALFORD ELECTRICITY DEPT.

Vacancy for Draughtsman

APPLICATIONS are invited for the position of Draughtsman in the Mains Section of the Drawing Office.

The salary will be in accordance with Grade 10A, Class H, of the N.J.B. Schedule, the present value being £316 per annum, rising to £329 per annum in four years.

Candidates should have had experience of mains records work and cable layouts.

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

All applications should be addressed to the City Electrical Engineer, Electricity Department, Frederick Road, Salford, 6, Lancs, and be received by Monday, 28th October, 1946.

H. H. TOMSON, Town Clerk.
3028

BEDFORD CORPORATION ELECTRICITY UNDERTAKING

Junior Shift Engineer

APPLICATIONS are invited for the position of Junior Shift Engineer at the Council's Selected Generating Station.

The salary will be in accordance with Grade 9, Class G, of the National Joint Board Schedule (at present £380 per annum).

Applications, stating age, giving particulars of training and experience, together with copies of recent testimonials, should be forwarded to the undersigned, suitably endorsed, not later than Friday, 25th October, 1946.

P. G. CAMPLING,
Chief Engineer and General Manager.

Electricity Offices,
Prebend Street, Bedford.
7th October, 1946. 3070

THE MERTHYR ELECTRIC TRACTION AND LIGHTING CO. LTD.

APPLICATIONS are invited for the position of Technical Assistant. Applicants must have had experience of A.C. and D.C. supply systems. Some experience of static, rotary and rectifier substations and generation would be an advantage.

Applications, stating age, full details of present appointment and technical qualifications, together with commencing salary required, should be delivered to the Manager and Engineer, Merthyr Electric Traction & Lighting Co. Ltd., Pontmorlais, Merthyr Tydfil, by the 4th November, 1946. 3065

THE NORTHAMPTON ELECTRIC LIGHT & POWER CO. LTD.

Junior Shift Charge Engineer

APPLICATIONS, to be received not later than Friday, 1st November, are invited for this position from suitably qualified engineers. Commencing salary in accordance with Grade 8A, Class H.

25 Bridge Street,
Northampton. 2965

ACTIVE and experienced Representative required to develop the sale of all types of Rubber and Mains Cable in the Bristol and West of England area (location Bristol). Applications, detailing training and experience, should be sent to the Employment & Welfare Officer, Johnson & Phillips Ltd., Victoria Works, Charlton, S.E.7. 3034

AGENT and Supplier, well connected Liverpool and district, would consider representation and distribution. Please supply full details.—Box N61, Lee & Nightingale, Liverpool. 3029

APPLICATIONS are invited for the position of Junior Mains Engineer with practical experience in the design, construction and maintenance of a distribution system in a rural area. The salary will be in accordance with the N.J.B. Schedule, Class D, Grade 8A. Applications, stating age, experience and details of technical training and qualifications, should be sent to—The Resident Engineer and Manager, The Wigtownshire Electricity Co. Ltd., 76, George Street, Stranraer, Wigtownshire. 2956

APPLICATIONS are invited from Transformer Designing Engineers (Senior and Junior) for employment with the Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester. Applicants should state age, full particulars of education, general and technical, apprenticeship, practical training and design experience (the latter not essential for junior applicants). Apply in writing to—The Personnel Manager, Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester. 2762

APPLICATIONS are invited for the position of Station Superintendent at a steam generating station in Scotland at a salary in accordance with Class H, Grade 3, N.J.B. Schedule (at present £725-£765 per annum). House available for successful applicant. Applicants must be under 45 years of age. They must have had a sound engineering training, followed by experience in the operation and maintenance of large selected generating stations. Apply, giving particulars of experience and technical qualifications, to—Box 3017, c/o The Electrical Review.

ARMATURE Winder for repair shop.—Boys Ltd., 187, Goswell Road, E.C.1. 2720

ARMATURE Winder required for small growing repair shop.—M. C. Bignell, Frays Mill Works, Uxbridge. 2972

ARMATURE Winder required immediately by The Bermuda Electric Light, Power & Traction Company, not over 40, good character and experience all kinds motors, generators, especially A.C., fractional h.p. and up to 15 h.p. Wages 3/9 hour, equivalent about £9 per week, passage out paid, sickness and pension schemes, prospect advancement. Write—Robert Tucker & Co., 23, Coleman Street, E.C.2. 2960

ARMATURE Winder or good Improver required, used to all types of motors. Knowledge of dismantling and assembly of motors a good advantage. Apply to—Messrs. Charles H. Harwood & Co. Ltd., 32, Meyrick Road, Willesden, N.W.10. 114

ARMATURE Winder Foreman for repair shop, also armature winder & improvers.—W. H. Sugden & Co. Ltd., Glenny Rd., Barking. 2934

ARMATURE Winders wanted, experienced on A.C. and D.C. repair work.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 2749

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

ARMATURE Winders and Improvers wanted for General Repair Works, A.C. and D.C. top rates.—Phillips & Sons Electrical Ltd., 40, Waterford Road, S.W.6. 3066

ARMATURE Winders and Improvers required, A.C. and D.C., top rates, good working conditions.—Electrical Power Repairs (Gillingham) Ltd., Strover Street, Gillingham, Kent. 9664

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

ASSISTANT Electrical Engineer, large paperboard mill, load 8,000-10,000 kW. Must have had practical experience of design, distribution problems, switchgear and various types of electric drives. Knowledge of paper mill work an advantage, but not essential. Age limit 40. Qualifications must be of high standard. Apply—St. Anne's Board Mill Co. Ltd., Bristol, 4. 2885

ASSISTANT Plant or Maintenance Engineer required to do certain amount of drawing work in addition to dealing with shop queries. Location of work is at Rugby. Full details of training and experience should be given. Basic salary up to £7 per week, according to experience and ability, plus 32/6 married, 29/6 single, staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3008

ASSISTANT Foreman for winding department. A.C., D.C. Motors, fractional to 500 h.p. Permanent progressive position to suitable applicant.—Higgs Motors, Witton, Birmingham. 106

ASSISTANT Saleswoman required in electrical contractors' showroom (London). — Box 2783, c/o The Electrical Review.

AUTOMOBILE Dynamo and Starter Armature Winder, able to undertake fr. h.p. motor rewinds. Fully experienced and able to take charge of any established department. Permanency and good prospects. West London district. Write, stating age, experience and salary required, to—Box 2959, c/o The Electrical Review.

CABLE Estimator required in sales dept., London, preferably with knowledge of export business. State age, experience and salary required. Applications in confidence.—Edison Swan Cables Ltd., 155, Charing Cross Road, London, W.C.2. 9698

CLERICAL Assistant required for stores office. Must have good knowledge of electrical material.—London Electrical Co., 92, Blackfriars Road, S.E.1. 104

CLERK required for electrical department of well-known London builders' merchants. Must be experienced in wholesale handling of lighting fittings, fires and accessories, cable, etc. Good permanent position with increasing prospects. Five-day week. Write, stating age, experience and salary required, to—R. F., W. N. Froy & Sons Ltd., Brunswick Works, Hammersmith, W.6. 2730

COMMUNICATION Engineer, possessing engineering degree or equivalent and at least 5 years' experience in the design for production of communication type receivers and transmitters (including F.M. equipment). West London area. Apply, giving age, full details of education and experience, together with salary required, to—Box 2955, c/o The Electrical Review.

DRAKE & Gorham Wholesale Ltd. require a Sales Manager for Manchester and district. Must have experience in handling general wholesale business, including water heaters. Apply in writing, stating salary expected, to—Manager, 29, Piccadilly, Manchester. 2901

DRAUGHTSMEN, preferably with telecommunications experience, required by large firm in the Midlands. Maximum salary £350 plus cost of living bonus. Write, giving details of experience, age, and salary required.—Box 11, c/o The Electrical Review.

DRAUGHTSMEN (Senior) required for large A.C. and D.C. machines, including turbo and waterwheel alternators, also for medium type A.C. and D.C. machines. Applications from men with suitable technical qualifications and good general mechanical drawing office experience will be considered. Salary dependent upon qualifications and experience. Apply, giving full details of the qualifications, experience, age and salary required, to—Chief Draughtsman, Engineering Drawing Office, The General Electric Co. Ltd., Witton, Birmingham, 6. 2661

DRAUGHTSMEN, Senior and Juniors, over 22, required for power transformers, by a large Birmingham firm. Electrical experience desirable but not essential.—Box 2893, c/o The Electrcial Review.

DRAUGHTSMEN for design of Radio Communication Equipment. Experience in this class of work desirable but not essential, although drawing office experience is essential. Location of work is at Chelmsford. Basic salary up to £7 per week plus 25% staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3009

EASCO Electrical Ltd. have vacancies for (a) Production Assistant, capable of laying out and supervising assembly of electrical equipment, must possess full electrical and technical knowledge L.F. and H.F. circuits and rectifying equipment; (b) Toolmaker, for sheet metal section, to design and make own jigs and tools and supervise same. Both positions are permanent and progressive. Apply in writing.—Brighton Terrace, Brixton, S.W.9. 2742

ELECTRIC Motor Fitters required, dismantling and assembling motors in repair shop.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 2750

ELECTRICAL company shortly opening London premises intends to commence contracting side to business. Fully experienced electrician required take charge. Excellent opportunity for man prepared to move forward with developing business. Full details age, experience, salary.—Box 9741, c/o The Electrical Review.

ELECTRICAL Engineer, age 25-35, required for Malaya. Must be qualified in installation, operation and maintenance A.C. and D.C. electric lighting and power equipment, and able to prepare estimates for lighting and power schemes. Applicants should give full details technical qualifications and experience. Salary £630 p.a. passage paid, 5 years' agreement. Write—Box PR.511, Deacon's Advertising, 36, Leadenhall Street, E.C.3. 3049

ELECTRICAL Engineer or Electronic Physicist required, capable of original calculations and design work on electronic equipment, wave propagation problems and similar work. Degree or equivalent and some research or design experience essential. Approximate age 25-30. Salary £400 approx. Apply—Staff Officer, British Insulated Callender's Cables Ltd., Erith Works, Belvedere, Kent. Ref. SR.8. 2907

ELECTRICAL Engineer required to assist in technical and administrative work in a Test Room engaged in the production and finishing of instruments of precision. Applicants must have had previous experience in testing all types of accurate moving coil instruments. Degree man preferred. Factory situated in Home Counties. Progressive post for the right man. State age, experience and salary required.—Box 3048, c/o The Electrical Review.

ELECTRICAL Engineer - Surveyor required by an Insurance Company. Age 27 to 35. Must have undergone regular training as an electrical engineer; sound general and technical education essential. Salary, £365-£525 per annum. Superannuation scheme in operation.—Box 3045, c/o The Electrical Review.

ELECTRICAL engineering firm in Essex have a vacancy for a Jig and Tool Draughtsman between 25 and 30 years of age. Experience in machine tool design an advantage but not essential. Apply, stating experience and salary required, to—Box 3024, c/o The Electrical Review.

ELECTRICAL Transformer Designers required. Fully experienced in the manufacture of all types of transformers, both oil and air-cooled, up to 1,000 kVA. Applicants required in relation to establishment of new factory at Bridgend, Glamorgan. New housing accommodation can be arranged for. Permanent progressive positions for the right men. Apply—London Transformer Products Ltd., Cobbold Estate, Cobbold Road, Willesden, N.W.10. 2992

ELECTRICIAN with energy and initiative for London area, experienced factory installations, breakdowns and maintenance.—Box 9751, c/o The Electrical Review.

ELECTRICIAN with experience of shopfitting for work in London and small proportion in provinces. T.U. —Box 2976, c/o The Electrical Review.

ELECTRICIANS, Wiremen, all round. Phone or write —Freeman Electrical Co., 253, Whitechapel Rd., E.1. Bishopsgate 7311/2. 3069

ENGINEERS and Draughtsmen are invited to apply to a large electrical engineering firm in the Midlands which has vacancies in the switchgear department for Technical Sales, Contract, Costing and Design Engineers; also experienced Technical Engineers capable of handling large projects for generation, transmission and distribution. Vacancies also exist for Draughtsmen for circuit diagram and general work.—Box 69, c/o The Electrical Review.

ESTIMATOR required, fully experienced in preparing quotations for all types of power transformers up to 1,000 kVA. Applicants required in relation to establishment of new factory at Bridgend, Glamorgan. New housing accommodation can be arranged for. Permanent progressive position for the right man. Apply—London Transformer Products Ltd. Cobbold Estate, Cobbold Road, Willesden, N.W.10. 2991

EXPERIENCED Draughtsmen are required by large electrical firm in Midlands. Must be familiar with mechanical design and construction of medium and large A.C. and D.C. machines. Reply, with full particulars, to—Box No. 315, 8, Serle Street, London, W.C.2. 2967

EXPERIENCED Designer to take charge of electric motor designs. Applicants should have held similar position elsewhere. Generous salary will be paid to applicants having the necessary qualifications.—Box 2906, c/o The Electrical Review.

EXPERIENCED Lady Clerk required in electrical contractors' office (London). — Box 2782, c/o The Electrical Review.

FIRST-class Practical Engineer wanted, thoroughly accustomed to the complete overhaul of high-speed petrol and Diesel engines.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3061

FOREMAN wanted by leading firm of cable manufacturers for copper wire mill, including pickling plant and annealing ovens. Applicants should be between 30 and 40 years of age and must be conversant with all modern methods and fully capable of taking complete charge of plant, including die room for the re-finishing of synthetic and diamond dies. The position, which is a staff appointment, is progressive and superannuation benefits are available.—Box 3023, c/o The Electrical Review.

FOREMAN, with thorough knowledge of electrical machinery with some winding experience, required for large repair shop N.W. London. Good wages and prospects offered.—Box 3040, c/o The Electrical Review.

INSULATION Testing. Large London factory manufacturing insulating varnishes, components, etc., has vacancy for Assistant in their Insulating Laboratory. Applicants should be conversant with physical and electrical testing to standard specifications and the use of up-to-date testing equipment. The position will be permanent and pensionable. Reply, stating age, qualifications and salary required, to—Box 2872, c/o The Electrical Review.

JUNIOR Engineer required, preferably with some estimating experience, particularly on overhead line extension costs. Applications giving full details of experience and stating salary required, to—West Cambrian Power Co. Ltd., Electric House, Norton, Tenby. 9723

LADY or gentleman required as assistant to export manager by city firm. No Saturdays. Write—Box "C.P.M.," c/o 95, Bishopsgate, E.C.2. 2999

LARGE firm in London area has vacancies in its development department for test gear Engineers. Several years experience in the design of electronic equipment is essential. Test gear assistants with experience in wiring and assembly of electronic equipment are also required. Write stating age, experience and salary required to—Box 3052, c/o The Electrical Review.

LEADING firm of electrical manufacturers requires Assistant Manager for a sales department. Age about 35, with technical training and preferably with commercial experience of lamps and lighting supplies business. Applications, giving age and particulars of education and experience, to—Box 2980, c/o The Electrical Review.

LEADING Sound and Cinema Equipment Company requires Sales Representative in Birmingham district. Applicants should give full details sales experience past ten years and possess car. Good salary and commission.—Box 2968, c/o The Electrical Review.

MANAGER for Electrical Showrooms. Must be first-class man with modern experience. Good salary and excellent prospects.—E. W. Jones (Electrical) Ltd., The Square, Wellington, Salop. 9739

MANAGER or Manageress of good appearance and personality required for high-class electrical and radio retail and art goods business, 30 miles from London. Must be thoroughly capable and able to take full control. Write with particulars, stating age, experience and salary required.—Box 115, c/o The Electrical Review.

MICA Products Ltd., 1, Downs Park Road, London, E.8, require Two Representatives for London and the Home Counties with connection amongst leading engineering, electrical and radio firms, to sell mica, micanite, laminated tubes and sheets, all types of machined plastics, injection and compression mouldings. Letters only, marked S.M., giving experience and salary required. 2836

OLD-established appliance manufacturers require men experienced in selling to the electrical trade as representatives. Selected men will work under the direction of an area manager already appointed. Remuneration will be by salary and expenses. Car provided. Write, in first instance, to—Box 3022, c/o The Electrical Review.

OLD-established manufacturers (Birmingham), world-wide connection and available capacity, offer unique opportunity for Electrical Engineer with completed designs and ideas to start electrical department. Small switchgear or domestic appliances, suitable quantity production. Excellent prospects.—Box 2844, c/o The Electrical Review.

OVERSEAS Employment. Oil Company in the Middle East requires two Electrical Foremen for construction and operation of a substantial power house. (a) Experienced in construction and maintenance of transformers; heavy switchgear to 22,000 volts; industrial installations including motors to 500 h.p. and alternators to 20,000 kVA. (b) Experienced in construction/operation of industrial installations using motors up to 50 h.p.; internal wiring (conduit) of workshops and residences; L.T. overhead mains; cable jointing. The age limit in each case is 34, and the salary £600/700 per year. Salary ratings apply in each case to first three year contract; additional benefits are free quarters; medical attention; allowances including grants for children; provident and (non-contributory) Pension Fund. All married applicants must be prepared to live singly for at least twelve months overseas. Application for these vacancies should be made to any Employment Exchange. 3035

PLANNING Engineer required for large engineering establishment situated in Essex. It is essential that applicants should have specialised knowledge of coilwinding. Write, stating age, experience and salary required to—Box 2953, c/o The Electrical Review.

PYROMETERS. Instrument Maker required with thorough knowledge of pyrometers, temperature controllers, automatic recorders, etc. Mainly for maintenance work in a heat-treatment dept. Modern factory in Brentford district.—Box 2973, c/o The Electrical Review.

PROGRESSIVE manufacturing co. of domestic electric appliances require Representatives for London and Home Counties. Fullest backing and co-operation guaranteed. Salary, commission and expenses. Car essential. Write in first instance, giving full details of experience, present connections in this trade, and past earnings, all in the fullest confidence, to—Box 178, Phillips Advertising Ltd., 15, Wilton Road, London, S.W.1. 2837

REPRESENTATIVE calling on provincial houses required to handle high-class wrought iron fittings and lampshades for well-known London manufacturer. Write—Box PP4585, Samson Clark, 57/61 Mortimer St. W.1. 2794

REPRESENTATIVE for U.K. wanted by leading manufacturer, Metropolitan area. Good education essential and basic knowledge of radio components. Permanent position, salary basis. State qualifications, age and salary required.—Box 2988, c/o The Electrical Review.

REPRESENTATIVES for high-class lampshades and domestic heaters wanted, to call on wholesalers and stores, for the following districts: Cheshire, Lancs., Norfolk, Suffolk, Northampton, Shropshire, Hants and whole of West of England.—Box 2743, c/o The Electrical Review.

REQUIRED immediately Model Maker for electrical firm.—Box 3039, c/o The Electrical Review.

REQUIRED, Manager to take complete charge of factory employing 100 people mainly engaged on assembly work (light electrical engineering). Applicant must have thorough mechanical knowledge and must also be able to control buying and development work. Commencing salary £780 per year, plus bonus. Only applicants who can show thorough and lengthy experience in similar positions need apply to—Box 2847, c/o The Electrical Review.

REQUIRED, Plant Layout or Builders' Draughtsman conversant with the usual engineering workshop service equipment, such as compressors, boilers and the various service mains, preferably also conversant with building construction and plant installation in order to cover layout drawings and ordering of equipment. Will be required to progress this type of work and provide any technical liaison required. Location of work is at Rugby. Basic salary up to £7 per week, according to experience and ability, plus 32/6 married, 29/6 single, staff war bonus.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3007

REQUIRED urgently by firm in Bedfordshire, engaged in the manufacture of A.C., D.C. and universal fractional h.p. motors; young man, preferably 26/32 years of age, with sufficient experience in the above products and present day requirements, to be responsible for design and development and to be in charge of all testing.—Box 3055, c/o The Electrical Review.

SALES Representative for Lancashire, Yorkshire and North England for concrete columns and associated products. Firm of high standing with good connections, mainly dealing with municipal authorities. Knowledge of street lighting practice an advantage. Progressive job for keen man.—Box 3004, c/o The Electrical Review.

SENIOR Chemist required for electrical engineering works laboratory in London area. B.Sc. standard, preferably with experience in power cables. Salary £500-£600 per annum. Replies will be treated in confidence.—Write Box 2954, c/o White's Ltd. 72 Fleet Street, E.C.4. 3047

SENIOR Designer-Draughtsman required for electrical control gear. Knowledge of contractor design essential, five-day week and excellent prospects. Age over 35. Write details of experience, salary required.—Box No. 316, 8, Serle Street, London, W.C.2. 2966

SENIOR Draughtsman required by firm of Electrical and Ventilating Engineers. Applicants should preferably have some experience in design of fabricated sheet metal work. Applications, stating age, experience and salary required, to—Box 2958, c/o The Electrical Review.

SENIOR Draughtsman required for large variety of rotating electrical machines of small and medium size, state age, experience and salary required.—W. Mackie & Co. Ltd., 129, Lambeth Road, S.E.1. 3041

SHORTHAND Typist-Book-keeper required for electrical contractors' office. Must understand trade. South London district. Particulars and salary required to—Box 9734, c/o The Electrical Review.

SMALL drawing office requires on light electrical work including small motors the services of a responsible man having knowledge of D.O. routine to control issue of prints to works, deal with minor drawing alterations and supervise the work of two tracers and clerks. Apply by letter only, stating experience and salary required.—Box 3054, c/o The Electrical Review.

STOREKEEPER or Assistant for busy cable stores. Apply by letter stating age, wage and experience.—Aerialite Ltd., 91-93, Baker Street, W.1. 9746

SWITCHGEAR Draughtsmen required for expanding company in the Midlands. State age, experience and salary required.—Box 3003, c/o The Electrical Review.

TELECOMMUNICATION Draughtsmen required for preparation of wiring diagrams, running sheets and the routing of schematics. Should have had experience in cable-forming, rack wiring and installation work. Apply—Reference 634, Siemens Brothers & Co. Ltd., Woolwich, London, S.E.18. 2981

THE Alton District Electricity Company, Alton, Hants. Applications are invited from Overhead Linesmen (H.T. and L.T.). Wages and working conditions in accordance with National Joint Industrial Council Schedule. Replies stating age, experience and whether married or single should be addressed to the Company at Victoria Road, Aldershot, Hants. 3033

THE Engineering Publicity Department of a large electrical manufacturing organization in Birmingham requires an experienced Technical Journalist. He must have had engineering training and be experienced in the preparation of Press matter and descriptive publications for all types of heavy electrical engineering equipment. Write, stating age, experience and salary required to—Box "Engineer," c/o Geo. J. Smith & Co. Ltd., 154, Fleet Street, London, E.C.4. 2951

THE Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester, have vacancies in their plant sales department for men with sound technical knowledge of engineering, particularly rotating machines and control gear. Higher National Certificate or equivalent qualifications desirable. The work, which is in the ordering and tendering sections, offers good prospects to applicants with the right experience. Salary according to age and qualifications. Apply in writing to—Personnel Manager, marking envelopes "Plant Sales." 3030

TRANSFORMER Design Engineer, experienced in all types up to 500 kVA and capable of developing special types. Progressive position. Write, stating age, experience, salary.—Brentford Transformers Ltd., Windmill Road, Brentford, Mddx. 2946

TRANSFORMER Designer (Junior) required for all types of transformers up to 3,000 kVA, 33 kV. Reply, stating age, experience and salary required, to—Works Manager, Transformers & Welders Ltd., Sandown Road, Watford. 2741

WANTED by N. London firm of repute, working Electrical Engineer. Experience manufacture, operation and repair of electric motors and associated equipment, ½ to 100 h.p. Duties would comprise inspection of machines for repair, diagnosis of test faults, attendance on outside breakdown jobs. Only first-class men should apply for this vacancy, which is a permanency and has good prospects for advancement. State wages required.—Box 3064, c/o The Electrical Review.

WANTED for a Research Establishment at Elstree:—2 Designer Draughtsmen, experienced in the development of mechanical and electrical precision mechanisms. Good knowledge of electrics an advantage. 2 Junior Draughtsmen, capable of detailing from development drawings of mechanical and electrical precision mechanisms. Opportunity for advancement to up-graded positions. Draughtsman experienced in the preparation of factory maintenance drawings, and who is capable of detailing. Apply, stating age, experience and salary required to—Box 2799, c/o The Electrical Review.

WANTED for transformer sales department. Technical Correspondents for the preparation of tenders and the handling of orders. Applicants should be of good education and have sound technical electrical training, preferably with workshop experience. A detailed knowledge of transformers, voltage regulating equipment and reactors is preferred. Good salary and prospects are offered to applicants with the right experience. Apply in writing to—Personnel Manager, Metropolitan-Vickers Elect. Co. Ltd., Trafford Park, Manchester, and mark envelope "Technical Correspondent." 2990

WINDING Foreman to take charge of male and female labour for progressive medium-sized firm in East Midlands manufacturing A.C. and D.C. motors. Only experienced men used to controlling mixed labour and conversant with modern winding practice need apply. Flat available to suitable applicant.—Box 2954, c/o The Electrical Review.

WORKS Manager required for large electrical manufacturers and engineers. Must be experienced production man, high-grade executive capable of taking full charge of all production departments. Only energetic man with modern ideas as to works management should apply, with fullest particulars.—Box 2838, c/o The Electrical Review.

YOUNG Electrical Engineer required by Electrical Motor Manufacturers, to assist in the Estimating and Design Department, S.E. London area.—Write, stating age, experience, and salary required.—Box 2692, c/o The Electrical Review.

APPOINTMENTS FILLED

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

THE Metropolitan Electric Supply Co. Ltd. -Assistant Distribution Engineers. All applicants are thanked.

SITUATIONS WANTED

AMBITIOUS Engineer, 27, experienced electrical manufacture, requires opportunity sales/service representation. Ex-officer, energetic, good organiser, keen competitor. Anywhere—Box 9732, c/o The Electrical Review.

A.M.I.E.E. requires senior and responsible position. Wide technical and commercial experience, contracting, power, illumination, sales management, trade journalism, etc. Fully accustomed to all management and executive work. Knowledge of Canadian methods and markets. Very adaptable.—Box 9695, c/o The Electrical Review.

BUYER, fully experienced radio and other industries, seeks post East London or Essex. Highest references.—Box 9729, c/o The Electrical Review.

CHIEF Electrical Engineer of extensive modern rolling mill plant, etc., max. demand 25 M.V.A., desires change; very active, wide experience, specifications, layout, complete installations, keen buyer, planned maintenance.—Box 9742, c/o The Electrical Review.

CHIEF Storekeeper requires situation with live electrical firm, 14 years' experience, age 30. Thorough knowledge of all electrical accessories, and clerical work, future opportunity becoming a buyer.—Box 9724, c/o The Electrical Review.

ELECTRIC Lamps. Production Specialist with knowledge of all types requires executive or managerial post.—Box 9699, c/o The Electrical Review.

ELECTRICAL Engineer requires change; seeks responsible progressive position; 17 years' experience in general and marine electrical engineering, including installation, manufacture and maintenance.—Box 9685, c/o The Electrical Review.

ELECTRICAL Engineer (26), D.F.H. (hons.), Grad. I.E.E., major in R.E.M.E., desires administrative position with responsibility and scope. Technical sales experience, excellent organisation ability and used to handling personnel. Highest references available.—Box 9691, c/o The Electrical Review.

ELECTRICAL Engineer (31), M.Sc., A.M.I.E.E., general design and maintenance experience, wishes to enter development or sales in light engineering field, preferably electro-medical.—Box 9744, c/o The Electrical Review.

ELECT. Mech. Eng. (24), 5 yrs. general apprenticeship, 1 yr. test room, 18 mths. D.O. on F.H.P. motors, 18 mths. R.N. elect. artificer, requiring D.O. jig and tool or planning.—Box 9733, c/o The Electrical Review.

ELECTRICAL Wholesalers' Manager, 27 years' experience, extensive knowledge in all branches, supplies and correspondence, desires change with well-known firm. Not afraid of responsibility. Good connection with the retail trade. Replies to—Box 9737, c/o The Electrical Review.

ELECTRICIAN (43), fully exp. all branches electrical installation work, estimating, costing and office routine, seeks supervisory position, or as representative. Town or country (own car).—Box 9747, c/o The Electrical Review

EX-Squadron Leader R.A.F. (25), B.Sc. (Electrical Engineering), First Class Honours, seeks progressive post in or near London with prospects in Technical Sales or Production side of light electrical engineering company. Technical, organisational and executive experience in R.A.F. Radar work. Widely travelled. Willing to undergo period of training.—Box 9683, c/o The Electrical Review.

FARMER and M.I.E.E. with many years' experience in the electricity supply industry would consider appointment as consultant or adviser to a supply authority, electrical manufacturer or cable firm on rural electrification matters.—Box 2977, c/o The Electrical Review.

IF you want a Chief or Assistant Engineer (age 39, B.Sc., A.M.I.E.E., etc.) for a telephone operating company abroad please write—Box 9745, c/o The Electrical Review.

MAN with 30 years' experience London wholesale trade, dealing with orders and assisting buying, would be glad to hear from interested houses in London and Home Counties area.—Box 9686, c/o The Electrical Review.

TECHNICAL Assistant (33), requires position in agricultural dept. of supply company, interviewing, estimating and supervising, good practical and technical experience.—Box 9716, c/o The Electrical Review.

VACUUM Flasks. Production Engineer, experienced in big scale output England and Continent, seeks post.—Box 9700, c/o The Electrical Review.

FOR SALE

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

STALYBRIDGE, HYDE, MOSSLEY & DUKINFIELD TRANSPORT AND ELECTRICITY BOARD

Sale of 33-kV Transmission Lines and Cables

THE Board invite tenders for the purchase, recovery and removal of the following transmission lines and cables which were installed during 1940/1941 :—

Item 1.—820 yards 0.15 sq. in. copper, 33 kV, single circuit overhead line, supported on 6 lattice steel P.B. masts, with 0.10 sq. in. continuous earth wire. Average span length 410 ft. Suspension type insulators.

Item 2.—820 yards line as Item 1 but with addition of 12 core P.I.L.C. served auxiliary pilot cable, supported on 7/8 SWG galvanised steel catenary wire.

Item 3.—2,080 yards 0.075 sq. in. copper 33 kV single circuit overhead line, supported on 16 lattice steel P.B. masts with 0.075 sq. in. continuous earth wire. Average span lengths 415 ft., suspension type insulators.

Item 4.—2,080 yards line as Item 3 but with addition of 16 core P.I.L.C. served auxiliary pilot cable supported on 7/8 SWG galvanised catenary wire.

Item 5.—Approx. 3,000 yards 3 core 33 kV 0.1 sq. in. type HSL single wire armoured and served cable laid direct in the ground with concrete protection covers.

Item 6.—Approx. 1,500 yards 16 core (12 × 3/.029 + 2 prs. 20 lb. tel.) P.I.L.C. steel wire armoured and served auxiliary pilot cable laid direct in the ground.

Further particulars and conditions of sale may be obtained on application to the undersigned.

J. HARWOOD LUMSDEN, M.I.Mech.E., A.M.I.E.E., Chief Engineer.

Electricity Offices and Showrooms,
Tame Valley, Stalybridge. 3020

COUNTY BOROUGH OF SOUTHEND-ON-SEA

THE Corporation invite tenders for the undermentioned redundant Horizontal Steam Engine and Generating Set comprising :—

(1) 23-kW, open, 4-pole, Interpolar Compound Generator, No. 85872, by G.E.C., belt-driven by
(2) 30-h.p., Horizontal, Single-cylinder, Non-condensing Engine.
(3) Switchboard and accessories thereon.

The set may be inspected at Southend Municipal Hospital, Rochford, by appointment with the Resident Mechanical and Electrical Engineer.

The successful tenderer will be required to dismantle and completely remove the set at his own expense within three months after a prescribed date. Sealed tenders, addressed to the undersigned and endorsed "Redundant Generating Set," are to be delivered to this office not later than 12 noon, 18th November, 1946.

No tender will be received except in a sealed envelope, which shall not bear any name or mark indicating the sender. The Corporation do not bind themselves to accept the highest or any tender.

ARCHIBALD GLEN,
Town Clerk.

Municipal Buildings,
Clarence Road, Southend.
October, 1946. 3000

MINISTRY OF WORKS

ELECTRICAL EQUIPMENT. At the South End Power Station, Stromness, Orkney, 2 × 26 kW, 1 × 25 kW, 1 × 12 kW Generators complete with Diesel Engines. 1 × 40 h.p. Diesel Engine. 1 National Gas Engine Compressor, 1 Ruston Air Receiver, 2 Water Pumps and 1 Ventilation Fan.

Permission to view and Forms of Tender may be obtained on application to The Secretary (A.S. Scotland 5), Ministry of Works, 122, George Street, Edinburgh. 2994

A.C. Motors for sale: 220-h.p., 575-r.p.m., 400/3/50-cycles, Crompton slip-ring; 100-h.p., 580-r.p.m., 400/3/50-cycles, G.E.C. slip-ring; 100-h.p., 730-r.p.m., 500/3/50-cycles, E.C.C. slip-ring; 75-h.p., 730-r.p.m., 500/3/50-cycles, Siemens slip-ring; 60-h.p., 480-r.p.m., 400/3/50-cycles, B. West slip-ring; 35-h.p., 960-r.p.m., 400/3/50-cycles, Parkinson slip-ring; 40-h.p., 480-r.p.m., 400/3/50-cycles, L. D. & M. squirrel-cage; 28-h.p., 488-r.p.m., 500/3/50-cycles, B.T.H. slip-ring.—Newman Industries Limited, Yate, Bristol. 3062

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

A number of Dynamos from 10-80 kW, 110 v. and 220 v., for belt drive or coupling of various descriptions available.—The Electroplant Co., Wembley, Middx. 3011

A number of unused portable petrol-driven Welding Sets, suitable for use with electrodes, sizes 6 to 12.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3057

A.C. Motors, 1/75th h.p. to 5 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3. 57

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). 102

A.C./D.C. 5-valve Superheterodyne Sensitive 3-wave Band Receiver. Excellent tone. Attractive modern cabinets in "Plastele" or polished wood. £16 16s. Usual trade terms and facilities. Early delivery. Trade only.—Morgan, Osborne & Co. Ltd., Southview Road, Warlingham, Surrey. 110

ALMOST new Diesel Generating Set, built 1944, 6 cyl., vert., cold start, on bed, coupled to dynamo, 70 kW, 220 v., 1,000 r.p.m. Latest design.—Box 3013, c/o The Electrical Review.

ALTERNATING Petrol/Paraffin Sets, 400/3/50, direct coupled on bed. First-class order. 25 kVA, 35 kVA, 50 kVA, 70 kVA. Fully tested, for quick delivery.—Electroplant Co., Wembley, Middx. 3012

APPROX. 100 Motors, 1-50 h.p., numerous voltages. For further particulars apply—Box 2984, c/o The Electrical Review.

ATTRACTIVE Lampshades, exclusive designs available for the Christmas trade. Prompt deliveries.—The British Bright Light Co. Ltd., 266-268, Battersea Park Road, S.W.11. 2734

AUDAX Ltd. now have available an extensive range of new season's designs of high-class Lamp Shades in Plastics and Parchment, together with a range of Table Lamps. Prompt delivery available to all parts of the country. Enquiries particularly invited from wholesalers and electrical factors.—84, Preston Road, Brighton (Tel. Preston 5565). 9583

B. & W. Water Tube Boilers for disposal. Two 50,000 lbs. evaporation, 310 lbs. w.p.; two 50,000 lbs. evaporation, 220 lbs. w.p.; four 30,000 lbs. evaporation, 260 lbs. w.p.; one 20,000 lbs. evaporation, 175 lbs. w.p.; one 12,000 lbs. evaporation, 200 lbs. w.p.; two 16,000 lbs. evaporation, 190 lbs. w.p.; one 9/10,000 lbs. evaporation, 200 lbs. w.p. We install complete including brickwork. Economisers, Pumps, Piping, Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough. Telephone, Middlesbrough 2622. 32

BARCRO Drawing Storage Eliminator. One complete Barcro Drawing recording and reproduction equipment in full working order, comprising: photo copying and projection unit, with frame to take drawings up to 40" × 30", washing and developing tanks, print and film dryer, material storage cabinet, safelights, electric heater, electric timer, and other accessories. Immediate delivery on completion of sale. The complete equipment is in first-class condition and can be inspected as a working unit on application to—Box 3071, c/o The Electrical Review.

BATTERY Chargers for home and export, 4 models. 2-6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659. 97

BEEANTEE Festoon Striplight Holders, made of X20 Bakelite, for use with 7/.029 T.T.R. cable, require no tools or screws for wiring. Immediate delivery of any quantity. Passed by the fire authorities. Used by corporations and supply companies all over the world. Large quantities of British made Electric Lamps and Cable always in stock.—The Beeantee Illuminations (London) Ltd., Temporary Address, 6, Upper Street, Islington, London, N.1 (Phone, Canonbury 4555). 71

B.T.A. A comprehensive service is now available for all classes of tools and equipment for the accumulator trade.—B.T.A., 246, Cavendish Road, London, S.W.12. Tel.: Balham 6691/2. 92

BURDETTE & Co. Ltd. stock Reconditioned A.C. and D.C. Motors and Starters equal to new. Day and night service.—Stonhouse St., Clapham, S.W.4. Mac. 4555. 17

CLEFA "Hall Lanterns, Pendant Fittings and Wall Brackets; also Shade Makers, Gymbals, etc. Actual manufacturers.—Central London Engineering (Fabrications) Ltd., 120, Old Street, E.C.1 (CLE. 2586). 108

COUNTRY House Lighting Set, comprising 5-h.p. Petter semi-diesel, 3-kW generator, 110-volt Premier battery, switchboard, complete. All in first-class order. £100. Purchaser to undertake dismantling and transport.—Louis G. Ford Ltd., Eastbourne. 2998

D.C. Generator, 100 kW, 440 v. D.C. Motors, 220 v., one each ½, ¾, 2, 4, 7, 10, 15, 40 h.p., two 5 h.p.—Box 2971, c/o The Electrical Review.

D.C. Motors: 1 B.T.H., ½ h.p., 100/125 v., 1,770 r.p.m., series wound. 1 Addresograph Multigraph, 100 v., ¼ h.p., 1,425 r.p.m., shunt wound.—Cox-Walkers Ltd., Darlington. 2962

D.C. Motors, new, 200/230 volts, 1,400 r.p.m.: 8 to 31½ h.p., also 110 volts, D.C., 21 h.p., several available with starters.—Stewart Thomson & Sons (L'pool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Telephone Number, Bootle 2697) or 28, Victoria Street, Westminster, London, S.W.1 (Telephone Number, Abbey 2101). 96

DYNAMIC Balancing Machines, Production Type, supplied in four standard sizes, accommodating electric and other rotors weighing from a few ounces up to about 5 cwt. Portable Dynamic Balancing Equipments for larger rotors of all kinds and weights, adapted for balancing operation on test-stand or on site. Early delivery.—C. F. R. Giesler Ltd., River Place, Essex Road, London, N.1. 2982

ELECTRIC Lamps, Flashlights, Flashlight Bulbs, Portable Fires, Accessories. Prompt delivery.—Suplex Lamps Ltd., 50, Gray's Inn Road, London, W.C.1. Holborn 0225. 116

ELECTRIC Motors, 1/3 h.p., 3,000 r.p.m., D.C. 110 volts. Also 220 volts. Stock delivery, £6 each.—John Steel, Clyde Mills, Bingley, Yorks. 84

ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

ELECTRIC Motors, A.C. and D.C. We supply all types and sizes of electrical machinery. Slow speed reduction gears can be supplied to customers' requirements with short deliveries. Send your enquiries to—Be-Be Engineering, 3, Retreat Close, Kenton, Middx. (Wordsworth 4928). 42

ELECTRIC Storage Battery, 54 cells, by D.P. Battery Co., Bakewell, Derbys., together with 7-h.p. Lister Engine. Owner now on mains supply.—Strutt & Parker, 2, High Street, Chelmsford. 2963

ELECTRIC Welding Plant, Engine and Electric, A.C. driven, 300 amps. output, complete with weather-proof covers.—Box 34, c/o The Electrical Review.

EXHAUST Fans, 2-18", new, 3-ph., 415 v., fitted in short circular section air trunk. £20 ea.—Smith & Hammond Ltd., 5, Buckingham St., W.C.2. TEM. 5063. 2964

FLUORESCENT, from stock. 18", 24", 36", also 5 ft. 80-watt Trough and Flush with Constead unit. Complete with tubes.—Box 9731, c/o The Electrical Review.

FLUORESCENT Chokes, 80 watt. Low noise level, for satisfied users; long life, for low replacement costs; characteristics matched with lamp, for rated lamp life and light output. Prompt deliveries.—Micramatic Ltd., Meico Works, Congleton, Cheshire. 73

FLUORESCENT Fittings. If he is electrically wise it's Scemco he buys. For details of fluorescent fittings apply—Scemco Ltd., 6/7, Soho Street, London. Tel. Ger. 2034. 121

FLUORESCENT Lighting. Constead Units for sale. Dispenses with all starter gear and gives instantaneous lighting, prevents maintenance worries, each unit guaranteed. Apply—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. GER. 2034). 117

FLUORESCENT Lighting in several designs can be supplied from stock to meet all requirements. Send your enquiries to—John Phillips & Co. (Electrics), 31, Fortune Green Road, N.W.6 (Park 4772). 3014

FLUORESCENT Lighting. Special offer, wholesalers only: Fittings without tubes. Minimum order, 12 of each type: 20-gauge stove enamelled white, fitted Constead or ballast unit control gear, Industrial Trough Unit, £5 15s. each nett; ditto, Built-in Flush to Ceiling Unit, £5 10s. each nett. Immediate delivery.—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. Ger. 2034). 120

FLUORESCENT Lighting: 18"-15 w., 24"-25 w. and 36"-45 w. Fittings, complete with tubes. Colours: White, Warm White, Daylight and Pink.—Scemco Ltd., 6/7, Soho Street, London, W.1 (Tel. GER. 2034). 118

FLUORESCENT Lighting Fittings. Extensive range, including Trough and Flush type, fitted with "All in One" "Constead Unit." Delivery 7 days, with tubes. Write—Scemco Ltd., 6/7, Soho Street, London, W.1. Phone, GER. 2034. 100

GEARED Motors, 1 h.p., 3-phase, 400/440 v., 50 cycle, with or without magnetic brakes, 400 and 430 r.p.m.; also 1-h.p., 3-phase, s/cage, 940-r.p.m. flange mounting and D.C. Motors and Generators.—Burdette & Co. Ltd., 150, Clapham Manor St., S.W.4 (Macaulay 4555). 2903

GEORGE Cohen, Sons & Co. Ltd. for guaranteed Electrical Plant, Motors, Generators, Switchgear, etc.—Wood Lane, London, W.12 (Telephone, Shepherds Bush 2070) and Stanningley, near Leeds (Telephone, Pudsey 2241). Established 1834. 27

HORIZONTAL Motorised Miller, 8" travel and 8" rise and fall; pedestal drill belt drive four speeds up to 3 morse taper.—Box 2970, c/o The Electrical Review.

HUMIDITY Control Cabinet with Transformer, and N. & Z. Temp. Hum. Recorder, £100; Testing Unit complete, £80; Laboratory Table complete, sink, taps, plugs, drawers, shelves, etc., £80. Nearest offers accepted.—Box 2929, c/o The Electrical Review.

INSTALLATION Tester, 500 v. Record Minor, £11. From stock.—Robins Electrics, 222 & 222b, West End Lane, N.W.6. 83

JUNCTION Electric Irons, superior design and quality, supplied with suitable stand. Also Junction Nickel-plated Torch Cases. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 49

LADDERS, single and extension, from—Ramsay & Sons (Forfar) Ltd., Forfar. 9004

LARGE number of Plating and Anodising Generators, up to 1,200 amps, for the most part unused. Send requirements to—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 3056

LARGE range of toasters, fans, portable and wall electric fires, radiators, convector heaters, floor standard and table lamps, electric irons (heat controlled and others), vacuum cleaners, hair dryers, novelty bowl fires, boiling rings, electric kettles, immersion heaters. (Radios very shortly available.) Large range of torch cases, cycle lamps and all types of lighting and H.T. batteries, etc. Detailed list and catalogues available. Place your orders in good time.—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Phone, Victoria 9550/1441. Inland Telegrams, "Beebats, Sowest, London." 66

LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers and Telephones.—214, Queenstown Road, Battersea, S.W.8. Telephone, MACaulay 2159. Nearest Rly. Sta.: Queen's Road, Battersea (S.R.). 18

MONOMARK. Permanent London address. Letters re-directed. 5s. p.a. Write—BM/MONO53, W.C.1. 68

MOTOR Generator Sets and Convertors, all sizes and voltages from ¼ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 28

MULTI-Range (Eleven) A.E.G. Millivoltammeter, plush lined carrying case, condition as new, £27.—Allsop, Westfields, Bakewell, Derbyshire. 9730

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches.—Stilwell & Sons Ltd., 152, Far Gosford Street, Coventry. 14

NEW or Secondhand A.C./D.C. Motors can be supplied from stock or at short notice. Specialists in rewinds and repairs. Send your requirements to—John Phillips & Co. (Electrics), 31, Fortune Green Rd. N.W.6 Park 4772). 3015

NEW 18-c. Gold Chronographe Wrist Stop Watch, split second timekeeper, calibrated 1/1,000 sec. flyback, etc., etc. (cost 125 guineas), superb looks and performance, guaranteed, £65; Eversharp (U.S.A.) 14-c. Gold Streamline Model Fountain Pen, £12 10s.; ditto Pencil, £8 10s.—B. W. Thomas, 40, Kensington Park Gardens, London, W.11. 8646

OSMOR Radio Heart equals complete first-class 5-valve Superhet, positively only small condensers and resistances to find. Super-efficient components. Building instructions, £5 16s. Cabinets. Trade invited.—Morgan Osborne Ltd., Southview Rd., Upper Warlingham 2560, Surrey. 101

PHONE 98 Staines. 90-kW Ruston Diesel Set, 110 vo. D.C.; 25-kW Mirrlees ditto, 110 vo.; 7/9-kW Ruston ditto, 110 vo.; 5-kVA Ruston ditto, 400/1/50; Weir Feed Pump, 8½" × 6" × 13".—Harry H. Gardam & Co. Ltd., Staines. 60

PLATING Generators, unused, several ranging from 350 to 700 amps., 6 to 12 volt, plain or with A.C. or D.C. motor drive. Particulars from—Stewart Thomson (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Bootle 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 63

ROTARY Converters, 200-kW, 6,600/3/50 input, 230 volts, 2-wire D.C. output, complete with Transformer and switchgear, seen running in Liverpool. 2,000-kW, 6,600/3/50 input, 418/462 volts, three-wire D.C. output, complete with transformers, starting panels, D.C. machine panels. First-class condition. Two sets available.—Stewart Thomson & Sons (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Bootle 2697); or 28, Victoria Street, London, S.W.1 (Abbey 2101). 72

REBUILT Motors and Generators. Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size. Send us your enquiries. Over 1,000 ratings actually in stock here.—Dynamo & Motor Repairs Ltd., Wembley Park, Middlesex (Telephone, Wembley 3121, 4 lines); also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham (Telephone, Northern 0898). 26

RECONDITIONED Sectional Nissen Huts and other ex-Government buildings for sale. Several available ex stock, Nissens, 36' × 16', £65-£73, delivered. No licence required. Write for further details or call to view prototype erected at—J. Thorn & Sons Ltd., Box 80, Brampton Road, Bexleyheath, Kent. 47

ROTARY Converters in stock, all sizes; enquiries invited. — Universal Electrical, 221, City Road, London, E.C.1. 16

SACKS and Bags in excellent condition for all commodities, as low as 4d. each. Write—John Braydon Ltd., 230, Tottenham Court Road, W.1. Tel. No. Museum 6972. 79

SPIRAL Elements for electric fires, boiling rings, and other appliances, supplied to order.—Electrothermal Engineering Ltd., 270, Neville Road, London, E.7. 54

SPIRALS, first quality, 500, 600, 750 and 1,000 watt, all voltages, for immediate delivery.—Box 59, c/o The Electrical Review.

SPIRALS, 230/50 volt, 1,000 watts, 106s.; 750 watts, 80s.; 600 watts, 60s. per gross, carriage paid.—Box 9675, c/o The Electrical Review.

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write — Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

STEAM Generating Plant. The following is a selection of sets available in our comprehensive stock: 2,000-kW B.T.H. Turbo-Alternator, 6,600/3/50, 180/210-lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 1,250-kW Brush Ljungstrom Turbo-Alternator, 400/3/50, 200 lbs. pressure, complete with surface condenser and all auxiliaries, seen running. 750-kW Adamson/Mather & Platt High-pressure Pass-out Turbo-Generator, 200-lbs. initial steam pressure, passing out 25,000 lbs. per hour at 80-lbs. pressure, 500 volts, three-wire D.C., with balancer, complete with surface condenser and all auxiliaries. First-class condition. Full particulars from—Stewart Thomson & Sons (Liverpool) Ltd., Fort Road, Seaforth, Liverpool, 21 (Tele. No. Bootle 2697); or 28, Victoria Street, Westminster, London, S.W.1 (Tele. No. Abbey 2101). 98

SUPERIOR Type Builders' Ladders now in production; also Steps, Trestles and Extension Ladders. Phone—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363/4. 15

SURPLUS D.C. Electrical Equipment for disposal. Generating Set, 90-b.h.p. W. H. Allen High Speed Steam Engine coupled to 60-kW Dynamo, 230 volts D.C.; Generating Set, 20/22-h.p. Cold Start Crossley Diesel Engine with 12.8-kW Dynamo, 230 volts D.C.; Electric Motor, ½-h.p. B.T.H., 230 volts D.C., with Starter. Write—Naylor Bros. (Clayware) Ltd., Denby Dale, Near Huddersfield. 2978

SURPLUS Disposal—50% discount. R.1 Lead Alloy Sheathed Cable: 2 drums 300 yds. 37/083, 1 drum 100 yds. 61/093, 3 drums 500 yds. 91/093, 7 drums 1,200 yds. 127/093. T.R.S. Single Core 660 volt Cable: 12 coils 3,000 yds. 7/064, 3 drums 5,000 yds. 19/052, 5 drums 1,400 yds. 19/064. All original makers' packings. Must be cleared. All or any offers considered.—Electrical Agencies (Belfast) Ltd., College Street, Belfast. Phone 24813. 2983

SWITCHGEAR: Westinghouse oil-immersed, draw out Switches. Ten for sale, various sizes.—Norman E. Potts (Birmingham) Ltd., 105, Alcester Road South, Birmingham, 14. 9750

UNUSED D.C. Motors: fifteen 21 h.p., 220 volt; six 21 h.p., 105 volt, and many others.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3058

USED Double Flanged Bobbins, good condition, 2,000 gross approx. Measurements 3¼" overall, 3¼" traverse, 3" diameter flange. Will sell all or part.—Joseph Harari, 42, Whitworth Street, Manchester. 99

VACUUM Cleaner Parts. Hoses, braided, all diameters. Commutators, bearings, fans, carbon brushes, driving belts, brushes, attachments and fittings for all makes. Wholesale only.—Vacuum Cleaner Supplies, 543, Moseley Road, Birmingham, 12. 80

WE have in stock Cat. No. W30 "Bill" 30-amp. 3-way Teak Fuseboards. Also ¾" entry square surface Ironclad Switchboxes at 100/- per gross.—Rands & Co. Ltd., 34, Victoria St., S.W.1. Tel.: Abbey 5974. 3002

WEE Meggers, Evershed, 500 v., 20 meg., in carrying case, £12 5s. 6d., ex stock (new).—Robins Electric, 222, West End Lane, N.W.6. 82

2 Reconditioned Kango Electric Hammers, 200/250 v., in perfect working order. Price £20 each.—City Electrical & Engineers' Supply Co., 77, Minories, E.C.3. 2740

5-kW and 2½-kW, 230/250-volt D.C. Generating Sets, complete with 4-cylinder, 10-h.p. Austin Engines, with petrol tanks, radiators, fans and switchboards. Large number available.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 103

15-kW portable Diesel-driven Generating Set, comprised of vertical 4-cylinder Dorman Diesel Engine, 1,000 r.p.m., coupled to 15-kW Alternator, 400/3/50, complete with Switchboard Radiator and all accessories (3 available). Full details—B.C.S. (Engineers & Contractors) Ltd., Central Offices, Taffs Well, Cardiff. Tel. Taffs Well 296. 2826

50-kW Alternator by E.C.C., 3-phase, 50 cycle, 415 volts, 750 r.p.m., direct-coupled exciter, v-rope drive, complete with control panel.—Box 9727, c/o The Electrical Review.

250-kW Rotary Converters (2), with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts; also A.C. and D.C. Motors, Switchgear, Generating Sets, Welders, etc.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 36

440-volts, 3-phase, 50-cycles Motors, standard r.p.m., slip-ring. Two 90-h.p. Metro-Vickers; two 50 h.p.; one 40 h.p.; one 20 h.p.—Norman E. Potts (Birmingham) Ltd., 105, Alcester Road South, Birmingham, 14. 9749

2,500-kVA Met.-Vick. outdoor type Transformer, input voltage 22,000 or 11,000 volts, output 6,000 volts, new 1931 (2 available); 100-kVA Westinghouse indoor single-phase Transformer, input voltage 6,600, output 400 volts, new 1921 (3 available). Full details—B.C.S. (Engineers & Contractors) Ltd., Central Offices, Taffs Well, Cardiff. Tel. Taffs Well 296. 2827

5,000 good strong Crates, inside measurements 29" × 9½" × 9½", ¾" thick, battened all round, at 1s. 9d. each, ex works.—K. Goldser & Sons, 14a, Rectory Square, London, E.1 (Tel. Stepney Green 2550). 75

ARTICLES WANTED

A.C. Generating Set, gas or petrol driven, 200 kVA, 400/3/50.—Box 2760A, c/o The Electrical Review.

A.C. Motors, all sizes, burnt out machines acceptable providing mechanically sound.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3060

A.C. Motors urgently wanted, any condition, 400/3/50 type, sizes from 1 to 20 h.p., speeds 1,500 and 1,000. State price.—Bowie Electrical Service, Roscoe Street, Scarborough (Tel. 1264). 2881

A.C./D.C. Motors wanted urgently, all sizes and voltages. Best prices offered.—John Phillips & Co. (Electrics), 31, Fortune Green Road, N.W.6 (Park 4772). 3016

ACCUMULATOR Plates (old) and lead Peroxide; as actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased.—Elton, Levy & Co. Ltd., 18, St. Thomas Street, S.E.1. Hop 2825-6. 39

ALTERNATOR, 250/300 kVA, 400/3/50, 375 r.p.m.—Box 2760, c/o The Electrical Review.

CELLULOSE Acetate Offcuts urgently wanted. Send samples and prices to—Box 107, c/o The Electrical Review.

CONNECTORS, 2-way, porcelain, 50/60 amps., suitable for mounting in steel boxes, 6" × 4" × 2".—Box 9736, c/o The Electrical Review.

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call—Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

FIRE Bar Elements (Flat), 9" × 3", 1 kilo.; also 5 to 15-amp. Switches. Large or small quantities. Offers to—Supreme Electrical Manufacturers, 3, Downs Road, Epsom, Surrey (Phone, Epsom 1358). 9712

FLUORESCENT Lamps, 5 ft., urgently required, any quantity, retail prices paid. Collected London area.—Box 111, c/o The Electrical Review.

LAMINATIONS, types 75A.4A., required in substantial quantities. Small quantities also considered.—Cornercroft, Fallibroome Road, Macclesfield. 95

ONE Alternator required, 3-phase, 50 cycles, 400 volt supply, 250 kW rating preferred. Required for rope drive, speed not to exceed 750 r.p.m. Overall length including rope pulley and outer bearing not to exceed 10 ft.—Box 2993, c/o The Electrical Review.

QUANTITIES Enamelled Copper Wire, 42 to 22 gauge, also Braided Bronze, 16 wires, .0065" dia., 5/15 amp. plug sockets, other accessories, Cast Iron Switch Fuses, 10/60 amps.—Box 2969, c/o The Electrical Review.

QUOTATIONS wanted from founders for electric iron sole plates.—Box 2949, c/o The Electrical Review.

QUOTATIONS, with samples, wanted from manufacturers able to give early delivery of plastic handles for electric irons from stock tools.—Box 2948, c/o The Electricall Review.

REQUIRED: Mica Electric Iron Elements; Toaster Elements; Spirals, nichrome wire; Cotton-covered Flexes; Brass, Copper and Steel Sheets, min. size 9" × 6"; Alu. Strip, ½" × ½"; Machinery, new and used; Timber; Glazing; Rubber Grommets; Asbestos; Switches; Iron Connectors, etc., etc. Offers to—British Diamix Ltd., Metrum Works, Beatty Street, N.W.1. Euston 5951. 44

URGENTLY required, 3 to 3½ kW Compound Wound Dynamo, 50/70 volts, 1,500 r.p.m. Particulars to—Electrical Engineer, c/o N. Corah & Sons Ltd., Leicester. 3042

URGENTLY wanted for Power Station extension, one 25,000/30,000 lbs. capacity Babcock & Wilcox Water Tube Boiler, 200 lbs. working pressure, temp. 580° F., complete with superheater, chain grate stokers, etc.—Box 2932, c/o The Electrical Review.

WANTED, D.C. and A.C. ball-bearing Motors. Full details to—Britannia Manufacturing Co, Ltd., 22/26, Britannia Walk, London, N.1. 29

WANTED for works change-over the following A.C. 400/3/50-cycle Motors and Starters: one 25-h.p., 960-r.p.m. slip-ring; two duplicate 25-h.p., 960-r.p.m. squirrel-cage; two 12-h.p., 960-r.p.m. squirrel-cage.—Box 3063, c/o The Electrical Review.

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

WANTED. Well-known Wholesalers in N.W. Lancs are prepared to make spot cash purchases of switchgear, domestic appliances and regular or clearance lines of all requirements for the electrical contracting trade. Offers in confidence to—Box 3031, c/o The Electrical Review.

1 to 1 h.p., 220 and 110 volt Motors, or equivalent 2 Dynamos.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3059

1-h.p., 230-v. A.C. or D.C. Motor.—Universal Electrical, 221, City Road, London, E.C.1. 25

5-ft. Fluorescent Tubes, any quantity, new, retail prices, carriage at our expense.—Box 8654, c/o The Electrical Review.

8-volt or 10-volt, 2,000 to 2,500 amp. Generating Set, complete with exciter, starter and motor, suitable for 440-volt, 3-phase, 50-cycle supply.—R. B. Pullin & Co. Ltd., Phœnix Works, Great West Road, Brentford, Midsx. 3037

24 15-amp. Interlocking Double Pole Switch Plugs in iron boxes, galvanised, but not essential; 36 one-gang square sunk Dolly Switches in iron boxes; 24 two-gang ditto; 24 three-gang ditto; 1" Galvanised Tubing. Licence available.—Bowie Electrical Service, Roscoe Street, Scarborough (Tel. 1264). 2880

250-ft. Tubular Heaters, 12 to 14 ft. lengths.—Allen & Son, 74, Leonard Street, E.C.2. 9715

300 approx. amp.-hour Storage Cells.—Jackson, Pie-in-Hand, Mablethorpe, Lincs. 9740

WORK WANTED AND OFFERED

ALL makes and kinds of Electrical and Radio Measuring Instruments repaired by skilled technicians, A.I.D. approved. All work quoted by return without charge. Also for sale, large variety of Voltmeters, Ammeters, Milli-ammeters, 2" and 2½" dials, reconditioned ex-Air Ministry stock.—C. Gertler, Dept. A, 29-31, Cowcross St., E.C.1 (Tel. Cle. 6783). 9670

ARMATURE, Rotor, Stator Rewinds and Repairs, from fractional to 100 h.p. With the return of our old staff and extended premises we can offer prompt, reliable service. —T. A. Boxall & Co., Horley, Surrey (Phone 654). 2727

ARMATURE Winding: Vacuum Cleaners, etc., single or quantities.—Vac, 80, Cranbrook Road, Ilford. 9612

CAPACITY available for light assembly, December, January. Some machining, London area.—Box 91, c/o The Electrical Review.

CAPACITY required for surface grinding and linishing of electric iron sole plates.—Box 2950, c/o The Electrical Review.

COIL Winding Capacity! Experimental work carried out if material is supplied. Field Coils, immediate delivery.—Ajax, 7, Chesterfield Rd., Finchley, N.3. 9748

DRAFTING—tracing, drawing, detailing of all kinds, by experienced draughtsman. Prompt service. Reasonable charge.—W. Day, 98, Hansons Bridge Road, Erdington, Birmingham, 24. 9743

ELECTRICAL Engineers seek designs for production of small A.C. starters, 3-phase and single-phase, automatic push-button type. Would also consider manufacture of any light electrical device that can be produced at competitive prices. Write first instance—Box 2795, c/o The Electrical Review.

ENGINEERS, Precision, South England, seek manufacture of electrical, mechanical or domestic assemblies or components. Press tools, gauges, small stampings, capstan turning, also Internal and External Grinding. Write—Box 74, c/o The Electrical Review.

LAMPSHADE Wires, any design, from own drawings or samples. Enquiries invited.—Regent Wares, 57a, Queen's Road, Walthamstow, London, E.17. 9711

LIGHTING Fittings, Table Lamps, Bedlights, All Types of Shades; home or export orders undertaken; shades made to customers' requirements. All goods are in the most exquisite and up-to-date designs and finishes. Shades are hand-painted in various designs to suit all customers. Send your inquiries to — Decorshade Ltd., Bromford House, Bromford Lane, Erdington, Birmingham. Tel. No. Erd. 1516. 2744

MACHINING Work, for Centre Lathes up to 6½ in. centres and medium-sized milling (good grade work preferred).—The London Electric Firm, Croydon. Uplands 4871. 56

PRODUCTION capacity required for complete manufacture of newly developed and patented electro-mechanical instruments required in medium quantities. Prototype can be viewed, tooling may be sub-contracted. —Soag Machinery Co., Juxon Street, London, S.E.11. 3067

REWINDING Specialist. For all types of electric motors, stators, armatures, machine tools and vacuum cleaners. Guaranteed work. Any spares supplied and fitted. Trade terms. Prompt service.—W. J. Rich, 85, Egerton Road, Bristol, 7. 8657A

SHOT Blasting, Metal and Paint Spraying. We are able to undertake the efficient and prompt handling of all goods sent for treatment. Large capacity available Enquiries to—Commercial Structures Ltd., Staffa Works, Staffa Road, E.10. 112

TESTING equipment for laboratory and factory designed and manufactured by expert engineers. All types of non-standard equipment for research or mass-production. Free consultations.—Gamma Electronics Ltd., 12, Greenford Road, Greenford, Middlesex. Telephone, WAXlow 3152. 2957

AGENCIES

A reputed Indian firm desires to contact manufacturers and stockists in electrical accessories, fittings, domestic appliances, refrigerators, radios, etc., on commission or buying basis.—Box 9738, c/o The Electrical Review.

ADDITIONAL lines of electrical components and appliances required for distribution throughout the North-West. Please send samples and terms to—Leonard Heys, Faraday House, Henry Street, Blackpool. 3032

AGENCIES required for London, South of England, for the following: (1) Domestic electrical appliances; (2) Brass electrical accessories, switch plugs, etc.; (3) Conduit. Advertisers have clientele with every wholesaler in the territory mentioned. Immediate turnover can be guaranteed. Either commission or buying basis. Post-war arrangements considered.—Box 64, c/o The Electrical Review.

AGENCIES required, South of England, including the London area: (a) Cables; (b) Small Switchgear; (c) Transformers; or any lines suitable for distribution for wholesalers' business.—Box 40, c/o The Electrical Review.

APPLICATIONS invited from interested parties wishing to be appointed as Agents for the Harbilt Electric Truck. Reply to—Harborough Construction Co. Ltd., Harbilt Works, Market Harborough, Leics. 2739

EXPORT Agents, with substantial connections Australia, N.Z., China, Indo China, Siam, Malaya, have good enquiries for electric irons, toasters, fans, etc. Interested manufacturers please communicate early.—Box 9735, c/o The Electrical Review.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered —Box 23, c/o The Electrical Review.

MANUFACTURERS' Agents, with offices London and South Coast, wish to hear of additional lines, including Cables and Domestic Appliances, for sale to corporations, wholesalers and retailers.—Box 9676, c/o The Electrical Review.

MANUFACTURERS of electrical products have opening for agents and distributors, first-class lines, good commission. For the whole of England and part of Scotland.—Wescam Products Ltd., 40, West Campbell Street, Glasgow, C.2. 2986

PATENT NOTICES

PATENT Agents.—A. E. Hill, Chartered Patent Agent, 27, Chancery Lane, London, W.C.2. Tele. Chancery 8444. 65

BUSINESSES FOR SALE AND WANTED

FOR Sale, old-established Automobile Electrical Service Station, exceptional opportunity for power and electric vehicle repairs.—Sheppard, 918, London Road, Leigh-on-Sea. 2823

WANTED to buy as going concern, Factory of 7/15,000 sq. ft. manufacturing light electrical goods of any description. Details in confidence to—Box 2947, c/o The Electrical Review.

EDUCATIONAL NOTICES

ENGINEERING Careers and Qualifications. Both Government and industry have announced and emphasised that young men with technical knowledge and qualifications must receive every chance of rising to the highest posts within their capacity in post-war engineering and allied industry. Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives particulars of the first-class training supplied by the T.I.G.B. for the A.M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., B.Sc.(Eng.), C. & G., etc., examinations in which T.I.G.B. home-study students have gained 44 first places and over 1,000 passes. The Guide covers careers in all branches, Electrical, Mechanical, Radio, Aeronautical, etc.—The Technological Institute of Great Britain, 35, Temple Bar House, London, E.C.4. 77

LATEST A.M.I.E.E. Results. In the recent examinations held by the Institution of Electrical Engineers 477 candidates sat who had taken B.I.E.T. courses. Of these 457 were successful in passing the examinations. We believe this record of 457 successes out of 477 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of technical training which we have laid down. The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination. We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers. We guarantee—"No pass—no fee." May we send a copy of "Engineering Opportunities"? Containing a great deal of useful advice and detailed information on over 200 home-study courses and examinations, this handbook is of very real value to the ambitious engineer. Our highly informative handbook will be sent free and without obligation on request.—British Institute of Engineering Technology (established 1927—over 200,000 students), 12, Shakespeare House, 17, 18 & 19, Stratford Place, Oxford Street, London, W.1. 33

PLASTICS offers particularly good prospects to experienced Engineers with a sound knowledge of Plastics Technology. Authoritative home-study courses are now available in General Plastics and specialised branches of the science. Full details of these courses and the prospects in the rapidly-expanding plastics industry will be found in our handbook "Opportunities in Plastics," sent free on request. British Institute of Plastics Technology (Dept. 301), 17, Stratford Place, London, W.1. 2811

BUSINESS OPPORTUNITIES

AN established firm of mechanical engineers in the Midlands wish to enter into an agreement with or to purchase a small firm manufacturing electric motors. Write in the first place, giving brief particulars, to Box 2985, c/o The Electrical Review.

SCEMCO Ltd., Fluorescent Lighting Specialists, wish to contact manufacturers of electrical equipment and accessories, including "Novelty" and "Improved" appliances. Domestic fluorescent fittings and components of particular interest. When possible complete output will be taken, and full co-operation given in exchange for sole distribution rights. Replies will be treated with strictest confidence.—Man. Director, Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. 119

MISCELLANEOUS

BATTERY Chargers Modernised. Your old Charger made like new by specialists. Conversion from valve to metal rectification. Send for interesting leaflet "Q.D." on this service.—Runbaken Electrical Products, Manchester, 1. 45

HIRE plant to solve your delivery problems. We have set up a Special Hire Dept. where customers can obtain at moderate rates Motors, Generators, Engines, etc., to satisfy their immediate needs. Please send your enquiries, stating approx. hire period, to—G. P. U. Ltd. (Hire Department), Wembley, Middx. Phone: Wembley 3691: 'Grams: Powaguide, London. Maintenance and service stations at Wembley, Huddersfield, Leicester and near Wrexham. 3010

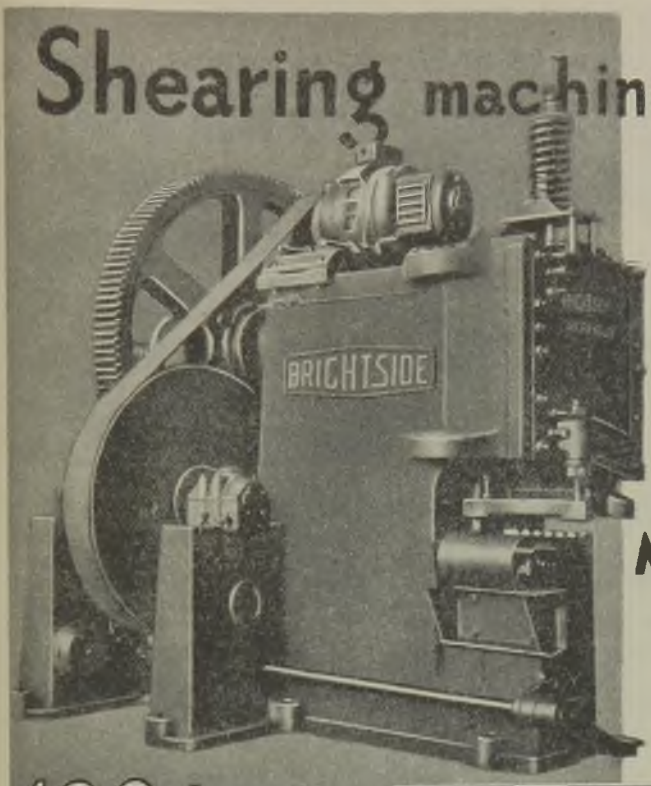
SHORTHAND Typists, Private Secretaries, Clerks, etc. If you are in urgent need of staff, contact Embassy Secretarial Employment Bureau, Excel House, Whitcomb Street, W.C.2 (Abbey 6745; also Riverside 2330). We specialise in efficient personnel. 90

INDEX TO ADVERTISERS

Index to Advertisers

(*Continued on page* 80)

Shearing machine Drives



Whether you need power for the largest press or smallest guillotine, you cannot do better than specify:

METROVICK MOTORS

100 ton

Above: A Metrovick 12 h.p. slip-ring induction motor driving an open gap Brightside shearing machine. It has a 100 ton load for shearing cold bars, is fitted with a semi-automatic clutch to obtain single or continuous cuts, and is belt and spur driven.

550 ton

Right: A 55 h.p. Metrovick Q type motor with totally-enclosed closed air circuit, driving a 550 ton Cowlishaw Walker machine for shearing billets.

METROPOLITAN Vickers ELECTRICAL CO., LTD.
TRAFFORD PARK ··· MANCHESTER 17.

I/A 607

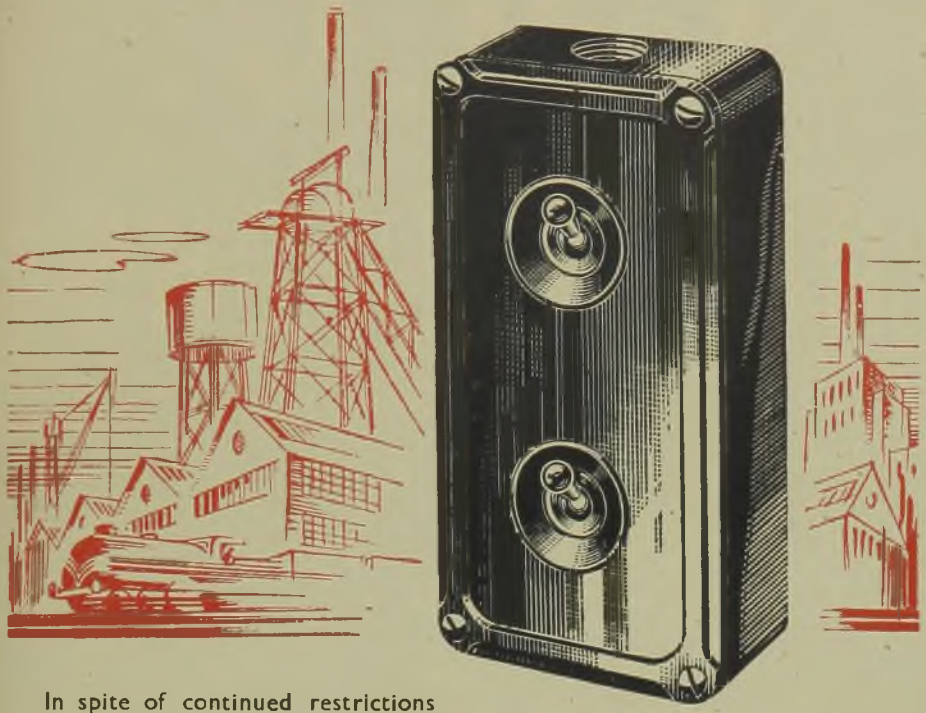
Switch to METROVICK lighting when daylight fades

INDEX TO ADVERTISERS

Index to Advertisers (*Continued from page 78*)

INDUSTRIAL IRONCLAD SWITCH UNITS

POINTS OF PERFECTION



In spite of continued restrictions all available supplies of "Britmac" Electrical Accessories are reaching the recognised Electrical Wholesalers who, we know, are doing their utmost to meet your demands.

Illustrated is the "Industrial" Type Switch Unit with flat lid, Catalogue No. P.1542.

BRITMAC

ELECTRICAL ACCESSORIES FOR ALL INSTALLATIONS

BRITMAC ELECTRICAL CO. LTD.

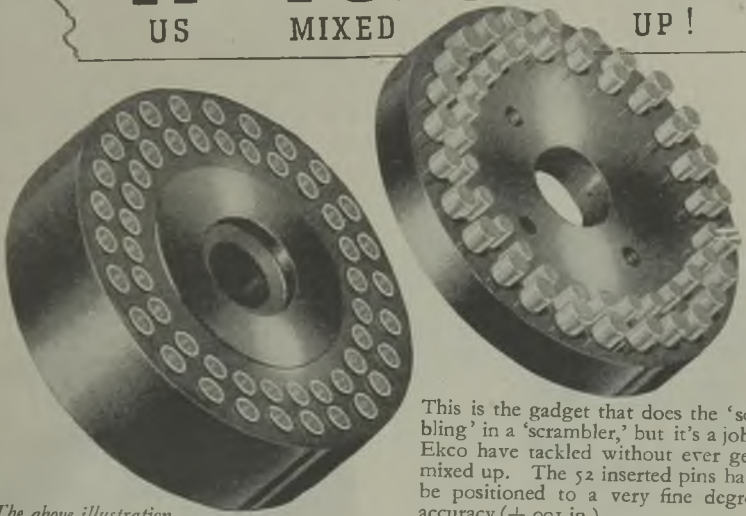
SALES ORGANISATION OF C. H. PARSONS LTD

Head Office. BRITANNIA WORKS · WHARFDALE ROAD · TYSELEY · BIRMINGHAM · 11

Telephone · ACOcks Green 1191 (3 lines). Telegrams : "BRITMAC, BIRMINGHAM"

Glasgow Office : GRESHAM CHAMBERS, 45 WEST NILE STREET, GLASGOW, C.1. Telephone : Central 9106

HTUF THIS RURZ'H EGH DIDN'T GET IF YULGR IB ! US MIXED UP !



The above illustration is actual size.

This is the gadget that does the 'scrambling' in a 'scrambler,' but it's a job that Ekco have tackled without ever getting mixed up. The 52 inserted pins have to be positioned to a very fine degree of accuracy (±.001 in.).

This is because Ekco went through all their 'growing pains' in plastics years ago. Ekco have the experience, the plant and the technicians, in short—the 'know-how.'

Ring Regent 2601 or Southend 49491 about that Thermosetting Moulding job of yours—you'll get expert, impartial attention.

Works: Southend-on-Sea.

E. K. COLE LTD., PLASTICS DIVISION, Dept. ER, 5 VIGO ST., W.1

Do you know when fire will break out in your premises?

Be prepared against such a possibility. Install "National" the most efficient fire fighting equipment on the market and take advantage of our maintenance service to ensure you are always ready to combat the danger wherever and whenever it threatens.

WRITE FOR ADVICE ON YOUR OWN PARTICULAR RISKS

NFP

THE
NATIONAL
FIRE PROTECTION
COMPANY LIMITED,
RICHMOND · SURREY
Telephone RICHMOND 2342-3-4

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

first RADAR

now DISTRENE foil

Radar, one of the most epoch-making inventions of this century, would not have been possible without the help of a material possessing a very low power factor, a high resistance to moisture and great dimensional stability.

DISTRENE Regd. (Polystyrene) was the material that completely met these needs.

Now, in the change over from war to peace, you have your problems of high-frequency radio and electrical insulation. DISTRENE FOIL can help you to surmount them.

In DISTRENE FOIL (Orientated Polystyrene Film) the molecules are specially arranged during manipulation so that the tensile strength is increased by 3 times and the flexibility by 10 times.

Power Factor
0·0002-0·0004
Tensile Strength
10,000 lbs/sq.in.
Thickness
0·001″ to 0·008″

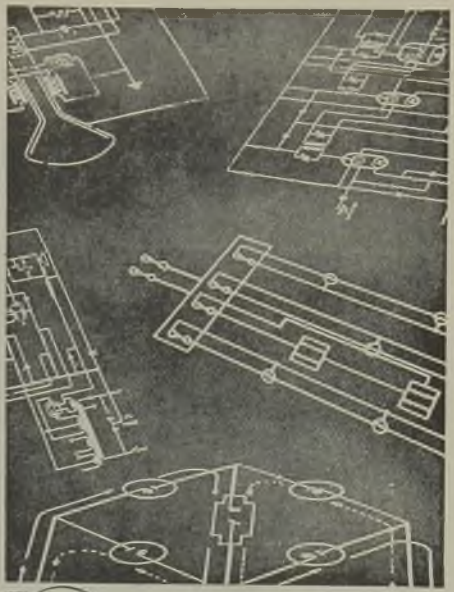
★ ★ ★

BX PLASTICS LTD LARKSWOOD WORKS · LONDON · E.4

Telephone : Larkswood 4491

Branches : King Street Buildings, 1 Ridgefield, Manchester, 2. *Telephone: Manchester Blackfriars 0258* 42 Wellington Street, Sheffield. *Telephone: Sheffield 25517*

Works : London, Manningtree and Dundee



GLENFIELD-LOCKHEED REMOTE CONTROL

THE system is intended for the manual operation from a central position of groups of valves, which may be of widely varying types and sizes and separated by considerable distances. Formerly such remote control has required the use of power-driven units, which are complicated and uneconomical when the operating efforts are within the capacity of manual operation.

We illustrate (top) the application of the Glenfield-Lockheed system to the operation of a ½" Single-Ported "Homeyard" Hydraulic Valve, a 6" Sluice Valve and an 8" Balanced Disc Valve, the Control Panel being provided with different types of indicators showing the positions of the respective valves.

We also show in greater detail a manual transmitter and selector-valve block for the control of six separate valves, from which the compact nature of the installation will be observed.

Please write for full particulars of this new and efficient development.

Glenfield

GLENFIELD & KENNEDY, LIMITED, KILMARNOCK

Printed in Great Britain at THE CHAPEL RIVER PRESS, Andover, Hants, and published by ELECTRICAL REVIEW, LIMITED, at Dorset House, Stamford Street, London, S.E.1.