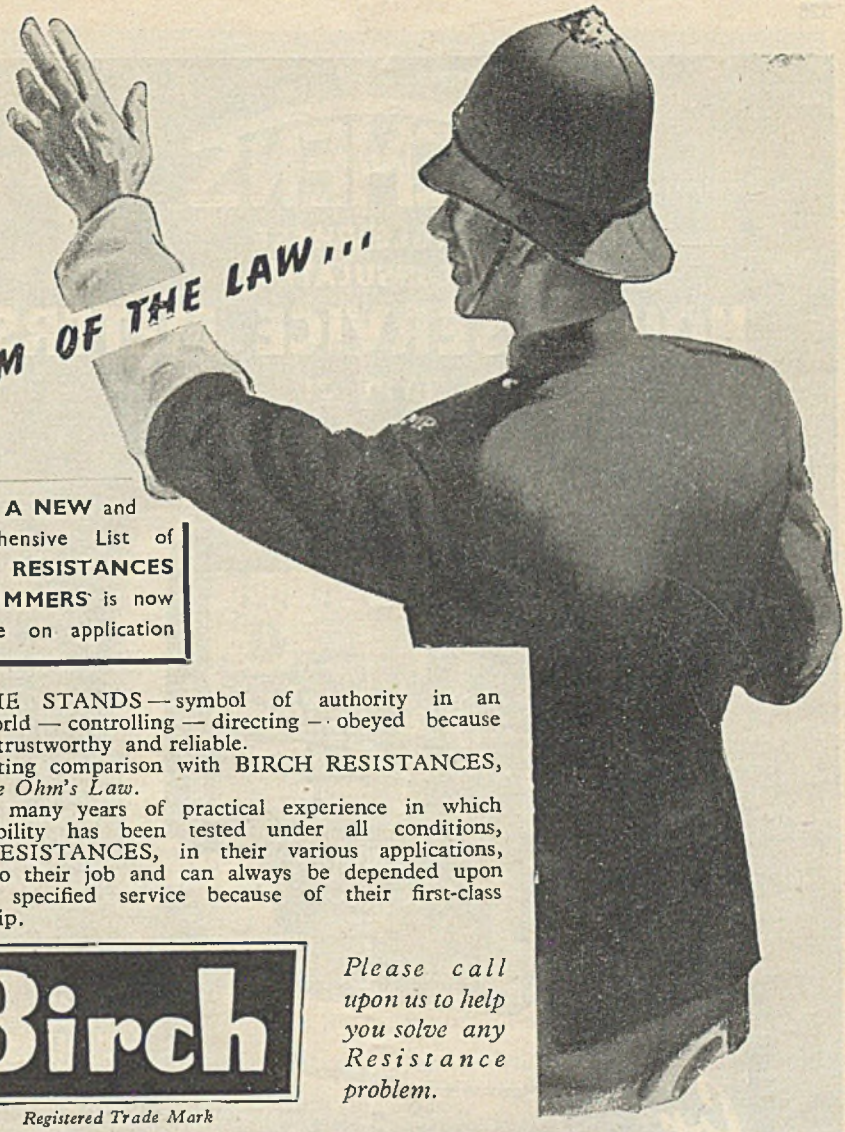
THE
ELECTRICIAN

THE TECHNICAL NEWSPAPER OF THE ELECTRICAL INDUSTRY

7 MARCH, 1947
SIXPENCE



A NEW and comprehensive List of **SLIDING RESISTANCES** and **DIMMERS** is now available on application

THERE HE STANDS — symbol of authority in an orderly World — controlling — directing — obeyed because absolutely trustworthy and reliable.
What a fitting comparison with BIRCH RESISTANCES, *Arms of the Ohm's Law.*
Backed by many years of practical experience in which their reliability has been tested under all conditions, BIRCH RESISTANCES, in their various applications, stand up to their job and can always be depended upon to provide specified service because of their first-class workmanship.

Birch

Registered Trade Mark

Please call upon us to help you solve any Resistance problem.

Resistances

ARMS OF THE OHM'S LAW

May we quote you for any of the following :—

RADIAL TYPE REGULATORS – SLIDING RESISTANCES – DIMMERS – ASBESTOS WOVEN RESISTANCE NETS AND GRIDS – HEATING ELEMENTS – RESISTANCES FOR SPECIAL REQUIREMENTS, ETC., ET C.

H. A. BIRCH & CO. LTD., Wilohm Works, Wood Street, WILLENHALL, STAFFS
Telegrams: "WILOHM," Willenhall. Telephone: Willenhall 494-495
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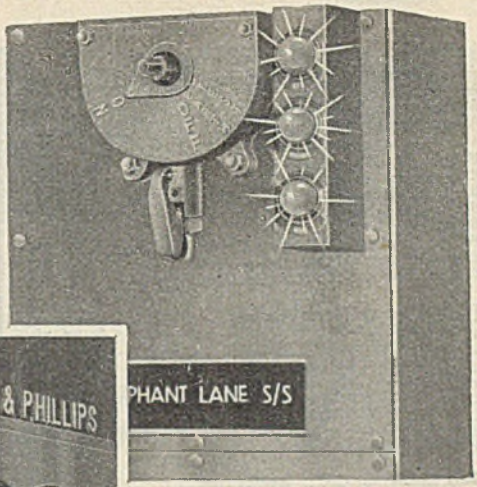
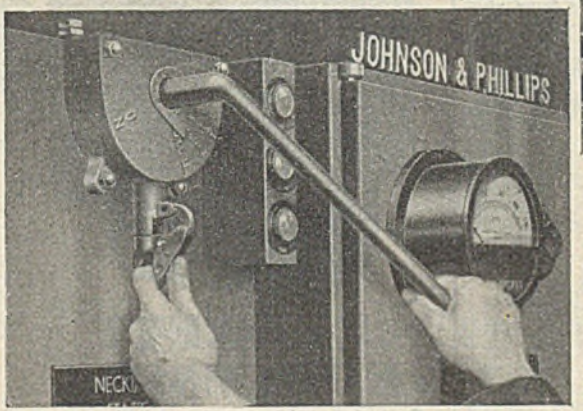
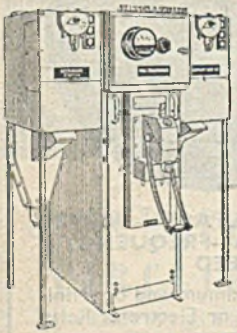
EARTHING IN SAFETY





with NEON INDICATION

ON the new J. & P. oil immersed isolator gear an operator is given positive information—by three neon indication lamps—whether cables are alive from remote points or not. While the lamps glow, the cables are connected to a supply and it is unsafe to earth. When the lamps do not glow, the operator knows that he may safely open the gate interlock and discharge the cable by switching over to earth, as shown in the left-hand illustration above.



Neon indication is not supplied as standard equipment but only against specification. The need for a safety device such as this is a matter for individual consideration—but, as ever, J. & P. have realised the need and are ready to satisfy it.

The equipment illustrated is a ring main unit comprising Type "A" incoming isolators, with a Type AG 16 air insulated, metal-clad, vertical isolation circuit breaker unit

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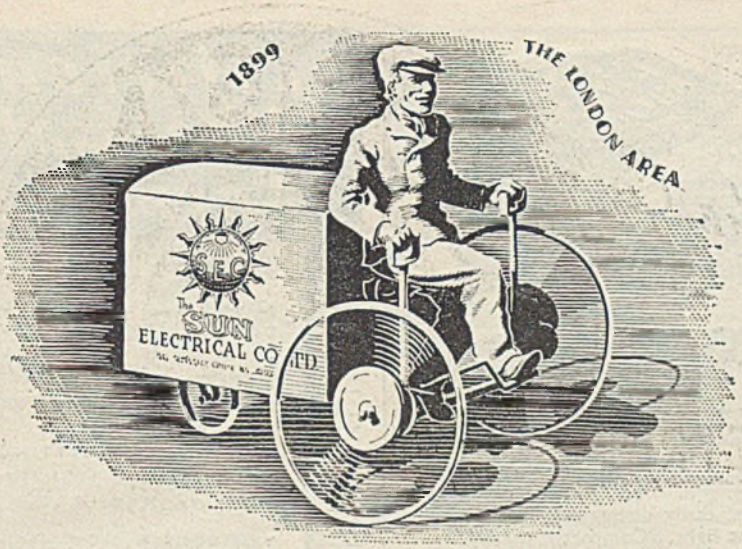

believe it or not . . .

this was our swift delivery service in London 48 years ago.

BUT NOW . . . SUNCO delivery vans speed daily on their rounds, bringing you all that is best in the electrical and radio fields. Remember too, that our aim is not only to **sell** you what you need but to help you get round awkward supply problems in these difficult days.

The SUN ELECTRICAL CO., LTD.

118-124 Charing Cross Road, London, W.C.2

Tel TEMple Bar 3500 (18 lines). *Grams*: SUNELEC, WESTCENT, LONDON

Also at LEEDS, SLOUGH, *and* NEWCASTLE-ON-TYNE

SUNCO means more to more people — NOW

PHASE BUTTONS

Strong, accurately made in casein plastics, in brilliant permanent colours, easily distinguishable in the poorest light. Compactly packed in boxes of 100, *each containing packet of fixing nails.*
Standard colours: black, white, blue, green, red and yellow.

Manufacturers:
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BRIMSCOMBE · STROUD · GLOS.

Efficient Wholesale Service!

WIRING EQUIPMENT
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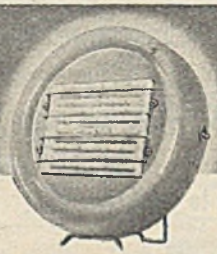
Send enquiries and orders to.

R^D JOHNSON, CLAPHAM & MORRIS LTD.
7-9, SWAN STREET, MANCHESTER, 4.
'Phone: DEAnsgate 5491

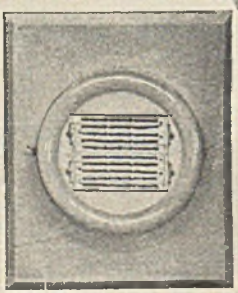
HEAD OFFICE JACEM HOUSE, TRAFFORD PARK, M/c 17

BRIGHTGLOW *Electric Fires*

FOR HEAT CONTROL



2KW. Standard Portable in various pastel shades.



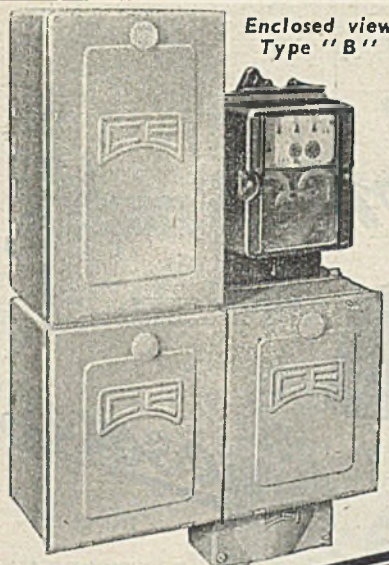
Wall Panel 2KW. Fire with circular inset panel.

Modern Wall Panel Fires for the New Housing Programme. Will replace Tile Surrounds with beautiful coloured Vitreous Enamel Panels in many Pastel Shades.
We are already supplying Builders' for the New Housing Programme with Wall Panel Fires at the rate of four Panel Fires per house—

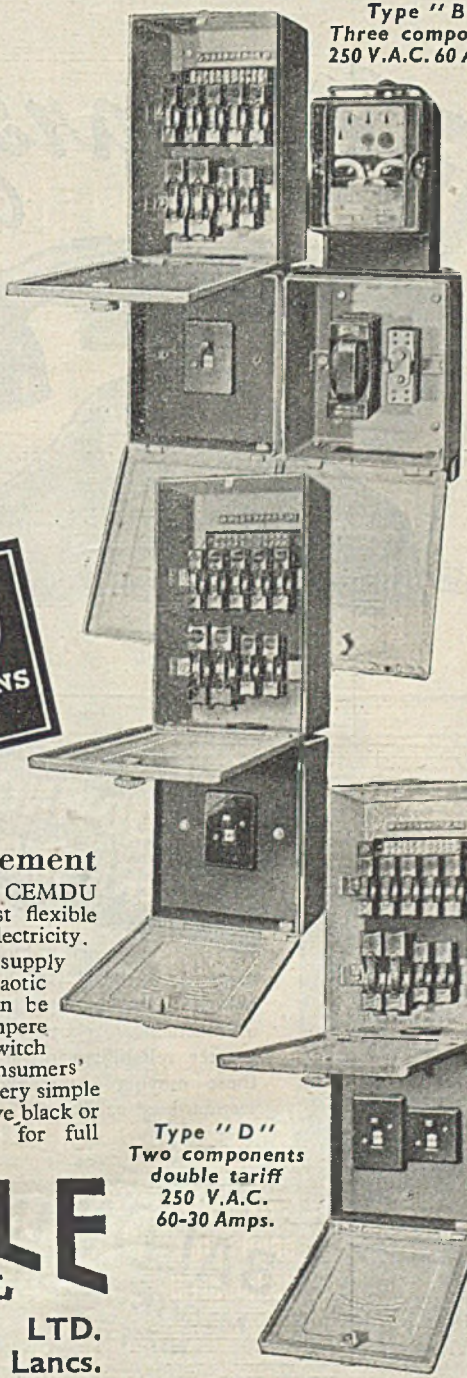
Two Bedroom Fires	.....	28″ × 22″
One Sitting Room Fire	.....	24″ × 24″
One Kitchen Fire	.....	18″ × 22″

No chimney flues necessary
Write for full list and prices or telephone Pinner 5971

BRIGHTGLOW LTD 320 RAYNERS LANE PINNER MIDDX



Enclosed view
Type "B"



Type "B"
Three components
250 V.A.C. 60 Amps.

Type "D"
Two components
double tariff
250 V.A.C.
60-30 Amps.

CEMDU

CARLISLE ELECTRICAL MAINS DISTRIBUTION UNIT

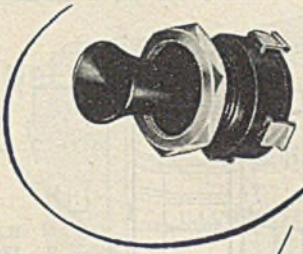
Types for every requirement

Already in use by many supply authorities CEMDU is the up-to-date, trouble-free and most flexible system for the intake and distribution of electricity. Comprising one unit housing all domestic supply control CEMDU banishes the usual chaotic conditions at the incoming end. It can be placed in any position. Supplied 60 ampere or 60 and 30 ampere double pole Main Switch Control. Any meter can be fitted; consumers' fuses are rewirable and extensions are a very simple matter. CEMDU is supplied in attractive black or cream stove enamelled finish. Write for full particulars to the sole manufacturers.

CARLISLE ELECTRICAL MANUFACTURING CO. LTD.
Bentcliffe Works, Eccles, Lancs.

'Phones: Eccles 1691-2-3-4. Telegrams: "Carlectric" Eccles.

C4



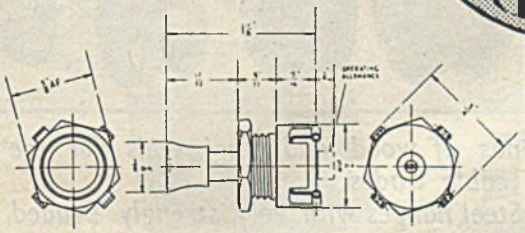
Miniature Push-Button Switch

by

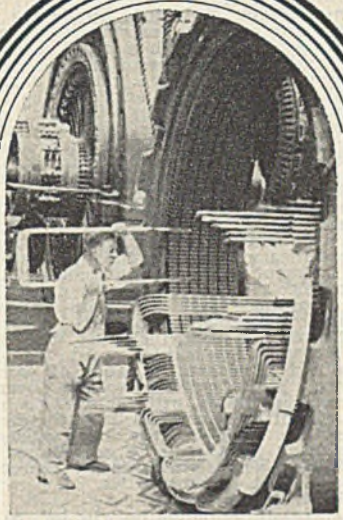
PAINTON & Company Limited NORTHAMPTON

Specially developed for use in miniature equipments, but providing electrical characteristics enabling it to be used for a wider field of circuit requirements. The switch embodies one pair of normally made and one pair of normally open contacts completely isolated from one another in all positions. By cross connection of the contacts single pole change-over can be obtained. Locking or non-locking facilities can be provided as required. FEATURES. Voltage rating, 250 A.C. R.M.S. Current carrying capacity, 1 amperes. Average measured contact resistance, 0.01 ohms approx. Insulation resistance 10,000 megohms.

DIMENSIONS



PAINTON & CO · LTD.
KINGSTHORPE · · · · NORTHAMPTON.



Much of the work of Britain's Premier Electrical Repair Service is for Central Stations all over the Country. For the discriminating engineer there could be no greater tribute to the reliability of Collins workmanship. You can rely on Collins.

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Southall 0168

CEL-1

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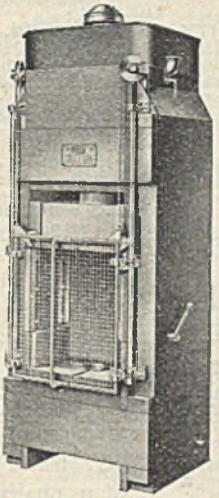

E.M.B.W. 160 TON MOULDING PRESS.

EMBW

MOULDING PRESSES

The new EMBW PLASTIC MOULDING PRESSES embody many up-to-date features :

Heavy welded steel side frames, replacing the old round type pillars, give great rigidity and enable the moving platen to be provided with proper slides. The bearing surfaces lie radially from the centre of the platen so that any expansion due to variations in temperature has no effect on the working clearance.

Made in up-stroke and down-stroke types. 25 to 160 tons.

E.M.B. CO. LTD. WEST BROMWICH

MISCELLANEOUS ADVERTISEMENTS

TENDERS

CITY OF BRADFORD.

TURBO-ALTERNATOR FOR DISPOSAL.

THE Electricity Committee of the Bradford Corporation invite tenders for the purchase and removal of—

ONE 15 000 kW (M.C.R.) PARSONS TURBO-ALTERNATOR, exclusive of Condensing Plant.

The alternator is of the 3-phase type, suitable for 6 000 volts between phases, 50 cycles per second.

The set is in running condition, and, by appointment can be seen in operation at the Valley Power Station.

Form of Tender and further particulars may be had on application to the Electrical Engineer and Manager, 45 to 53, Sunbridge Road, Bradford, to whom all enquiries respecting the set should be addressed.

Tenders, on the forms provided, must be delivered to the undersigned not later than 10 a.m. on 22nd April, 1947, and no tender will be received unless enclosed in a plain, sealed envelope bearing the words "Tender for Purchase, etc., of Turbo-Alternator," but not bearing any mark or name indicating the sender.

The highest or any tender will not necessarily be accepted.

W. H. LEATHEM,
Town Clerk.

Town Hall, BRADFORD.
March, 1947.

STATE ELECTRICITY COMMISSION OF VICTORIA,

22-32, William Street,
Melbourne, Australia.

TENDERS are invited for Steel Cored Aluminium Conductor and Steel Earth Conductor for 220 kV Transmission Line in accordance with specification No. 46-47/114.

Full particulars available from Agent-General for Victoria, Victoria House, Melbourne Place, Strand, London, W.C.2.

Tenders, accompanied by preliminary deposit of £50, and endorsed "Specification No. 46-47/114," are returnable at the Commission's Office, 22, William Street, Melbourne, by 11 a.m. on Wednesday, 2nd April, 1947.

The Commission does not bind itself to accept the lowest or any tender.

W. J. PRICE,
Secretary.

METROPOLITAN BOROUGH OF POPLAR.

SALE OF ROTARY CONVERTER.

THE Council invites an offer for the purchase and removal from site by the 30th June, 1947 of the following:—

1—1 000 kW General Electric Co., Rotary Converter; Year 1919; speed 500 r.p.m. A.C. side:—Transformer, 6 000 volt, 3-phase, 50 cycle. D.C. side:—470/520 volts. Exclusive of all interconnecting cables, and control panels.

This machine is ready for immediate dismantling and removal.

Form of tender together with further particulars, which include arrangements to view, may be obtained from the Borough Electrical Engineer and General Manager, 208, East India Dock Road, Poplar, E.14 (Telephone: EAST 2883).

Offers should be enclosed in sealed plain envelopes endorsed "Offer for Rotary Converter," and lodged with the undersigned not later than 6.30 p.m. on Thursday, 17th April, 1947.

The Council do not bind itself to accept the highest or any offer.

S. A. HAMILTON,
Town Clerk.

Poplar Town Hall,
BOW ROAD, E.3.
27th February, 1947.

FIRST-CLASS Electricians required. Used to all systems. Permanent posts to right men. Apply—R. J. Kemp and Co., Coalville.

SITUATIONS VACANT

COUNTY COUNCIL OF THE STEWARTRY OF KIRKCUDBRIGHT.

ELECTRICITY DEPARTMENT.

APPLICATIONS ARE INVITED for the following posts:

(a) **Junior Mains Assistant:** Applicants must have had previous experience of mains work, preferably with a rural electricity undertaking. The person appointed will be required to act as a general Assistant in the Mains Department, and the duties would include the supervision of maintenance work on lines and sub-stations. The salary payable will be in accordance with Grade 8b, Class D, of the National Joint Board Schedule (£340-£354 per annum, inclusive of War Bonus).

(b) **Electrician:** Applicants must be fully qualified Electricians capable of carrying out all classes of wiring installation work. The duties will include the installation of all types of domestic equipment and also small electric motors. The wage payable is in accordance with the Joint Industrial Council Agreement (Zone B), at present £5 14s. 7d. per week, including War Bonus.

(c) **Linesman:** Applicants must be fully qualified Linesmen, capable of carrying out all work on low voltage overhead lines. The duties will include the maintenance of L.V. overhead lines, the erection of service lines and the fixing of meters. The wage payable is in accordance with the Joint Industrial Council Agreement (Zone B) at present £5 10s. 8d. per week, including War Bonus.

The successful candidates will be required to pass a medical examination for Superannuation purposes.

Applications stating age, whether married or single, and previous experience, and accompanied by copies of not more than two recent testimonials, must be lodged in the case of the Junior Mains Assistant with the County Clerk, County Offices, Kirkcudbright, and in the case of the Electrician and Linesman with the County Electrical Engineer, 165, King Street, Castle Douglas, not later than 17th March, 1947.

ROBT. C. MONTEATH,
County Clerk.

County Offices,
KIRKCUDBRIGHT.

BOROUGH POLYTECHNIC.

HEAD OF DEPARTMENT OF ELECTRICAL ENGINEERING AND PHYSICS.

THE Governors invite applications for the above post. Salary Burnham Head of Department, Grade 3.

The department is large and provides advanced instruction in electrical engineering, radio and telecommunications in addition to other branches of electrical technology.

Candidates must possess a degree, be not more than 45 years of age, and have had adequate teaching and industrial experience. Special considerations will be given to applicants with an honours degree and also to those possessing research experience and qualifications.

Further particulars and an application form may be obtained by applying to the undersigned enclosing a stamped addressed foolscap envelope.

DOUGLAS H. INGALL,
Principal.

ELECTRICAL ENGINEER, about 30, required for Cement factory. To be responsible for installation and maintenance of electrical plant throughout factory. No generating plant. Applicant must have wide experience of maintaining low tension A.C. plant. Permanent position, pension, etc. Commencing salary £500 p.a. Applications in writing only, giving full particulars of experience, to Lafarge Aluminous Cement Co. Ltd., Fondu Works, West Thurrock, Grays, Essex.

COMPETENT installation ELECTRICIAN required. Permanency to suitable tradesman.—Davis and Hadley, Weymouth.

SITUATIONS VACANT

APPOINTMENT OF MECHANICAL MAINTENANCE ENGINEER (GENERATION).

APPLICATIONS are invited for the appointment of Mechanical Maintenance Engineer (Generation).

Candidates must have had considerable practical experience in the maintenance of modern boiler and turbine plant.

The salary will be in accordance with the National Joint Board Schedule, Class "J," Grade 6 (present salary £616 per annum). It is anticipated that the Station will be reclassified "K" during 1947.

The appointment will be subject to the provisions of the Local Government and Other Officers' Superannuation Act, 1937, and the selected candidates will be required to pass a medical examination.

Applications, which must be made on the prescribed form to be obtained from Mr. H. Pryce-Jones, M.Eng., Engineer and Manager, Brighton Corporation Electricity Department, Electric House, Castle Square, Brighton, 1, are to be delivered to him endorsed "Mechanical Maintenance Engineer (Generation)," not later than 14 days from the date of publication of this advertisement.

J. G. DREW,
Town Clerk.

Town Hall,
BRIGHTON, 1.

MUNICIPALITY OF SINGAPORE, COLONY OF SINGAPORE.

ELECTRICITY DEPARTMENT.

Assistant Meter Superintendent.

THE Municipal Commissioners of Singapore invite applications for the appointment of Assistant Meter Superintendent on the permanent staff of the Electricity Department, the appointment to be in the first instance on a three years' agreement.

Applicants should be unmarried and be graduates of the Institution of Electrical Engineers or have equivalent qualifications, and should be fully conversant with the fixing, testing and maintenance of all types of Direct and Alternating Current (single and Polyphase) meters, sub-standards, protective systems, and the testing and maintenance of operative and protective gear.

The selected candidate must pass a medical examination.

Salary:—$440, $460 and $480 a month respectively for the three years of agreement, rising thereafter (if service be continued) by annual increments at the rate of $20 a month to $500 a month, and thereafter if efficient, rising by annual increments at the rate of $25 a month to a maximum of $600 a month (plus Cost of Living Allowance of $98 a month, at present—based on salary of $440 a month).

The exchange value of the dollar is 2s. 4d. sterling. Free passage will be provided with half salary during the voyage to Singapore.

Eight months' leave with full pay is normally granted after four years' service. A Provident Fund is operated by the Municipal Commissioners.

Applications stating age, birthplace, details of education, qualifications, training and experience, accompanied by copies of three recent testimonials, must be lodged with Messrs. Peirce and Williams, No. 1, Victoria Street, Westminster, LONDON, S.W.1 (Agents to the Municipal Commissioners) not later than 29th March, 1947.

Further information, if desired, may be obtained from the Agents or the Municipal Electrical Engineer, Singapore.

WORKS MANAGER required by Electric Control Gear Manufacturers. Engineering and electrical experience essential, also ability to organise and control production. London accommodation necessary.—Reply giving age, experience and salary required to Box L.E.A., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

SITUATIONS VACANT

SOUTH LANCASHIRE TRANSPORT COMPANY.

ELECTRICITY GENERATION AND DISTRIBUTION DEPARTMENT.

CABLES and Sub-stations working Charge Hand required with experience of E.H.T. Cables and L.T. Cable work, also with Mercury Arc Sub-station equipment, together with lighting and power in Depots.

Conditions of employment are according to the National Joint Industrial Council, present rate 31.75 pence per hour. Applications giving age, experience, training and references to the Managing Director, E. H. Edwardes, Esq., Transport Offices, Leigh Road, Atherton, Lancs.

THE UNIVERSITY OF LIVERPOOL.

APPLICATIONS are invited for the post of Assistant Lecturer (Grade III) in the Department of Electrical Engineering (Electrotechnics), at a salary scale of £425/£25/£475 per annum.

Applications, stating age, academic qualifications, and practical experience, together with the names of three referees, should be received not later than 26th April, 1947, by the undersigned, from whom particulars of the conditions of appointment may be obtained.

STANLEY DUMBELL,
Registrar.

February, 1947.

CENTRAL ELECTRICITY BOARD.

THE Central Electricity Board have vacancies for Senior and Junior Draughtsmen.

The men required should be—

(a) Experienced in Building and Civil Engineering Draughtsmanship and also in taking off and billing quantities, or
(b) Experience in preparing layout drawings for Indoor and Outdoor Sub-stations, for voltages up to 132 kV.

Salaries will range from £200 to £500 per year according to qualifications and experience.

Candidates should submit their applications in writing, stating their age, and giving full details of their training and experience, and address their applications to the Chief Engineer, Central Electricity Board, Trafalgar Buildings, 1, Charing Cross, London, S.W.1. 24th February, 1947.

IMPERIAL CHEMICAL INDUSTRIES LIMITED, WILTON WORKS, require an ENGINEER for the maintenance of Diesel-Electric Locomotives and Road Vehicles. Experience essential with locomotives (preferably Diesel-Electric or Diesel) and Diesel Road Vehicles. Preference given to candidates with a degree or professional qualification.

The successful candidate will be appointed to the Established Staff.

Application forms may be obtained from the Personnel Manager, I.C.I. Ltd., Wilton Works, P.O. Box 54, Middlesbrough, Yorks. Applications must be submitted within fourteen days of the appearance of this advertisement.

ELECTRICAL ENGINEER required immediately. Fully experienced in maintenance of Diesel-engined Generating Equipment.—Apply Beautility Furniture Ltd., Angel Road, Edmonton, N.18.

YOUNG Electrical Engineer, B.Sc. honours, required for development laboratory of large electrical concern, S.W. London area. Some experience electronics essential. Apply in writing, stating age, experience and salary required, to—Personnel Manager, 45, Nightingale Lane, S.W.2.

DESIGNER required by British National Electrics Ltd., near Glasgow (Johnson and Phillips Ltd.). Experience in design of modern electric cookers essential. Applications in writing stating age, experience and salary required to be addressed to Johnson and Phillips Ltd., Charlton, London, S.E.7.

SITUATIONS VACANT

BEDFORD CORPORATION ELECTRICITY UNDERTAKING.

APPOINTMENT OF CONSUMERS AND INSTALLATION ENGINEER.

APPLICATIONS are invited for the above appointment from persons, with sound technical training, who have had considerable experience in electrical installation work, the repairs and maintenance of electrical appliances, sales and showroom Departments.

The successful candidate will be expected to supervise these Departments and to be able to prepare complete installation schemes and estimates and able to advise consumers and conduct correspondence.

Applicants should be Corporate Members of the Institution of Electrical Engineers.

Salary and Conditions of Employment will be in accordance with the National Joint Board Schedule, at present Class "G," Grade 5, commencing salary £573 per annum.

The appointment will be subject to the provisions of the Local Government and other Officers Superannuation Act, 1922, and the successful candidate will be required to pass a medical examination.

Applications, containing full details of age, qualifications and experience, accompanied by copies of three testimonials, to be forwarded to the undersigned not later than the 24th March, 1947.

Canvassing, either directly or indirectly, will disqualify the candidates.

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

Electricity Offices,
Prebend Street, BEDFORD.
March 1st, 1947.

ELECTRICAL Engineer required for Tin Dredges near Kuala Lumpur and Ipoh, Malaya. Experienced man age thirty to forty, healthy and good physique, who has served electrical apprenticeship, and fully familiar with installation, repair and maintenance heavy duty alternating current equipment used on tin dredges. Applicants must have sufficient knowledge and experience to secure Malayan Government certificate as first grade electrical engineer; three year contract with free passage out and home; free furnished quarters; after six months' satisfactory service Company would provide transportation for wife. Monthly salary $500 Straits currency first year, $550 thereafter, plus boarding allowance $200, equivalent at present to £700 plus £280 per annum first year, and £770 plus £280 thereafter. Applicants should send full details previous experience, and if possible photograph, to Box L.E.E., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

EXPERIENCED DRAUGHTSMEN required for the mechanical design of large D.C. and A.C. machines by Mather and Platt, Ltd., Park Works, Newton Heath, Manchester, 10. Write c/o Employment Department.

ARMATURE Winders required, also Charge-hand or Foreman, also Improvers for fractional motors up to 50 h.p. Standard rates, good prospects.—D.C. Engineering, Sherborne, Dorset.

FOR SALE

DATRASSES, wood-blocks, switch-blocks. Guaranteed seasoned polished hardwoods, including teak, mahogany, birch, etc., well-finished. 3½ in. by 3½ in. by ½ in., 8s. 6d. doz. 3½ in. by 3½ in. by 1 in., 12s. 6d. doz. 6½ in. by 3½ in. by ½ in., 13s. doz., 6½ in. by 3½ in. by 1 in., 20s. 6d. doz. Other prices on application, post-paid, cash with order, or send for samples C.O.D.—New Age Products, 19-21-23, Newcastle Place, Bramley, Leeds.

IMMERSION Heaters, 2 kW, complete with thermostat and mechanical flanges, £6 10s., postage and packing 2s. 3d. extra. Immediate delivery on receipt of cheque or C.O.D.—T. J. Toye, 48, Holmbush Road, Putney, S.W.15.

FOR SALE

GERWOOD BOARDS WITHOUT LICENCE OR RESTRICTION, ¼ in. by 47 in. by 46 in. Send stamped addressed envelope for sample and prices.—N. Gerver, 2-10, Mare Street, Hackney, E.8. Telephone: AMHerst 1131-2.

ONE 30 h.p. A.C. 3-phase Slipring MOTOR, 220 volts, with oil starter. One 30 h.p. A.C. Slipring MOTOR, 400 volts, 3-phase, 50 cycles, with starter. One 2½ h.p. D.C. MOTOR, 400 volts, 1 200 r.p.m.—H. D. Douglas and Co., 2, Caxton Street, S.W.1. Abbey 6344.

FRACTIONAL h.p. motors, 1/20 h.p., a.c. or d.c., variable speeds; complete with sliding resistance; £5 10s. each.—Stewart & M'Kenzie, Riverford Road, Pollokshaws, Glasgow, S.3.

MAY we send our Engineers' STETHOSCOPE on approval (without obligation)? Particulars on request.—Capac, Ltd., 2, Ullswater Road, London, S.W.13.

ONE 20 h.p. D.C. Electric MOTOR, 460 volts, 880 revs., complete with Switchgear; one 10 h.p. D.C. Electric Motor, 460 volts, 930 revs. —Thomas Smart and Sons, Ltd., Watson's Green Works, Dudley.

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DIESEL Alternator Set, 20 kVA Lister/Met-Vick (ex R.A.F. Mark II set). Output 230 volts, single-phase, 50-cycle, combined with 7 kVA, 400-volt, 3-phase output through auto-transformer. Complete with automatic voltage regulator. Fully reconditioned and guaranteed. Suitable commercial standby set —immediate delivery. Price on application to —R. A. Lister and Co., Ltd., Imperial House, Kingsway, W.C.2. Telephone: Temple Bar 9681.

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LIGHTING PLANT, 110 volt, complete with 5 h.p. Petter's engine, switchboard, dynamo, battery cells, as new, can be seen by appointment, the price is £175 complete.—F. James and Sons, Newport Pagnell (Phone 18).

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50 OFF 1/30 h.p., 2 000 r.p.m., 230 V, A.C./D.C. New double ended ball bearing Motors, £2 18s. 6d. each. B.T-H. 50 h.p. Slip ring Motor, 400/1/50. Complete with condensers and starter for Ferraris Arno System conversion to 400/3/50. 6 Distributon boards. Iron clad. Double Pole. 6 and 8 way. 60 amp.—Enquiries to John Phillips and Co. (Electrics), 31, Fortune Green Road, N.W.6. Hampstead 8132.

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FOR SALE.—Heavy Steel American built Sack Trucks, some with rubber tyres, at £3 each.—Apply G. A. Day Ltd., London Road, Portsmouth.

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ELECTRIC MOTORS, A.C. and D.C. We supply all types and sizes of Electrical Machinery—Slow Speed Reduction Gears can be supplied to customers' requirements with short deliveries. Send your enquiries to The Electro Power Co. Ltd. (formerly Be-Be, Eng.), 3, Retreat Close, Kenton, Middlesex. Tel.: WORdsworth 4928.

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ENQUIRIES invited for the supply of Small Pressings. Efficient Tool Room available.—Write P. J. Conway, Dept. 11, Carlton Works, Pasture Lane, Clayton, Bradford.

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WANTED urgently, two oil immersed STARTERS and SLIDE RAILS, suitable for 30 h.p. Slipring Motors, 400 volts, 3-phase, 50 cycles.—Jas. B. Warke and Co., Castlerock, Co. Derry.

ONE 220/230-Volt D.C. Electric Motor. Approximately 3 000 r.p.m. 2½/3½ h.p.—Boulton Paul Aircraft, Ltd., Wolverhampton.

ELECTRICAL Alloy Steel Sheets wanted, 0.020 and 0.014. Whole sheets or offcuts.—The Nelson Engineering Co. Ltd., Netherfield Road, Nelson.

5 000 MINIATURE 4½ volt Buzzers.—Box L.E.C., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

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COOKERS.—We can give good deliveries of Sheet Metal Vitreous Enamelled Electric Cooker parts.—JOHN KING & SONS (ENAMELLERS), LTD., PYRO WORKS, CHESTERFIELD. Phone: 5305.

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BUSINESS OPPORTUNITIES

SCEMCO LTD., Fluorescent Lighting Specialists, wish to contact manufacturers of electrical equipment and accessories, including Domestic and Industrial Lighting Switches, all "Novelty" and "Improved" electrical appliances. Fluorescent Tubes, Fittings and Components, both Domestic and Industrial, of particular interest. Where possible complete output will be taken and full co-operation given in exchange for sole distribution rights. Replies will be treated with strictest confidence. — Managing Director, Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1.

NOTICE to Manufacturers.—London Export House wishes to assist manufacturers in handling their export business. Own agents in principal world markets. Warehouse and other facilities available in London. All enquiries to Progress Mercantile Co., Ltd., 72/74, Tooley Street, London, S.E. Phone: Hop. 3666.

NOTICES

E.A.W. CERTIFICATE FOR DEMONSTRATORS AND SALESWOMEN.

THE E.A.W. EXAMINATION IN ELECTRICAL HOUSECRAFT (Theoretical) will be held on Thursday, 12th June, 1947, from 6 p.m. to 9 p.m. at various centres in Great Britain.

Full particulars may be obtained from:—
The Electrical Association for Women,
Examinations Department,
35, Grosvenor Place,
London, S.W.1.

IMPORTANT.—The final date of entry for the Examination is 1st May, 1947.

AGENCIES

MANUFACTURERS of and dealers in Electrical Machinery, Wiring Accessories and Cables interested to make contact with an experienced engineering firm of 25 years' standing, for sale, export and representation of their products in India, are asked to correspond with—R. Cardew, Kilcrea, Tresowes Ashton, near Helston, Cornwall.

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Crisis and After

So much has happened in the two weeks since THE ELECTRICIAN was last published that comment upon the circumstances which have led the industry to the position where it now finds itself, must give way to a review of the conditions as they are to-day and an appreciation of the difficulties which have to be faced.

The electricity consumption restrictions applied on February 10, to industry in the North-West, Central and South-East areas of the country so dislocated production that the manufacture of generating plant designed to raise the pre-crisis shortage of power station capacity of the country to a figure nearer to that of the national demand, has been appreciably delayed, and, among other things, the re-equipping with electrical plant of industry generally has received a serious set-back. The lowering of electrical export trade figures, shortages of electrical equipment for the sponsored housing programmes and delays in railway electrification extension schemes are among other negative results which may be expected of the crisis in coal and the methods adopted to overcome it. One wonders, in the circumstances, whether so much sacrifice was necessary.

The shut-down of industry in the areas above named was, we were told, to bring about a saving in coal and though admittedly some coal has been saved, its cost to the nation in terms of production of manufactured goods is immeasurable. In the immediate pre-crisis week the coal consumed for electricity

generation purposes was 698 300 tons; in the first week of the restrictions applied mainly to the "black area," it was 496 520 tons; in the second week with domestic restrictions applied to the whole country, but with industry free in the South-West and North-East, the coal consumed amounted to 502 500 tons; an increase over the previous wek of 5 980 tons. The amount of coal saved up to February 24 was 397 710 tons, with seven stations in the North-West and fifteen stations in the South-East and London still with less than two weeks' stocks. In the three weeks, 550 000 tons were saved.

Was Crisis Unavoidable?

THE build-up of coal reserves of the above dimensions in so short a time as twenty-one days, suggests that if the emergency delivery arrangements which were introduced on February 10 had been put into effect, even two weeks before, the supply industry so far as coal is concerned would have been able to have held its own during the cold spell with much less dislocation of industry than the Ministry of Fuel imposed by its restrictions; to have built up coal stocks though at a slower rate; to have met reasonable industrial demand before load shedding became necessary; to have permitted the majority of industrial users of electricity to work at least part of each day; and to have saved the unemployment total from reaching over 2 300 000. Why then was the crisis allowed to develop?

Official Indifference to Warnings

IT was known by the Ministry that the minimum coal requirement for 1946, but without exporting coal, was 205 million tons; the Ministry knew that coal production figures were short of this target by a serious amount; it knew that the supply industry was deeply concerned at the official indifference to its warnings; that it would, if invited, offer practical suggestions for reducing the demand for power, but not until so serious a decline had set in that one selected station was left with enough coal for only a few hours working, was anything done—and then without consultation with the industry. We submit that if the emergency measures for coal deliveries had been applied even two weeks earlier than they were, the crisis as we now know it, need never have been.

A Dangerous Policy

THE attitude of mind from which the difficulties of the past three weeks were born is apparently also to be applied to future considerations, in that the Ministry of Fuel has now suggested that power station coal stocks are to be based on "programmed future consumption of 580 000 tons a week." In the absence of an official statement, the implications of this figure are doubtful, but if it represents the "ration" which the supply industry is to be permitted for the whole of the country it is worth examination. Consumption in the week ending February 22, the only complete period in which all restrictions, both industrial and domestic were in force, was 502 500 tons, while in the pre-crisis week, a figure of 698 300 tons was reached. We have been told that domestic restrictions will remain in force. If as a result of this the basic consumption can be held at the level for the week-ending February 22, namely, 502 500 tons, the surplus of 77 500 tons, and only that, will be available for meeting the power generation needs of industry at that time closed down. The intention of the Ministry to continue restrictions, coupled with the fact that it as yet has shown little initiative with a view to producing more coal, nor applied its energies to finding ways by which output might be raised, suggests that the purely defensive policy of the past may be pursued until results even more serious than those of the last three weeks force the Ministry into more constructive action. A policy based on a programmed coal consumption of 580 000 tons per week for electricity generation has in it very real danger.

Shortage of Generating Capacity

SUPERIMPOSED on the conditions outlined above is the pre-crisis problem of shortage of generating capacity which on January 30 last, amounted to over 1 500 MW, and with the anticipated demand will next winter be greater by, perhaps as much as a further 2 MW. The programme of extensions and new station building is sadly behind schedule and will be even further delayed by events of the last three weeks. In these circumstances every facility must be given

the supply industry for making good the leeway lost due to priorities being directed to other channels, and the war-time methods of expedition again be brought to bear. Some indication of the effect of the present-day Government policy with respect to power stations was given last week by Sir ROBERT RENWICK, chairman of the County of London Company, when he pointed out with some emphasis that whereas Littlebrook A was started in January, 1937, and was steaming in September, 1939, it would take four years to build the station under present conditions. Littlebrook B of similar capacity was started in August, 1944, and is unlikely to be completed before August, 1948, and that on an already partially developed site. That the Government is fully aware of the need for increasing generating capacity more in keeping with the time schedule set out in the extension programmes, is indicated by the remarks respecting it in the Economic Survey published last week. Its reaction, however, is that "drastic steps will be taken to keep down the non-industrial load," and that the distribution of man-power and materials in 1947 for work on capital equipment will be shared by electricity, gas and the Post Office to a value of 9 per cent. only, compared with 20 per cent. for housing and 22 per cent. for other building.

Vague Recovery Proposals

THE Government has made it clear that there is not yet formed any clear-cut plan to be put into operation to overcome the rot which has set in. There will be restrictions on domestic consumption, there will be rationing of industrial coal and a large portion of industry will have to be put on night work or on hours when the rest of industry is not working. In their present form the effectiveness of these proposals cannot yet be judged, but the administration difficulties they present call for careful consideration, not by any Government department, but by the executives of the industries concerned, together with those responsible for meeting their power requirements, bearing in mind that the crisis through which we have just come may have the effect of making night working a normal incident in industry for some time.

Electric Space Heating Restricted

DRASTIC curtailment of the manufacture of electric space heaters is another imposition to be applied by the Government as part of its plan to reduce domestic consumption of electricity. Towards the end of last year the shortage of steel plate led to the prohibition of the use of that material in the manufacture of electric fires and other heaters, under the Electrical Appliances (Control of Manufacture and Supply) Order of 1942, but the utilisation of other products in substitution was allowed under licence. Following the recent statement in the House of Commons to the effect that, in agreement with the President of the Board of Trade, the Ministry of Supply is restricting the production of electric heating appliances for the home market to essential requirements, whilst at the same time encouraging maximum production for export, inquiries at the Ministry revealed that it is probable that the output of domestic electric space heating appliances for the home market will be brought down this year to one-twelfth of the manufacturing capacity of the industry. This is to be effected by reducing the issue of licences to manufacturers and also the quantities specified on the licences. Permits, which are issued quarterly under the Order, licence manufacturers to supply a stated number of appliances for the home market and an unrestricted quantity for export, but apparently, so far, the overseas demand has not been large; so that unless this increases appreciably the output of this branch of manufacture is likely to show a serious falling off.

Under an Order of the Ministry of Fuel and Power, THE ELECTRICIAN *was obliged to cease publication for two consecutive issues. All subscription orders are, therefore, being extended by two weeks, so that for the price of his annual subscription, each subscriber will receive the 52 issues for which he contracted.*

Invoices for renewals falling due during the month of March were prepared before the February crisis. In view of the very large number of accounts involved and the urgent need to save paper, these are being despatched without alterations and such subscribers will receive their extensions, as promised above, during 1947-8 instead of immediately.

Fuel Crisis—How Coal Was Saved

Readers will recall that in our last issue the events leading up to the imposition of restrictions, on February 10, were summarised. Below is given an account of the effect of these restrictions and how they assisted in the building up of coal stocks during the first three weeks of the crisis.

MANY months will pass before the full effects of the first fortnight of the fuel crisis—a period without precedence in the history of the British electricity supply industry—can be pieced together, for throughout a large part of the country, industry came to a standstill, unemployment figures reached their highest total for a decade and domestic consumers experienced a type of privation which was unknown, except for a few hours, during the worst days of the war. Though it has been officially stated that, at the peak of restrictions, three-quarters of industry remained unaffected it is certain that delays and shortages will be experienced well into the summer.

The technical aspect of the crisis, also, at this stage, can only be sketched in. Experiences in individual power stations differed widely, depending on the type of load and the degree of restriction imposed. Some, like Barking and Battersea and other "base load" stations, felt little more than changes in the shape of load curves, while in the smaller stations, output dropped to as low as 50 per cent. of normal. Connecting feeders between areas were heavily loaded as rapid fluctuations occurred in C.E.B. inter-zonal exports. During one early morning peak, a net import of 150 MW into the London and South-Eastern area, at 8.40 a.m., had changed, by 9 a.m., to an export of 160 MW.

REDUCTION IN KWH

Compared with an average national consumption of just over 1 000 million units per week during January, 735 million units were sent out during the first week of restrictions and 745 million in the second. As yet, no figures are available showing the saving in units brought about by the different classes of restrictions although the indications are that domestic restrictions caused about half the total reduction in energy consumed, and the picture to-day, in fact, can only be painted in terms of coal.

In this connection two facts are paramount. First, during the second week of the crisis, when the full effect of the emergency measures taken to move coal rapidly from pithead to boilers began to be felt, coal deliveries totalled 741 470 tons, a figure unequalled, despite unfavourable weather, since June last year, and exceeding the peak consumption week immediately before the crisis by 43 000 tons. Second, about 400 000 tons—representing four days' supply at the peak rate—were saved as a direct result of the restrictions imposed, within 14 days.

THE FIRST WEEK-END

On Friday, February 7, when the first news of the impending cuts was announced, power stations stocks throughout the country stood at just under nine day's supply or 895 000 tons. One selected station had completely exhausted stocks, and was using a small proportion of oil fired plant, while a larger station had sufficient coal only for a few hours' running. Movement of sea-borne coal from South Wales and North Eastern ports was almost at a standstill, rail movement was hindered by drifts on many main lines and electricity consumption was at a level so high that the Central Board had been forced, for the first time, to extend load-shedding warnings over a 12-hour period daily.

A letter from the Electricity Commissioners, addressed to selected stations in the London and South-East, Central and North-Western areas, ordered that, as from midnight on Sunday, consumption of electric power by all industrial undertakings in these areas, except those classed as essential, was to cease. In the case of non-industrial consumers, all feeders not supplying hospital and other public services were to be disconnected daily from nine a.m. to noon, and from two p.m. to four. Subsequently, as the list of exemptions from domestic cuts was progressively extended, it became impossible in most areas to carry out the isolation of domestic circuits on more than about 20 per cent. of feeders and even this—necessitating mobile parties touring outlying sub-stations—was done at the expense of normal maintenance work. The load curve given in figure 1 contrasts the demand of February 10 with that of the previous Monday.

The first day's cuts in the three "black" areas gave an estimated saving in coal—based on the same day in the previous week—of 33 per cent. or 22 500 tons. Deliveries, however, continued to be delayed by the weather and, when the Prime

Minister made a broadcast statement, on Monday night, it was doubtful if the stock position in the three restricted areas had much improved. In the "white" areas—those so far unaffected by restrictions—the position had slightly deteriorated, and an official warning was issued that restrictions might be extended to the remainder of the country.

To restriction was added, on the third day, more positive action, when the first

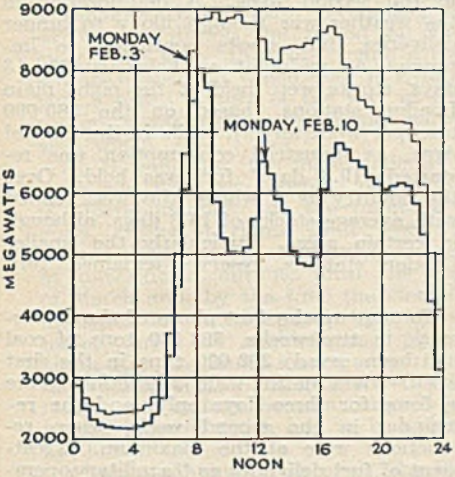


Fig. 1—National load curve; the first day

meeting was held of a Joint Committee, consisting of the Prime Minister, the Ministers of Labour, Fuel and Power and Transport, the Chancellor of the Exchequer and the President of the Board of Trade, as well as representatives of the National Coal Board, the C.E.B., and the Railway Executive Committee.

Reviewing the savings so far achieved, it was said that these were insufficient to raise stocks to the safety margin. The movement of coal by sea and rail was still hampered by weather and efforts to overcome the crisis would now be operated with the same speed and urgency as a major military operation during the war. The Joint Committee was to take decisions and co-ordinate action from day to day. During the first fortnight, it met six times.

The first decisions became evident that evening, when it was stated that, as from Thursday, the domestic restrictions would be extended from the "black" areas to the remainder of the country, the hours being slightly staggered for technical reasons. In addition, consumption for domestic purposes was to be prohibited by an Order under Defence Regulation 55, while a further saving was to be achieved by reducing the statutory voltage limits by 5 per cent. Special priorities were given to the unloading of wagons and colliers, and troops were called in, to help clear snowdrifts and move coal by road.

Statutory authority for the domestic restrictions produced, at first, a salutary effect, as a comparison between figures 1 and 2 will show. Coal savings in the "black" areas rose, on Thursday, 6 per cent. above the previous day, to 43.7 per cent., and in the newly restricted areas, a further 6 100 tons were saved. By Thursday night, the total savings throughout the country amounted to 114 500 tons.

On Friday, February 14, coal savings at power stations reached the highest figure recorded during the crisis—31 350 tons in the "black" areas and 6 920 tons as a result of domestic restrictions in the rest of the country. Stocks in the three original areas, which had been 529 000 tons the week before, were then 635 000 tons, and in the London and South-Eastern area, the first significant rise—to 274 000 tons after a week at which they had remained static below 260 000 tons—was felt. The level remained at one week, however, at the main London stations.

New directions from the Ministry of Fuel instructed local authorities to reduce street lighting to a safe minimum and, after considerable criticism had been expressed, an amendment to the Statutory

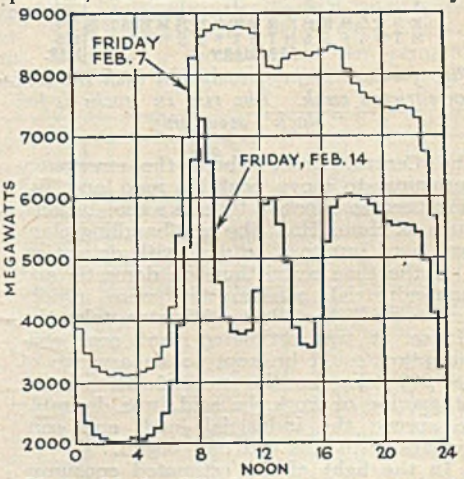


Fig. 2—National load curve; the fifth day

Order was issued, making it no longer illegal for owners of wind-driven generators and other non-statutory plant to use their equipment during the restricted hours.

By the week-end, a review of the first week became possible. Shipping and rail transport was then moving well, despite continuous weather difficulties, many pits were working a seven-day week, and, since Sunday night, 275 000 tons had been dis-

charged in the Thames. Consumption had been reduced from 699 270 tons to 496 520 tons, giving a saving for the week of 202 750 tons, or 29 per cent. of the previous consumption and stocks had built steadily.

The second week opened with a condition of "steady improvement." Stocks at the eight London stations had climbed to nine days and stood, throughout the country, at 11 days. On Wednesday, it was announced that industrial restrictions would be lifted as from February 24, in the Central Area, where the emergency measures to move coal by road and rail had been so effective that in some stations, such as Hams Hall, the coal-handling plant was hard put to it to deal with deliveries.

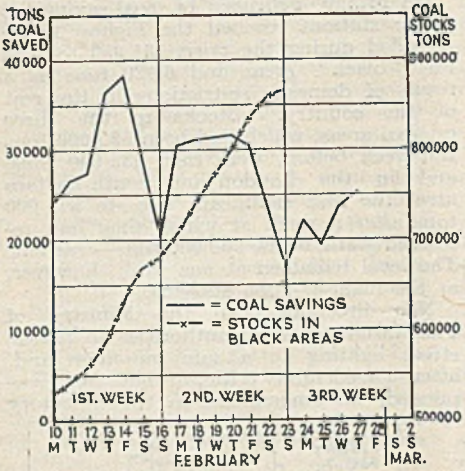


Fig. 3—Coal savings, compared with the last unrestricted week. The rise in stocks is for "black" areas only

If the then restrictions on domestic and non-industrial consumption were rigidly maintained, the Prime Minister told the House, it was estimated that coal consumption could be kept to an average of 580 000 tons for the rest of the winter. Staggering of work, he said, was desirable to spread the industrial load, and conversations to this end had begun.

In the light of the estimated consumption of 580 000 tons per week, stocks were then reassessed. They ranged from 12.6 days, in the North-West, to 16.1 days in the Central Area. The eight main London stations, on the new level, had about 11½ days' supply.

Doubts caused by the Prime Minister's reference to non-industrial consumption were expressed, by a representative of THE ELECTRICIAN, to the Ministry of Fuel. As the ban was raised in each area, a Ministry spokesman explained, the exemption previously given to certain essential industries in that area would be applied to all industrial activities. These were understood to include all smaller establishments and workshops which were engaged either on manufacture or on maintenance and repair work.

Beyond a gradual falling-off in the observance of the domestic cuts towards the week-end, no new trends were discernible in the second week. A deterioration in the weather was thought likely to hinder deliveries, but stocks continued to improve. At midnight on February 23, 13 days' stocks were held at the eight main London stations (based on the 580 000 tons per week target), while in the Central Area, as industrial consumption was restarted, 19.3 days' fuel was held. Over the country as a whole, the week ended with average stocks of 15.8 days, although in certain areas, particularly the smaller London stations, reserves remained very low.

To sum up the first phase of the emergency, in two weeks, 398 000 tons of coal had been saved, 202 000 tons in the first week, when nation-wide restrictions were in force for three days only, and the remainder in the second week, when restrictions were at the maximum. Treatment of fuel deliveries as "a military operation" had brought during the last seven days of the period, 741 470 tons of coal to the power stations, a quantity 161 000 tons in excess of the target consumption and which, had it been reached a fortnight earlier, might have made any restrictions to industry unnecessary.

The beginning of the third week saw the worst of the crisis over, the return to work in the Central Area, and the decision to switch on in the North-Western Area on the following Monday. In the Central Area, coal consumption rose towards the pre-crisis figure, less the savings —amounting to about 13 per cent.—arising from the domestic restrictions, voltage cuts and reduced street lighting. The week's total coal savings were 153 085 tons, consumption being 545 215 tons, and by Friday night, with national stocks at 17 days and the base-load stocks in London up to 15 days, the order was given for the return to work, on March 3, of the London and South-Eastern, as well as the North-Western Area. Altogether, industry has lost two weeks' work in the Central Area and three weeks in the North West and South East. As a result of this, just under one week's coal, or 550 000 tons, were saved since the restrictions came into force. The fourth week opened with broadcast warnings by the C.E.B. and widespread load-shedding.

Undertakings and the Crisis

Effects of Shut-Down and Coal Deliveries

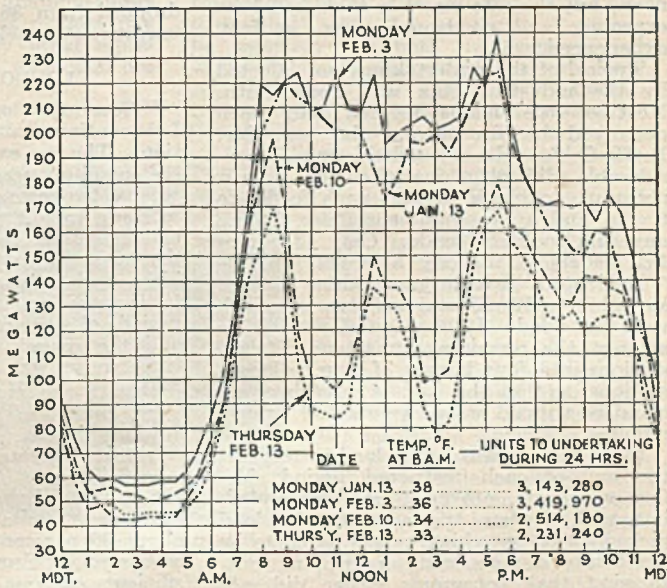
WITH the limited space at our disposal it is impossible to publish more than a few of the many reports we have received from chief electrical engineers throughout the country, recounting their experiences during the period of emergency. We have, therefore, made a representative selection which will, it is hoped, give a broad picture of the way in which the crisis was met by the supply industry as a whole.

At Birmingham, the main difficulty encountered was less shortage of coal than a superabundance. At the onset of the crisis, stocks at Hams Hall were considered sufficient for continued operation, at unrestricted output, until the middle of March and, by the time the emergency measures for moving coal by rail were under way, the coal-handling plant at Hams Hall was found inadequate to handle the volume of coal being delivered. As a result, the sidings became jammed with trucks, most of which had to be unloaded by hand.

At the beginning of the crisis, the Blackburn undertaking, Mr. R. H. Harral, engineer and manager, informs us, had about 9-10 days' supply of coal. This increased by the end of the second week to approximately 14 days. Although there was no interruption in incoming deliveries, the main difficulty was in handling the coal, which was frozen to such an extent that railway wagons had to be emptied for the most part, by manual labour. The total amount of fuel saved during the first 14 days, it is estimated, was 6 800 tons, and units sold decreased on an average by approximately 45 per cent.

In Leicester, neither the deadening of non-essential feeders nor the sudden rise in demand following the restoration in supplies presented any serious problem, Mr. J. Mould reported. Approximately 20 per cent. of consumers, it was found, could be switched out without interrupting essential supplies and voluntary abstinence where mains still remained alive was, on the whole, good. The highest percentage reduction in units sent out was felt on the two days after the restrictions became statutory, when consumption dropped by 44 per cent.

Asked for his observations on the emergency, Mr. J. Eccles, of the Liverpool undertaking, sent us the interesting load curves reproduced below. That for January 13, Mr. Eccles explains, shows a normal winter day without load-shedding, while that for February 3 is typical of a day on which there was considerable shedding. The effect of the first day's restrictions is seen in the February 10 curve, while that for February 13 shows a similar effect on the first day on which the statutory penalties were imposed. In order to carry out the Government's instructions, it was necessary to switch out some 65 000 domestic consumers at 9 a.m. and again at 2 p.m., although the various modifications in respect of essential supplies subsequently limited the switching rota considerably. The work, however, remains a considerable embarrassment, and it is considered impracticable to main-



Load curves of the Liverpool undertaking, showing typical daily demands before and during the crisis

tain this method of operation in any permanent rationing scheme which may be evolved.

Mr. R. A. S. Thwaites, chief engineer and manager of the Manchester undertaking, says that the original arrangements made, at extremely short notice, were to cut off residential consumers at 9 a.m. by means of the supervisory control system, but to make no cuts in the centre of the city, in view of the large number of essential services there. Subsequently, however, it was found that almost all residential supplies had to be restored.

AN INGENIOUS REMINDER

The method of dealing with those consumers whose observance of the restrictions was only lukewarm was simple but apparently effective, the action taken being to switch out feeders (other than those supplying hospitals, etc.) in turn for ten minutes, as a reminder. This had a marked effect, and in one area at 9.30 a.m. the load on restoration was 3 000 kW less than before switching out.

At the generating stations, as soon as the railway lines had been cleared of snow, Manchester found itself in a similar predicament to Birmingham. Coal trains poured into the sidings and, as the stations were operating at half normal output it was impossible to unload the wagons as fast as they arrived. Some difficulty had been anticipated, says Mr. Thwaites, with the rapidly changing load at 9 a.m. and noon, but the rate was less than had been expected, and no trouble was, in fact, experienced.

Typical of the undertakings not affected by the industrial cuts was Portsmouth. Most of the mains records had been destroyed by fire during the war, Mr. R. H. Coates tells us, and this caused considerable difficulty, inasmuch as it was necessary to check through each feeder to try to find an essential consumer, before any cuts could be made. Only 43 out of 195 feeders in the city area fell into the "residential" category, and these 43 were spread over 18 sub-stations, two of which were attended. It was found possible to arrange the remaining unattended substations into four groups of four adjacent stations, so that the feeders in each group could be tripped within a period of twenty minutes.

Fears of a sudden heavy load increase at the end of each restricted period, Mr. Coates reports, proved to be unfounded, but with feeders tripped out, the load picked up on switching in was found to be two-thirds of the load on tripping out, showing that consumers either did not bother to switch off individual pieces of apparatus or had switched them on in anticipation of the restoration of supply. Where consumer co-operation was found to be poor, inspectors visited addresses in an attempt to locate the cause, and some 1 500 calls were made.

The maximum rate of change of undertaking load was found to be 17 MW/half hour, on falling load, and 14 MW/half hour on rising load, at the beginning and end of each restricted period, respectively. These figures were well within the capabilities of the plant installed, where variations of 30 MW/half hour were common in normal operation. There was, of necessity, some falling-off in station efficiency during the "cuts," because of the lower loading of the plant, as the length of the periods did not merit the shutting down of boiler and turbine units.

Fairly typical of the experiences of other engineers in the London municipal power stations were those of Mr. Robert Lee, of St. Pancras, which entered the crisis period with only two days' stocks of fuel. All domestic districts were found, says Mr. Lee, to have a number of semi-essential consumers intermixed, and it was therefore decided to cut these feeders from 9 a.m. to noon, but not during the afternoons. As a result, the semi-essential premises had current available for 21 hours out of the 24, while the morning cut served as a moral reminder to the domestic consumers to continue to co-operate. A saving of 35 per cent., which remained constant over three weeks, was recorded. The morning demand during the restricted hours dropped from 36 000 kW during the last unrestricted week to 12 000 kW.

LONDON BLACK-SPOT

"Consumers on this undertaking," Mr. Lee continues, "gave excellent co-operation. The one exception was, perhaps, the cosmopolitan area of Soho, which had to receive two afternoon cuts as well as the morning to jolt them into recognising the emergency." The peak load character of the generating plant—Ljungström turbines and pulverised-fuel boilers—reacted to the sudden heavy changes of load at periods of restriction without any trouble, and the overall saving of coal over the three weeks was 3 000 tons.

During the period of emergency, visits were made to the larger "base-load" stations in the London area where, as might be expected, conditions were somewhat different. Over the whole bulk supply system of the London Power Co., the savings in units sent out amounted to about 30 per cent., although coal savings, as a result of under-running at the more efficient stations, were rather less. On the first day of restrictions, the system

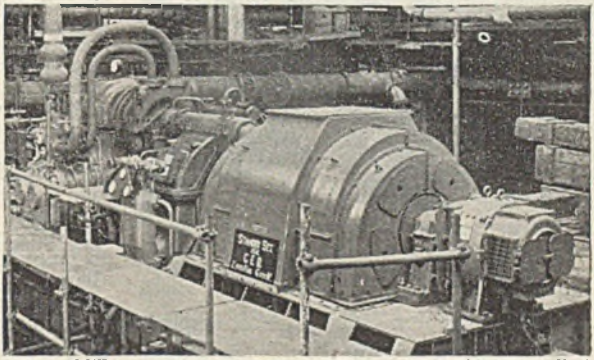
(*Continued on p.* 572.)

The Industrial Close-Down

How Manufacturers Were Affected—Emergency Measures

THE coal crisis and the cutting-off of industrial power in the three large areas affected, in many cases brought to a standstill electrical manufacturing organisations dependent upon public supplies. Their power difficulties were added to by shortage of coal, and stocks in hand, in many cases, had to be reserved for the purpose of preventing plant from freezing up. Some manufacturers were able to instal petrol or Diesel engine-driven generator sets and by other improvisations continued full or partial production. Other firms took advantage of the suspension of their ordinary activities to carry out maintenance and repair work in their factories.

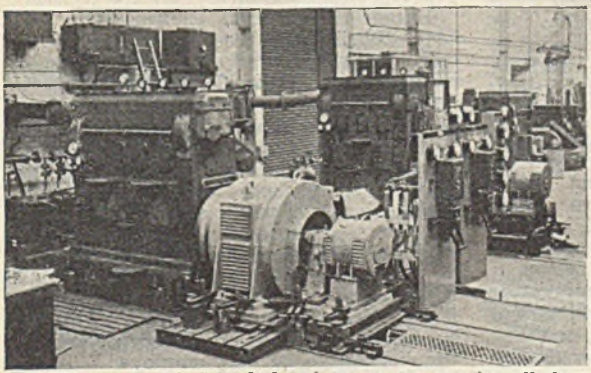
While the restoration of power last week and this enabled work to be resumed immediately in most works, it may be some weeks before the rate of production becomes normal because of lack of materials and components, the manufacture of which ceased or was curtailed during the crisis.



2 500 kW power unit of a mobile power station, installed in the turbine test department of the Metropolitan-Vickers Electrical Co., Ltd.

In the space available it is not possible to give a full and complete record of the experiences of all electrical manufacturers during the crisis, but so that readers may appreciate how the industry fared representative examples of what was done are given in brief below.

BRITISH THOMSON-HOUSTON CO., LTD.—In common with other manufacturers of electrical plant and equipment whose factories are mainly in the London, Midland, and North Western areas, had to curtail their activities. Every one of the company's eleven dispersed factories, from Willesden in the London area to Colne in Lancashire, were virtually at a standstill, and only at the main works at Rugby, where generating plant was installed was limited manufacture carried on and a wholesale stand-off of the labour force avoided. The company's heavy plant manufacturing is carried out at Rugby, where least interference with production took place. "The full effects of the crisis, combined with the shortage of raw materials," state the company, "cannot be assessed, but both management and workpeople are determined to overcome the difficulties. If increased co-operation is one of the fruits of this determination, leading to greater productivity, there are prospects of overhauling the lost output in a much shorter period than at first appeared likely."

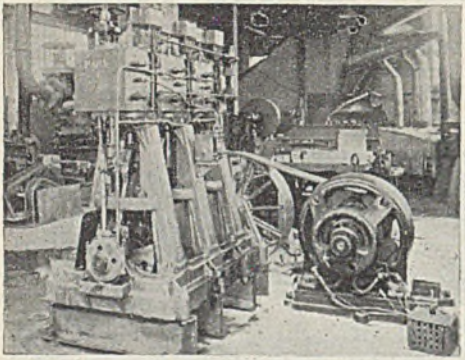


Two Petter-Brush Diesel-electric generator sets installed at the Falcon Works, Loughborough

BRITISH INSULATED CALLENDER'S CABLES, LTD.—The shut-down affected five main factories at Prescot, Erith, Willenhall, Helsby and Leigh. 14 000 hourly-paid employees were given notice as from the end of the normal day shift on February 19. To minimise the hardships which the waiting period would incur, the company made ex-gratia payments equivalent to the ordinary day rates in respect of Thursday and Friday, February 20 and 21.

ELECTRIC AND MUSICAL INDUSTRIES LTD.—The factories at Hayes, Middlesex, were closed. Hourly employees who ceased work on Monday, February 10,

received a guaranteed minimum week's pay. Weekly employees whose services could not be utilised during the crisis



A 110 H.P. steam engine, part of a "Pluto" ship's gear, driving a d.c. generator at the works of Johnson and Phillips, Ltd.

received either a week's notice in employment or a week's pay in lieu of notice. Both pension and life insurance contributions under the works' scheme for all workers were paid during the emergency.

FERRANTI LTD.—Dependent entirely on public supply for motive power, and also to a large extent for heating, the works at Hollinwood were completely shut down, and the office staff kept going by retaining their outdoor garments. The company managed to carry on a certain amount of experimental and development work, also a limited amount of work in test by the use of small generators, one of which was coupled to a fire engine, and another to an oil engine. A third generator, supplying power for radio test, was driven by a Fordson tractor, and the Admiralty lent an auxiliary Diesel set which provided a few kilowatts of power for some work in which they were interested in the instrument department.

JOHNSON AND PHILLIPS, LTD.—The steam engines, designed and employed on Operation "Pluto," were first used to drive generators to give light to works and offices. Petrol engines were then used to drive certain line shafts, and steps taken to secure a number of Diesel engine-driven generators which were promptly installed, and gave a further supply of light and power, enabling more of the machines to be kept running. Sufficient boiler capacity had already been converted to oil-firing to enable steam heat and some process work to be supplied, thus conserving coal stocks. With the aid of the partial supply of power, and concentration on such bench work, etc., as could be done without power, it was possible to keep a considerable number of workpeople occupied on their ordinary tasks. Those who could not be so engaged were found other useful work.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.—A 2 500 kW turbo-generator set (one of the mobile power units originally built for Russia) was put into commission to generate this limited amount of power, so that the foundry, steel products, "B" machine and maintenance departments could undertake a certain amount of work. Several boilers at the main works had been converted to oil firing as early as July, 1946, and were able to supply the necessary steam for this set. No facilities for generating power in the company's adjacent works were available and, therefore, the Mosley Road, Leonard and other works in Trafford Park had to cease work. As a result of the steps taken, it had been made possible to employ about 2 500 workers, but more than 10 000 had to be suspended. A second portable generator set was brought into commission on February 17, following arrangements which had been made enabling more steam to be raised by the utilisation of oil fuel. In consequence, it was possible to re-open certain additional manufacturing departments, thus providing employment for a further 1 500 to 2 000 employees. This addition enabled the company to maintain in employment practically 50 per cent. of its total manual workers.

SANGAMO WESTON, LTD., Enfield.—The factory was closed from February 7 when the fuel crisis started. About 1 000 employees were idle, but the company continued to pay them for a period of three weeks. No production was possible during the shut-down.

BRUSH ELECTRICAL ENGINEERING CO., LTD.—During the week-end prior to the cuts, engineers worked against time to instal temporarily in the test shop, at the Falcon Works, Loughborough, generators of the company's own manufacture, driven by Diesel engines built by a subsidiary company, Petters, Ltd., to maintain sufficient power to keep the factory working independently of public supply. At an associate company's factory, the Hazel Grove works of Mirrlees, Bickerton and Day, Ltd., at Stockport, adjustments were made to the existing generating equipment to make it possible for enough of the factory to be kept in operation to enable 90 per cent. of the workers to be fully employed. It was hoped to absorb temporarily the remaining 10 per cent. into other work in the factory. The Brush Company was inundated with inquiries for Diesel-electric sets from all over the country, and a special emergency organisation was estab-

lished to deal with them. In this way the sale of over 473 Diesel-electric sets and small engines, representing a total output of 12 500 H.P., was negotiated and delivery effected in a fortnight.

RAYMOND ELECTRIC, LTD.—This company maintained production and full employment by utilising motor generators at their Perivale factory.

TELEGRAPH CONDENSER CO., LTD.—Eight hundred workers were kept in employment at the North Acton works. Petrol and Diesel engine generator sets were installed during "crisis" week-end and except for a temporary stand-off of some sections on the Monday, work was resumed on a broad scale in all departments. Customers came forward with offers of additional generating plant and it was hoped to make use of these if raw material supplies were forthcoming.

TELEGRAPH CONSTRUCTION AND MAINTENANCE CO., LTD.—The coal shortage caused a partial close-down at the Greenwich works before the power cut, and when that was imposed production virtually ceased. The employees have a guaranteed week agreement and everyone possible was put on jobs of clearing up and general maintenance work.

COSMOS MANUFACTURING CO., LTD.—Following the cutting-off of the power on which their production depends, this company installed in their Enfield works one or two Diesel engine-driven generating sets supplying about 20 kVA to work a small proportion of machinery making essential components on which the company's Sunderland factory depended. One of the boilers was kept running to provide some warmth to the factory. The staff continued to work in unheated offices.

A. REYROLLE AND CO., LTD.—The company was affected by the crisis in two ways. Their fuel supply, like that of many other companies, was on a day-to-day basis, and the enforced economy in the use of current limited production. Their main problem was that of raw material supply, and that available was used sparingly, and allocated to equipment having priority for the coal mining industry and for supply undertakings. The compulsory rationing of raw material in the works resulted in short time, but this was arranged as fairly as possibly, so as to impose the least possible hardship on employees. If supplies are not resumed within the next week or two, it will be necessary to close those sections of the works that are unable to continue through lack of material.

CARTER ELECTRICAL CO., LTD.—A 3-ton Diesel engine-driven generator was installed at the Romford works to enable the firm to resume partial production. During the time of suspension employees decorated the premises. Now the generating plant is in full operation and the factory is in 100 per cent. production again.

(*To be continued*)

Electrical Personalities

We are always glad to receive from readers news of their social and business activities for publication in this page. Paragraphs should be as as brief possible.

MR. C. DE WIT, who has succeeded Mr. F. A. Kloppert as managing director of Philip's (Blackburn) Works, Ltd., has been in this country since 1935 and has been transferred to Blackburn from Century House, London, the head office, where he was secretary to the Group Plant Management Board. He has had long experience with the concern on the Continent and during the war was counsellor to the Netherlands Government. He received a great welcome from over 2 000 employees at the annual party on February 13, and said there were difficult times ahead, but with good will they would win through.

MR. C. DE WIT

COL. SIR GEOFFREY COX, a director of Edmundsons Electricity Corporation, Dr. C. P. Snow, and Sir Edward Wilshaw, formerly chairman and managing director of Cable and Wireless, Ltd., have been elected directors of the English Electric Co., Ltd.

DR. F. W. HAYWOOD has been appointed to the board of Wild-Barfield Electric Furnaces, Ltd., as technical director. He joined the company in 1938 as chief metallurgist and has been responsible for numerous important developments.

MR. C. CAMERON-KIRBY, chief engineer and manager to Alderley Edge and Wilmslow Electricity Board, has been appointed to a similar post with Margate and Broadstairs Electricity Board. He is a member of the I.E.E., an associate member of the M.I.M.E. and hon. secretary of

the North-Western Centre of the Associated Municipal Electrical Engineers.

MR. A. E. RAYNER, who has been an assistant secretary of the Institution of Electrical Engineers since 1935, retired at the end of February and has been succeeded by Mr. F. C. Harris, who also has spent many years with the institution. Including a short period of service in the Army in the 1914-1918 war, Mr. Rayner was with the institution for 47 years, during which time he served under four secretaries, commencing with Mr. W. G. McMillan, and is well known to many members. He was a familiar figure at the summer meetings, which were a popular feature of I.E.E. activities between the two wars, and in the organisation of which, as well as of the other major social functions, Mr. Rayner was closely concerned. Mr. Rayner was secretary of the Measurements Section from its inception in 1928 for some years until he was compelled by increasing responsibilities to give up those duties.

MR. A. E. RAYNER

MR. F. C. HARRIS

MR. C. J. ARMSTRONG, has been made associate director of development of Enfield Cables, Ltd., with responsibility for the design of outdoor installations (working in conjunction with the test and research department), contracts and No. 4 works. Mr. Armstrong was 14 years with W. T. Glover and Co., Ltd., before joining Enfield Cables in 1943. Mr. S. G. Holmes is to be associate director of export with responsibility for all matters affecting export sales and contracts. He joined the company in 1923 after four years with Siemens Brothers and Co., Ltd. Mr. H. D. Parsons is to be associate director of home sales, with responsibility for all matters affecting home sales departments and branches, the London office, and advertising. Mr. Parsons was for 23 years with Johnson and Phillips, Ltd., before going to Enfield in 1945. Mr. C. J. Sims has been promoted works manager of No. 4 works of Enfield Cables, Ltd., West Road, Northumberland Park, N. 17. Mr. Sims entered the Enfield organisation in 1914, having been employed by Johnson and Phillips, Ltd., and Siemens Brothers and Co., Ltd., with whom he was closely in touch with the design and manufacture of cable boxes and accessories.

MR. C. J. ARMSTRONG

MR. R. HOWARTH, one of their area meter examiners, has been appointed by the Electricity Commissioners to the post of chief meter examiner, which was rendered vacant by the death of Mr. S. H. Richards. Mr. Howarth has taken up duties at the Commissioners' offices at Savoy Court, Strand, W.C.2.

MR. A. S. WOODS, of Filey, Yorkshire, has been appointed electrical engineer of Mold, Flintshire, in succession to Mr. R. Gregory, who retires at the end of March.

MR. F. S. TAYLOR, deputy general manager of Newcastle-on-Tyne transport and electricity undertaking, has been appointed hon. secretary of the Northern area of the Municipal Passenger Transport Association.

MR. J. P. HESLOP will shortly take up his duties as engineer and manager to the Alderley Edge and Wilmslow Electricity Board in succession to Mr. C. Cameron Kirby. Mr. Heslop who was educated at King's College, Taunton, served his apprenticeship with the General Electric Co., Ltd., at Witton. Following an appointment with the St. John d'el Rey Mining Co. in Brazil, he served some years with the Rio de Janeiro Tramway Light and Power Co. On his return to England he joined the Manchester Corporation electricity department where he served in

MR. S. G. HOLMES

MR. H. D. PARSONS

various capacities for 16 years. Mr. Heslop is an associate member of the I.E.E., and of the Institute of Fuel, and the honorary secretary of the I.E.E. North-Western Centre Transmission Group.

SIR ROBERT WATSON-WATT, the radar pioneer, has received from Count Reventlow, at the Danish Legation, the Valdemar Poulsen Gold Medal, awarded by the Danish Academy of Technical Sciences.

COL. H. C. JOEL, controller, purchasing and supplies division, British Insulated Callender's Cables, Ltd., has been appointed a Deputy Lieutenant for the county of London.

SIR EDWARD APPLETON, secretary of the Department of Scientific and Industrial Research; Sir Claude Gibb, managing director, C. A. Parsons and Co., Ltd., Newcastle-upon-Tyne; and Sir Reginald Stradling, chief scientific adviser, Ministry of Works, are among those appointed to serve on the Advisory Council on Scientific Policy.

MR. KENNETH HORNE, sales director of the Triplex Safety Glass Co., Ltd., well known for his broadcasts, will entertain at the annual dinner of the Birmingham Electric Club at the Grand Hotel, Birmingham, this evening.

MR. A. W. MARTIN, chief engineer, E. K. Cole, Ltd., will be "on the air" from the B.B.C. Midland regional station (296.2m) in the programme "The Crown of the Road" on March 11 from 7.30 to 7.50 p.m., when he will talk to motoring listeners about car radio.

MR. N. F. ASTBURY has been appointed director of research to the Guest, Keen and Nettlefolds group of companies. Mr. Astbury was director of the research laboratories of Joseph Sankey and Son, Ltd. (one of the member firms of the G.K.N. group), which were described in our issue of October 25 last. It is intended that these laboratories shall now become the headquarters of the research organisation of the combine.

Sympathy is offered to Sir Cyril Hurcomb, Director-General of the Ministry of Transport and chairman of the Electricity Commissioners, in the loss of his wife, Lady Dorothy Hurcomb, who died at their home in London on February 21.

Obituary

LIEUT.-COL. W. E. CHINN, telephone manager, Nottingham, suddenly, at Birmingham, on March 1. He was a member of the I.E.E.

MR. H. E. CHASTENEY, Chief Inspector of Factories since January, 1946, on February 18, as the result of a street accident, aged 58 years.

DR. ARTHUR HAWDON MIDDLETON, one of the foremost authorities in the coke oven industry, at his home at Consett, aged 67 years. He gained his early engineering experience with Ferranti, Ltd., and the British Westinghouse Co., Ltd. He was president of the Coke Oven Managers' Association three times, a member of its Council since its formation in 1915, and senior past president.

MR. ARTHUR W. VICARY, chief designer and electrical engineer of the Midland Electric Manufacturing Co., Ltd., of Birmingham, February 18. Mr. Vicary was one of the original employees of that company, joining Mr. W. L. Barber when he founded M.E.M. in 1908. He was one of the early advocates of the use of porcelain as an insulator in medium tension switch and fusegear, and was a pioneer in the development of simplified protective control gear for electric motors. He played an active part on various technical committees of the B.E.A.M.A. and the British Standards Institution.

MR. WILLIAM A. MACFARLANE, an original director of the Macfarlane Engineering Co., Ltd., Cathcart, on February 22, aged 74 years. He served his apprenticeship with G. and J. Weirs, Cathcart, and was then employed by Mirrlees Watson and Co., Ltd., as a draughtsman. In 1895 he joined Watson Laidlaw and Co., Ltd., as assistant to his father, the late Mr. J. W. Macfarlane, then general manager of that company. After 12 years he went to the British Electric Plant Co., Ltd., Alloa, as works manager, remaining there until the formation of the Macfarlane Engineering Co., Ltd., in 1911. He was an associate member of the I.E.E.

Electrical Travellers

THE annual luncheon of the Electrical Trades' Commercial Travellers' Association, in London, on February 21, was attended by some 550, Mr. H. C. Potton, chairman, presiding. The chief guest was Air Commodore Sir Adrian Chamiers, who, after being introduced by the president, Mr. H. A. Lingard, explained how the A.T.C. was financed in the early days and expressed the hope that the association would do all it could to encourage the youth of the country to think in terms of good citizenship.

Mr. Lingard, in offering thanks, appealed for more effort to be made in the establishment of provincial branches of the association—a theme which was subsequently taken up by Mr. S. Johnson, the charities' secretary. Other speakers were Mr. C. A. Hughes, Mr. A. E. Morgan and Mr. H. E. Crow.

£87 was collected on behalf of the benevolent fund and the proceedings closed with an announcement by the Chairman to the effect that it was hoped to hold a ladies' night in October next.

I.E.E. Annual Dinner

Domestic Appliances and the Crisis—All-Electric Ideal

THE first I.E.E. dinner since the outbreak of war was held in London, on February 27. The president, Mr. V. Z. de Ferranti, was in the chair, and nearly seven hundred members and guests were present.

The principal speaker was Sir Stafford Cripps, President of the Board of Trade, who, in proposing the toast of the Institution, and after paying tribute to the contributions made by electrical science and engineering to the successful prosecution of war, said that two wars in one generation had almost literally turned our economy upside down. There could be no question of a return to pre-war conditions; the days of surplus labour were gone for ever, and there was temporarily an acute shortage of materials.

CONSUMERS AND PEAK LOADS

In such a situation, regard must be had to the many ways in which electricity could help, but the war had led to a shortage of generating plant just at the time when there had developed an enormous increase in demand. Apart from trouble with fuel supplies, there was the much longer-term difficulty of peak loads which our generating capacity could not carry. Everything must be and was being done to expedite the building of new power plants, but the gap caused by six years of war could not be made up in 18 months of peace. It would probably be three or four years before adequate generating plant was installed, during which time all those attractive domestic appliances which the ingenuity of the electrical industry had made available must so far as possible be sent to other countries. As much power as possible must be generated by smaller units improvised for that purpose, and large schemes of electrification must give way to reasonable alternatives where they existed. More must be done by economy in the domestic use of electricity and by transferring some of the industrial load to the night hours.

The President, who responded, said that when a member of the Institution was asked to become a Vice-President he was sent a wire asking him whether he was willing to accept that high office, with the possibility later of occupying the presidential chair. He himself received such a telegram, but he received it in France in May, 1940, when Germany was moving rapidly over the face of Europe and the Battle of France was raging. It gave him what might be described as a psychological shock, and a very good one indeed. It completely altered his outlook; he thought "Here is our dear old Institution sitting in London while the world is going to pieces, asking me whether I will agree to be President in four or five years' time." In his wildest dreams, however, he never imagined that during his year of office the electricity supply of the country would be cut off.

Dealing with the coal crisis, Mr. de Ferranti pointed out that the application of power and heat by electricity was a great saver of coal. It might be thought that to switch on an electric fire was a crime but, in fact, the man who did so, instead of burning coal in his grate, was a saver of coal and a public benefactor. Sir Oliver Lodge in 1905 had referred to the "uncivilised and essentially savage method of heaping a pile of crude coal together and setting alight to it," and personally he thought it wrong to leave in the hands of the individual for a moment longer than was necessary, the means of polluting the atmosphere and preventing the attainment in our industrial towns of the living conditions necessary for the health of the people. The only objection at the moment to the use of electrical apparatus was that it was said that there was not the plant to supply the load. It was true that there was not the plant to deal with the peaks of recent electrical demand, but the load factor was only about 50 per cent., and, therefore, there was available as much plant again as was used at present if the hours of its use were spread.

ELECTRICITY CHANGE OVER

He hoped that our present misfortunes would not affect our progress towards the all-electric ideal, which would mean that all the coal of the country would be efficiently converted into energy which would be available for every purpose for which it was required. If the process of changing over to electricity continued at the same rate as in the past, the job would be done in twenty-five years, and only such a steady increase in the power available could raise our material standard of living. It would be easier to develop and build those systems, however, than to control them when built, as the recent dislocation had shown.

The toast of the Guests was proposed by Colonel Sir Stanley Angwin, and responded to by the Earl of Listowel (Postmaster-General) and Lord Rayleigh (President of the Royal Institution).

Alexander Graham Bell Centenary

Outstanding Developments in World Communication

CELEBRATION of the Alexander Graham Bell centenary took the form of a public lecture staged by the I.E.E., in the Central Hall, Westminster, on Monday, and entitled "Graham Bell—Pioneer: An Era of Outstanding Developments in World Communication." The speaker was Col. Sir Stanley Angwin, a past-president of the institution, late engineer-in-chief of the General Post Office and now chairman of Cable and Wireless, Ltd., Mr. V. Z. de Ferranti, president of the I.E.E., occupied the chair and also on the platform were the Earl of Listowel, Postmaster General; Sir John Ireland Falconer, the Lord Provost of Edinburgh; and Sir Thomas Eades, chairman, Telecommunication Engineering and Manufacturing Association.

EARLY HISTORY

The President said they were met together that evening to do honour to the memory of Alexander Graham Bell, the inventor of the telephone, who was born in Edinburgh 100 years ago. The institution started 75 years ago as the Society of Telegraph Engineers, and it was interesting to find that on October 31, 1877, at 25, Great George Street, the old building of the Institution of Civil Engineers, Graham Bell visited the Society of Telegraph Engineers and gave a discourse on his researches.

The Earl of Listowel, in introducing Sir Stanley Angwin, said the Post Office had intended to arrange an exhibition to illustrate the development of the telephone, and it was with very great reluctance that they had decided that it was necessary to postpone it because of the fuel and lighting restrictions. Sir Stanley Angwin had a very distinguished career in the Post Office, to which he devoted 40 years of his life culminating in his appointment as engineer-in-chief just before the outbreak of war, when he at once shouldered most successfully and with great distinction complicated telecommunication problems with which the war presented the nation. On the telephone side in particular several outstanding developments were made under his guidance.

ADDRESS OF TRIBUTE

Sir Stanley Angwin, in the course of his lecture, gave a brief recapitulation of the more outstanding historical facts of Bell's life and work, and a resumé of some of those phases of subsequent telephone development which most closely derived from Bell's experiments, illustrating his remarks with several interesting demonstrations. Of all the many and great changes which the development of the technique and apparatus of telephony had brought about since the early days of the use, in combination, of Bell's receiver and the carbon-granule microphone, he said the changes in those two instruments were perhaps the least significant. Only recently, as the result of the application to accoustical and mechanical design of techniques based on analogies to electric circuit theory, had substantial improvements in the quality of the performance of those instruments been brought to a practical form. In particular, the effects of mechanical resonance could now be eliminated and the sensitivity of the instruments maintained at the higher frequencies transmitted in commercial telephony. That telephone instruments improved on those lines had not yet been brought into general use in this country was due partly to the war and partly to the magnitude of the task of replacing the millions of subscribers' telephones.

TELEPHONE DEVELOPMENTS

Referring to the stride forward in the last ten years in the development in carrier telephony by the use of coaxial cable, Sir Stanley Angwin mentioned that the latest system now being installed in this country had a bandwidth from 60 kc/s. to 2 850 kc/s., with repeater stations spaced about six miles, permitting a total traffic capacity of over 600 telephone circuits. The ability to transmit wide bandwidths of frequency had application not only to telephony, but also to television, for routing programme signals to the radio transmitters. The problem was more difficult for television, because equalisation not only of amplitude, but also of phase over the frequency band was necessary for television, but not for telephony.

The frequency bandwidth which would be usable for telephony on any long-distance submarine cable would be very valuable and could justify exceptional measures being taken for its most economical use. Some studies were now being made of the transmission of speech from a different approach from the simple one of direct transmission of the wave-forms of the currents sent out by the microphone. If advantage could be taken of

the comparative slowness of the rates of change of the wave-forms of speech, bandwidth economy could perhaps be effected by limiting the information transmitted to what was essential concerning those changes. A piece of practical apparatus, based on the analysis and synthesis of speech sounds, which illustrated the new outlook, was available. It was called a "Vocoder," a contraction of the two words "voice" and "coder." The analyser at the microphone end of the line broke down the wave-forms of the speech currents into eleven "packets" of information; these were separately transmitted, as a running commentary, to the synthetiser at the receiver end, which used them to build up local sources of voice frequency currents into wave-forms similar to those received by the analyser. Although there were eleven transmission channels, the speed of the signalling on each one was low, and it was estimated that they could all be accommodated in a bandwidth of about 300 c/s, as compared with about 3 000 c/s for normal telephony.

The operation of the Vocoder was demonstrated.

A vote of thanks to Sir Stanley Angwin was proposed by Sir Thomas Eades.

An abstract of Sir Stanley's address was broadcast that night in the Third Programme at 10.45 p.m.

CENTENARY DINNER

At a centenary dinner held by the Telecommunication Engineering and Manufacturing Association, at Grosvenor House, London, in the evening, with Sir Thomas Eades presiding, Sir Frank Gill added further tribute to the work of Alexander Graham Bell.

After recounting some of the early telegraph experiments which led up to the discovery of the telephone, Sir Frank pointed out that practically all commercial telephones to-day, had the same essential components as used by Graham Bell, — the transmitter, the diaphragm, variable resistance and the electromagnet. About 65 years ago there were very few instruments available to the telephone engineer, though the telegraph had benefited by the experiences of the professorial world. Later, however, men from the colleges opened the door to all kinds of measurements, one outstanding name being that of Duddell.

Sir Frank Gill concluded his remarks by a reference to Mr. J. E. Kingsbury, from whom a letter was read.

Sir Thomas Spencer proposed the Guests and Lord Listowel, the Postmaster General, in reply said that the Post Office had a six year plan which he believed would make communication services of this country second to none. Manual switching, almost completed, would enable 150 of the principal teleprinter offices in Great Britain to communicate direct with one another; and the introduction of automatic switching in England, to be completed by 1953, would raise telegraphic communication to a better position than it had ever occupied. There were 4 500 000 telephones in use in the country to-day, compared with 2 000 000 in 1936, giving a saturation figure per square mile higher than anywhere else in the world. The rate at which new connections were being made was 70 000 per month, compared with 30 000 before the war and there remained a demand of 400 000. How long these conditions could be met it was not possible to say, but already exchanges were showing signs of possible exhaustion; a condition which was, however, temporary.

Sir John Falconer, the Provost of Edinburgh, also replied.

The toast of the Association was proposed by Mr. V. Z. de Ferranti, president I.E.E., and replied to by Sir Thomas Eades.

J. E. Kingsbury

BY way of celebrating the 92nd anniversary of the birth of Mr. J. E. Kingsbury on February 27, four directors of Standard Telephones and Cables Ltd., made a gramophone record for presentation to him as a token of their high regard.

Mr. Kingsbury was a director of the Western Electric Co., Ltd., until September, 1925, when the name of the company was changed to Standard Telephones and Cables Ltd., and the record sent to him last week, originated from a wish to send some very personal expressions to the oldest telephone man in the world; a man who knew very many of the earlier telephone pioneers, including Alexander Graham Bell, the centenary of whose birth was celebrated on Monday.

The voices recorded on the presentation disc are those of Sir Frank Gill, chairman; Sir Thomas Spencer, managing director; Sir Donald Banks, director; and Mr. E. S. Byng, vice-chairman; speaking in that order.

The Incorporated Association of Electric Power Companies has issued, through its Public Relations Committee, a pamphlet informing consumers of the proposals made by the industry for limiting the general disruptive consequences of the coal shortage.

I.M.E.A. and the Bill

District Distribution Units—Adequate Compensation Sought

THE Incorporated Municipal Electrical Association, at an extraordinary general meeting at the Central Hall, London, on February 20, passed a number of resolutions aimed at amending the Electricity Bill to give the structure of the supply industry a more democratic basis than that proposed in the measure, and to secure adequate compensation for local authorities.

The resolutions were to the effect: (1) That steps be taken to secure that the scheme of administration below Area Board level as described in the association's Memorandum dated December 17, 1946, including the formation of District Distribution Units and District Committees, be established in lieu of the Consultative Councils proposed in Section 7 of the Bill. (2) The second resolution was that steps be taken to secure: (a) That the Minister, in the exercise of any of his powers in relation to any Area Board, should first consult the Central Authority; and (b) That the Central Authority should consider any conclusion, report and representations notified or made to them by Area Boards, and the Area Boards may, after consultation with the Central Authority, make representations to the Minister on any matter arising thereout. (3) That steps be taken to secure adequate compensation for local authorities including compensation for all losses arising from the severance of the undertakings from the other activities of local authorities.

In the memorandum to the Minister, dated December 17, the association supported the view that the whole of the supply industry should be publicly owned, and that a national authority should be created to control, co-ordinate and direct the industry, and expressed the opinion that such statutory authority should be of persons of wide experience with practical knowledge of (a) the operation and administration of the industry, (b) local government administration, (c) labour, (d) finance, and (e) industry.

AREA BOARDS

The over-riding necessity of limiting the number of Area Boards was appreciated by the association. To meet that necessity and at the same time provide administrative units with executive powers within reach of the consumer and prospective consumer, it was recommended that each area be sub-divided into a suitable number of districts, each controlled by a district distribution unit with delegated powers.

The engineer and manager of each district would be responsible to a district committee composed of representatives of local authorities in the district together with representatives nominated by recognised industrial and labour organisations. This Committee would administer the district unit under powers delegated to it by the Area Board. Further, the committee would make recommendations to the Area Board on all matters outside their delegated powers.

EVENTS LEADING TO BILL

Mr. J. S. Pickles, the president, gave an outline of the happenings since the August meeting of the association when it was agreed that the generating stations should be transferred to a central body and resolved in regard to distribution, to urge that the maximum local authority control in administration should be obtained in the new structure. Immediately after that meeting, he said, the Council of the association asked for an interview with the Minister of Fuel and Power to present to him those resolutions. They were not, however, invited to see the Minister until November, when Mr. Shinwell outlined his skeleton structure for the reorganisation of the industry. The Parliamentary Committee, representing all sections of the association, had a long discussion with him, and urged that local authorities were the safest basis upon which to launch the scheme of reorganisation and retain public confidence and goodwill. The Minister was told that they feared a too rigid structure, and outlined a scheme for the formation of district units as described in the memorandum.

Mr. Shinwell said that he could only ensure getting the right men in the right places if he had powers of appointment of the Central Authority and the Area Boards; he hoped that the Consultative Councils would form the link between the public and the Boards. He agreed to consider the suggestions, however, whereupon the Committee prepared a memorandum embodying their recommendations, and sent it to Mr. Shinwell on December 17.

After the Bill had been published it became clear that it would be desirable to see the Minister before the Committee stage of the Bill was reached, and Mr. Shinwell offered an appointment for February 14; owing to the fuel crisis, however, the meeting was postponed until February 21.

There were many things in the Bill, added Mr. Pickles, with which they were not pleased, but they realised that the Bill was inevitable and all efforts should be directed towards improving the measure with the general object of making it a workable and successful instrument that

would enable the industry to continue and accelerate its progress.

Mr. J. Eccles, city electrical engineer, Liverpool, and vice-president of the association, in moving the first resolution, said that the 14 Area Boards would each control some 5 000 sq. miles, some areas more than 100 miles from end to end. Lifelong experience of the administration of the supply industry had shown it to be exceedingly difficult to administer an area of that size from one central office, so that the first thing that any Area Board would have to do would be to break up its area into a reasonable number of administrative districts. If correctly chosen, there would be districts in which there was community of interest, in which the urban area was associated with the rural area and in which there was some link or communication between them. The Council of the association felt that that ought to be compulsory in the Bill, and one of the prime purposes of the motion was to secure that. They felt that local authorities, having had 50 years' experience in that business, having already controlled two-thirds of the electricity sold in this country at the present time, and having a record of which, not only were they not ashamed but had every reason to be proud, were the people who should have a voice in the control of those district units in their own areas. The Council, therefore, suggested that, having divided the areas up into districts, each district should be controlled by a committee mainly composed of the elected representatives of the local authority in that district, so that the new district distribution units, or district distribution authorities, or whatever their ultimate name might be, would be in essence a replica of the best type of local authority-owned undertaking as known to-day.

The discussion generally was in favour of the motion and it was carried, there being only a few dissentients.

Ald. Sir William Walker, in moving the motion relating to the powers of the Minister, referred to the repetition of the word "Minister" throughout the Bill, and said that it really meant Ministry, with the chance for interference in local administration. Therefore, they were seeking the right to bring in a little local pressure where it ought to be exercised.

The motion was carried unanimously.

In moving the resolution referring to compensation, Sir William Walker uttered a warning that care must be taken to safeguard assets that they wanted to protect. When one came to review the commitments of an electricity department, he said, it was astounding to find how far they extended and could be influenced by the proposals. He instanced a large piece of land that had been purchased by an electricity department for use in association with another department as a recreation ground, and other lands and buildings from which the local authority derived benefit, which under the Bill might be looked upon as assets of the electricity department. The Treasury officials would fall upon all they could, and, therefore, it was necessary to include the words "all losses" in the resolution. They had to look after the interests of the ratepayers and consumers.

Several amendments expressing the opinions of local authorities on the question of compensation generally and as it affected their own interests, were submitted and discussed at length, and finally the resolution as given above was adopted.

On February 21 Mr. Shinwell saw a delegation from the association at the Ministry of Fuel and Power, and the views as expressed in the resolutions above were presented to him. It was a private meeting and no statement was issued by either side.

[Other Bill items are on page 570.—Ed.]

The White Paper

THE broad arguments contained in the White Paper, "Economic Survey for 1947," published on February 21, have already been widely publicised.

After detailing the measures which the Government proposes to take to increase production per man and also build up the labour force in the mines, the survey promises high priority to the conversion of engines and plant to oil-burning.

The immediate crisis in the electric power industry, it is admitted, results from lack of coal. But even when there is enough coal to run the power stations, there will still be an electricity shortage. In 1938, electricity production was at its pre-war peak of 24 000 million units; in 1946, it was 41 000 million units. This January it was running 15 per cent. above last year.

The C.E.B. has less than 9 million kW of plant in service, and this winter the deficit is 1.4 million kW. In spite of a substantial programme for the production of generating plant, which will provide 0.8 million kW of plant in 1947 and 2.6 million kW by the end of 1949, the position is likely to get worse in the next two years.

Although high priority is already given to the production of new generating plant, it will take some years to make up the arrears. In the meantime, the Government will do everything it can to increase generating plant by the use of smaller units and by emergency measures. Drastic steps, it is reiterated, will be taken to cut down the non-industrial load.

ELECTRICAL RESEARCH

ANNUAL MEETING AND LUNCHEON—COUNCIL MEMBERS

THE annual report of the British Electrical and Allied Industries Research Association was presented by the Chairman of Council, Mr. R. Lee, at the annual meeting of the association on February 14.

The proceedings opened with an announcement by the Chairman that Lord Mount Edgcumbe, the new president, had been elected an honorary member of the association.

The following were elected or re-elected to the Council: Mr. L. A. Gripper, Col. Sir T. F. Purves, Mr. H. L. Kirke, Mr. C. W. Marshall, Mr. A. Collins and Mr. R. Birt.

The chief speaker at the luncheon which followed was to have been Mr. E. Shinwell, Minister of Fuel, but owing to the coal crisis he was unable to attend. Speaking in his stead, Sir John Dalton, general manager of the County of London Electric Supply Co., Ltd., and having expressed regrets at Mr. Shinwell's absence, said that had the Minister been present he might have attempted to explain why in the new Electricity Bill he was repealing the earlier section which enabled the supply industry to contribute financially to the funds of the E.R.A. Their interest might have been heightened if it had been explained to them why the Minister had put upon the new Central Authority the duty of conducting research on its own. He could only assume that in the new Bill, which bore abundant evidence of having been drafted in a great hurry, someone had blundered, and that, indeed, the existence of that admirable and important association was not known in the places where these Bills were prepared. He suggested that they should not accept any verbal assurances that there was no intention to disrupt the association, but should ask for positive amendments to that effect. The association had the confidence and support of every branch of the industry, and it must continue.

THE NEW PRESIDENT

Lord Mount Edgcumbe, who succeeds Sir Charles Darwin, F.R.S., as president of the association, said that it was with somewhat mixed feelings that they saw that the Government had made research one of the very prominent items of their new Industrial Organisation Bill. So long as they did not mean by " promotion of " merely " meddling with " it would be all right. Never had organised research been more vital to the well-being of the country than now. It was to be hoped that the " gainfully employed " part of the nation was now realising that you could not have what you did not produce; it should be posted on every cinema screen that you could gain only by producing more. The President of the Board of Trade had, very naturally, deprecated any shortening of the working week; but unfortunately at almost the same moment the Government reduced the working hours of all their dockyards.

The Batti-Wallahs

OWING to the absence on business of Sir Hartley Shawcross, who was to have been the guest-speaker at the luncheon of the Batti-Wallahs' Society, on February 27, the chief guest was Sir John C. Dalton, joint general manager of the County of London E.S. Co., with Sir Thomas F. Purves in the chair, in the absence of the president, Mr. P. V. Hunter, who was suffering from a chill.

In the course of his address, Sir John gave a semi-humorous criticism of the Electricity Bill. What, he asked, was to be put in the place of the Electricity Commission, the C.E.B., the 365 municipal electricity committees, the 195 company boards and eight joint authorities and joint boards? In effect it was the Rt. Hon. Mr. Emanuel Shinwell who made no fewer than 99 appearances in 61 clauses of the Bill, and, in addition to having power to make numerous regulations and orders, made 54 appearances in 16 different guises. He could direct eleven times, approve eight times, appoint nine times, determine eight times, require three times, settle once, authorise once, serve notice twice, consent four times, agree once, be satisfied once, be consulted once, think fit once, think necessary once, consider necessary once, and hold inquiry once. The Minister had power to appoint a minimum of 418 and a maximum of 558 gentlemen to run the industry for him and out of that number about 138 would be in the top-salaried class with allowances and pensions, and the rest would be able to draw allowances.

A vote of thanks was accorded on the proposition of Mr. E. Leete.

Two old Batti-Wallahs present were, Mr. J. C. Thomson and Mr. Bertram Thomas. The latter, who was one of the original P. and O. members, recalled early experiences as a ship's electrical engineer.

Danger of Fuel Restrictions

Warning of Possible Future Industrial Dislocation

THE view that the Government " need not have done to Britain what Hitler failed to do " if they—and especially the Minister of Fuel and Power—had listened to the electricity industry, was expressed recently by Sir Robert Renwick, chairman of the County of London Electricity Supply Company, at a luncheon of the Radio Industries Club in the Connaught Rooms.

British industry, he said, had been brought to a standstill and up to the very eve of the crisis " Mr. Shinwell had fiddled like a twentieth-century Nero with the Electricity Bill while Britain froze."

The great danger was that because the gamble on the weather had been made and lost, and because the country had been brought to disaster, the Government might scurry into a policy of wholesale and purely defensive fuel restrictions, the long-term results of which might be even more serious than the present catastrophe.

The principal cause of the crisis had been lack of coal. Home consumption of coal had not increased, but was almost the same in 1946 as it was in 1939. It was true that consumption of coal by electricity undertakings had increased, but that was all to the good because the use of electricity was acknowledged to be the most economical way of burning coal, and there had, therefore, been an actual saving.

COAL ALLOCATIONS

Referring to the Government's scheme for the allocation of coal to the electricity industry which had to be sub-divided among the generating stations, the speaker gave as an example the allocation to the South-Eastern area. The amount of coal allocated against the estimate of requirements from October 25, 1946, to February 7 this year, was 2.022 million tons; but the amount delivered was only 1.731 million tons, leaving a deficit of 291 000 tons. On February 7 the stocks of coal at power stations in this area amounted to 181 760 tons.

If the total coal allocated in the period had been delivered, stocks on that date would have been nearly 473 000 tons, which equalled three-and-a-half weeks at the normal rate of consumption.

The quality of coal was appalling. Since the amount of rubbish in every ton of coal was reckoned in the statistics of output, the figures did not entirely reflect that credit which the Ministry of Fuel so anxiously pursued. Before the war, power stations with which he was connected drew their coal from different colliery companies, which vied with each other to produce as near to specification as possible because they knew that their goodwill depended on meeting requirements. In 1946, the extra ash over and above the 1939 standard in the coal supplied to generating stations amounted to not less than 750 000 tons. This was one of the factors reducing the output of the generating plant.

GENERATING PLANT

As to plant, the Central Board, said Sir Robert, in its zeal to effect a high degree of economy, had, perhaps, reduced the margin of spare plant available to less than was considered prudent by those more intimately associated with the requirements of consumers. This was, in his opinion, the reason why the supply industry started the war with plant capacity in the aggregate equivalent only to about two years of normal development. The war had naturally aggravated the position. The deficiency in generating plant with which we now had to contend was most serious. In 1946, due to the absence of effective priority, only about 203 000 kW of new plant was added. The need was for about 1 400 000. Hence the shedding of load which took place before the major crisis—and inconvenience here and there, but not the complete disaster which was brought on by the shortage of coal, and which would have occurred irrespective of the weather.

Sir Robert Renwick gave a warning that in the future we must expect far greater dislocation of industry and hardship in the home unless the most energetic measures were taken at once. Coal was the key. If we were to achieve the full target of export of manufactured goods the minimum coal production target for 1947 must be about 220 000 000 tons, of which 10 000 000 tons at least must go to re-create stocks. Here he disagreed with the Government's minimum target of 200 000 000 tons, given in the White Paper.

The deficiencies in plant with which we had to reckon were most severe and would rise to 1 700 000 kW in the next two years; and on an optimistic basis we should not again be even as well placed as we were now until the winter of 1952. The only possible solution was to give manufacturers of plant and those engaged on building generating stations a sufficiently high priority to hasten the production of station plant at the expense temporarily of exports.

British Refrigeration Association

Increase in Membership—Views on Electricity Bill

SPEAKING as the chief guest at the annual luncheon of the British Refrigeration Association, in London, on February 17, Mr. Hugh Dalton, Chancellor of the Exchequer, said that the nation-wide Order of the Day was still "work, save, and export." The lessons of experience accumulated through life were often quickly forgotten, but all would remember the recent weeks for a long time.

EXPORT TARGET

Appealing to the member-firms of the association to concentrate on exports, he reiterated the Government's target of a 75 per cent. increase on pre-war volume in exports. "If we do not do this, the consequences will be very simple and very unfortunate." There was, he said, only one answer to the shortage of labour, of coal, or the many other shortages, including electrical generating plant, and that was to produce more, and to produce more not only for the home market but for export.

Mr. E. G. Batt, independent chairman, in reply, said that the association now had 371 sectional members, covering in a fully representative manner the manufacturing, distributive and servicing sections of the industry. During the past year there had been brought into operation two fair trading codes covering the commercial and domestic markets respectively. These codes were a binding obligation on all members, the aim being to secure to the public, the highest standards of distribution and service on the most economical basis. The codes specified certain limitations in discounts, but these applied to manufacturers' list prices, all of which were fixed by each manufacturer individually, dependent upon his own costs of production, and not in any way by collusion or agreement with other parties.

On the subject of education, as a result of joint discussions with the Institute of Refrigeration, classes were in operation at the Borough Polytechnic under the guidance of its principal, Dr. Ingall. The association had been asked to co-operate in the setting up of a National Training College under the auspices of the Ministry of Education, and the matter was now receiving the Council's attention. The association's technical representatives co-operating in the work of the B.S.I. continued their efforts and it was hoped that some at least of the standards which the industry badly required would be issued during the coming year. So far as production was concerned, the position was not bright, particularly in regard to domestic units. Apart from the supply of "built-in" units for the prefabricated housing scheme, efforts had been stultified by lack of labour and essential materials, by the difficulties of obtaining licences and by many other restrictions.

With regard to the Electricity Bill, the clause "Central Authority shall have power to manufacture electrical plant and electrical fittings," might, if finally included in the Bill, react on the refrigeration industry, particularly in so far as domestic units were concerned. If the provisions of the clause in the Bill were upheld, every one in the refrigeration industry would be continually and psychologically handicapped by the fear of a reduction in the volume of trade for which productive capacity was planned.

Mr. A. M. Allan, member of Council, proposed the guests, to which Ald. H. Leason, Lord Mayor of Stoke-on-Trent, and Mr. C. F. Dickson replied. The Chairman was proposed by Mr. Walter Riggs, member of Council.

I.E.E. Western Centre

AN appeal to the Government to give the country a lead and to tell the true facts which led up to the fuel crisis was made by the Lord Mayor of Bristol, Mr. Gilbert S. James, at the Western Centre of the Institution of Electrical Engineers' dinner and dance at the Victoria Rooms, Bristol, on February 17.

Mr. R. W. Biles, chairman, disclaimed on behalf of the electrical industry responsibility for the crisis and said plans to avoid such a position as had arisen were made in 1943. If the Government had let those plans materialise we would not be nearly so short of plant to-day.

Mr. V. Z. de Ferranti, president of the institution, said Mr. Shinwell, and apparently a number of people around him, kept talking about the phenomenal increase in the use of electricity. That was all nonsense. If the officials of the Ministry of Fuel would take the trouble to look at long-range figures, they would see that the increase in the use of electricity had gone up for a great number of years at the rate of 10 per cent. per annum. That rate of increase was about the steadiest thing he had ever seen, and it should not have surprised anyone.

The National Register

Work in Hand and Projected—Members of Board

THE National Register of Electrical Installation Contractors has drawn the attention of certificated members to the fact that copies of the list of members, wherein 1 200 names appear, are being sent to all principal corporations, institutions, bodies and officials who may be interested in installation work. The Register has also drawn the attention of certificate holders to the importance of I.E.E. Regs. 6 and 1108, pointing out that though the war prevented these regulations from becoming effective in many instances, it is now considered that they should be more generally adopted.

I.E.E. REGULATIONS

In this connection the Register is prepared to supply to registered contractors at cost price under bulk purchase, standard labels or tablets which may be fixed on or near the main distribution board in conformity with Reg. 6, and worded to the effect that the installation should be periodically inspected and tested. For this work, the Register has Mr. H. C. Hazell and Mr. J. J. Looker as inspectors.

Regulation 1108 calls for a certificate to be given by the contractor to his customer on the completion of the work, stating that the installation has been completed in accordance with I.E.E. Regulations subject to any named exceptions. The Register has decided to issue free of charge supplies of the necessary certificates in the form prescribed by the I.E.E.

Holders of the certificate of the Register are under obligation to see that, unless otherwise agreed with the purchaser, all electrical wiring installation work undertaken by them conforms to the I.E.E. Regulations for the Electrical Equipment of Buildings. If, however, due to force of circumstances or otherwise, a registered contractor is unable or unwilling to rectify work carried out by him not conforming to these regulations and it is considered to be undesirable that a purchaser should remain at a disadvantage on this account, the Register has decided that expenditure may be authorised in approved cases for ensuring that the obligations entered into with the Register by certificate-holders are upheld to the purchaser. Copies of a memorandum outlining this obligation which the Register has undertaken in the interests of the public have been sent to members, and attention may be drawn to it by registered contractors seeking orders for installation work.

The Register is supported by the Association of Consulting Engineers, the Central Board, the E.C.A. of Scotland, the I.M.E.A., the I.E.E., the R.I.B.A., the E.A.W. and the E.P.E.A., among others, but as explained in THE ELECTRICIAN of July 12 last year, is no longer supported by the E.C.A. With a view to clarifying the position which has developed since last summer, Mr. F. W. Purse, the honorary director of the Register, in the week before publication was suspended on account of the coal crisis, amplified the views of the Register with respect to compulsory registration, recounted some of its present activities, and announced that the Register would shortly publish its own journal.

Members of the Registration Board are: Messrs. P. V. Hunter, H. J. Cash, J. M. Donaldson, Forbes Jackson, W. J. McC. Girvan, J. A. McConnel (nominated by the I.E.E.); Messrs. R. Birt, L. A. Gripper, E. A. Mills, F. Swarbrick (I.M.E.A.); Messrs. H. M. Fulton, J. D. D. Shaw, W. A. Smith (E.C.A. of Scotland); Messrs. T. W. Heather, A. E. Iliffe (B.E.A.M.A.); Messrs. A. H. Dykes, H. M. Winstanley (Association of Consulting Engineers); Messrs. P. M. Millns, E. A. V. Peckham (E.W.F.); Mr. N. R. Elliott (London J.E.A.); Mr. D. B. Irving (C.E.B.); Mr. G. Fairweather and Mr. C. H. Perkins (R.I.B.A.); Miss C. Haslett (E.A.W.); Mr. W. E. Fry (E.P.E.A.); Mr. Fredk. W. Purse, hon. director, and Mr. A. Montgomery, secretary.

New 44 MW Hydro Scheme

DETAILS of the North of Scotland Hydro-Electric Board's Glen Shira project, which will make available to the region a further 44 000 kW, were published last week. The scheme is estimated to cost about £3 250 000, and during construction up to 2 000 men will be employed.

Two new lochs are to be created in the hills above Loch Fyne, one of them 1 125 ft. above sea-level. The water discharged from the main storage loch will pass initially to a 4 000 kW power station, and thence to a subsidiary loch, 965 ft. above sea-level, where water from a lower catchment area will be collected. A 4½ miles tunnel and pipeline will connect this to the main generating station, of 40 000 kW capacity.

Industrial Information

B.E.A.M.A. Price Adjustment Formulæ

For the purpose of calculating variations in (a) rate of pay, the rate of pay for adult male labour at February 8 shall be deemed to be 1/10s.; (b) costs of material, the index figure for intermediate products last published by the Board of Trade on February 8 is 207.9, and is the figure for the month of January.

Metrovick Pantomime Week

During the Metrovick Pantomime Week at the Palace Theatre, Manchester, when the house was booked for five nights by the Metropolitan-Vickers Electrical Co., Ltd., something like 11 000 employees attended performances of Tom Arnold's production of " Puss in Boots," and their enthusiasm was increased by the introduction of a number of topical " gags," some of the Palace management and artistes having visited the Trafford Park works in advance to obtain local colour. The Friday's performance was attended by representatives of the directors and management, and at the final curtain the performers were thanked by Mr. I. R. Cox (managing director) and Mr. E. W. Steele (director and general manager of works) for their co-operation.

Management and artistes from the Palace Theatre, Manchester, at the Trafford Park works of Metropolitan-Vickers to get " local colour " for Metrovick Pantomime Week. In the background is seen the stator of a 60 000 kW turbo-alternator for Stuart Street generating station

Stolen Appliances

Drubel Radio Distributors, Ltd., of 39a, Stafford Road, Croydon, having been burgled recently, desire to trace 12 " Mary Ann " cleaners, serial numbers 9311, 9314, 9206, 9369, 9331, 9209, 9351, 9340, 9380, 9156, 9312, 9266; a quantity of Diamix 1 kW and 2 kW fires; Sterling " Grenaby " clocks; O'Connor hot-plates; Jablo toasters; Junction irons. Any information should be telephoned to Croydon 1107/8 or to Croydon Police Station.

I.E.E. London Students

The meeting of the I.E.E. London Students' Section held on Tuesday, February 18, took the form of a discussion on " Radio Modulation Methods," opened by Mr. G. Dawson, who briefly explained radio for the benefit of the uninitiated and then put the case for amplitude modulation. Mr. R. F. Howard spoke on frequency and phase modulation, and Mr. D. Deacon concluded with the latest development of pulse modulation. An interesting and lively discussion ensued and the proceedings were summed up by Mr. J. H. Reyner, the senior member present.

Fluorescent Lamps

The E.L.M.A. has announced that by the use of improved fluorescent powders and electrode materials, the daylight fluorescent lamps manufactured by members of the association now give increases of 50 per cent. in both life and light output per W compared with those introduced in 1939. A comparison between the old and new efficiencies of the type MCF/U daylight lamp are tabulated below:

Rating	Luminous Efficiency in Lumens per W					
Lamp Wattage	Average at 100 hours		Average through life		Final	
	Old	New	Old	New	Old	New
80	35	45	24	38	22	32
40	40	50	30	43	26	36

Notes for Contractors

As a result of representations by the National Electrical Contractors' Trading Association to the Ministry of Works that members were being prejudiced by having to apply to their competitors, the local supply undertakings, for priority symbols to enable them to acquire National Housing Drive type of electric cookers in approved cases, arrangements have been made whereby members may apply to their Regional Materials Officer of the Ministry of Works instead of to the supply undertaking if they wish to obtain priority in approved cases. If he is satisfied that an application merits priority he will supply the necessary priority symbol. A supple-

mentary agreement has been reached between the National Federated Electrical Association and the Association of Supervising Electrical Engineers that as from the pay day following April 1, the cost of living addition shall be 25 per cent. on the basic salaries.

Lamps for Eire

The Government of Eire have fixed the quota of electric filament lamps that may be imported between March 1 and August 31, at 50 000.

Change of Telephone Number

The telephone number of the Incorporated Municipal Electrical Association, Kingsway House, 103, Kingsway, London, W.C.1, has been changed and is now Holborn 4608/9.

E.A.W. Course for Teachers

At the request of the L.C.C., the E.A.W. has arranged a special course of lectures on "Elementary Electricity for Girls' Secondary (Modern) Schools, with Special Reference to its Domestic Applications." The course is designed to enable teachers in those schools to teach this subject, as it is felt that simple knowledge of electricity and the basic facts underlying its modern applications in everyday life is essential. Miss A. M. Pilkington, E.A.W. housecraft lecturer, and Mr. E. W. Jackson are responsible for the lectures, and the arrangements were made by Mr. G. Leslie, chief science inspector of the L.C.C. The introduction to the course on February 6 was given by Miss Vera Norvick, E.A.W. assistant secretary.

Fluorescent Lighting in Insurance Office

Reproduced on this page is a photograph of the fluorescent lighting installation in the West End offices of the Norwich Union Insurance Societies carried out by H. J. Cash and Co., Ltd., under the superintendence of the societies' estates department. Philips' 80 W fluorescent lamps were used in type G.2620 fittings supplied by George Forrest and Son Ltd.

Fluorescent lighting in a West End insurance office. Philips' 80 W lamps are installed

I.E.E. Scholarships

The Council of the I.E.E. will this year consider the awards of four research scholarships and grants, and seven scholarships for undergraduates and students to attend universities and technical colleges, as follows:—

Research Scholarships: Ferranti, value £250 per annum for two years; Oliver Lodge, value £250 for one year, but may be extended for a second year; Swan Memorial, value £150 for one year; C. P. Sparks War Thanksgiving Fund, a grant not exceeding £100 for one year.

Student Scholarships: Duddell, value £150 per annum for three years; Manville, value £150 per annum for three years; Silvanus Thompson, value £100 per annum, plus tuition fees, for two years; Salomons, value £100 for one year; David Hughes, value £100 for one year; Paul value £50 per annum for two years; Thorrowgood, value £25 per annum for two years.

The closing dates for receiving applications is April 15 for student scholarships and June 1 for research scholarships. The award of student scholarships will be made towards the end of June. Full particulars and nomination forms, may be obtained from the Secretary, The Institution of Electrical Engineers, Savoy Place, London, W.C.2.

Irish Electrical Traders

At the annual meeting of the Irish Electrical Traders' Society, Dublin, Mr. F. V. Mulligan, the president, said that there had been practically no easing of the difficulties which had confronted them since the end of the war. Manufacturers and wholesalers had done everything to keep the trade supplied, and Irish manufacturers had maintained a reasonable supply of their products. Articles not made in Eire, such as switches, lamp holders, heating and lighting plugs, etc., were very scarce. During the year the membership increased by 47. Complaints regarding the practice of manufacturers and distributors outside Eire appointing as their representatives persons not engaged in the regular electrical trade in Eire, had been taken up with the British Manufacturers and Factors' Association with a view to keeping trade within proper

channels, and it was anticipated that the matter would be satisfactorily dealt with.

New E.A.W. Branches

The increasing interest of women in electricity is shown by the fact that Miss Caroline Haslett, director of the Electrical Association for women, last week visited Barry, South Wales, and this week Dundee to form new branches, and several others are preparing for inauguration. At Barry the Mayoress welcomed the new branch. Mrs. Tyrrell presided, and guests included Mr. D. G. Gwyn, the electrical engineer.

Meter Cards Not Receipts

The Court of Appeal has dismissed the appeal by the Attorney-General from a decision of Mr. Justice Macnaghten who, in July last year, dismissed an action brought by the Attorney-General claiming that an entry on a prepayment meter card made by a collector for the Northwood Electric Light and Power Co., Ltd., was a receipt within the meaning of Section 103 (1) of the Stamp Act, 1891, and that it was consequently liable to a 2d. stamp when the amount involved was £2 or upwards.

Makers of Royal Train Radio

The radio equipment on the trains used by the Royal Family in their South African tour was designed and produced specially for the requirements of the occasion by the following British manufacturers:—The General Electric Co., Ltd., (v.h.f. intertrain transmitters and receivers); Marconi's Wireless Telegraph Co., Ltd., (h.f. radio transmitters and receivers); E.M.I. Services, Ltd., and Marconi's Wireless Telegraph Co., Ltd., (broadcast receivers and train loudspeaker system); E.M.I. Services, Ltd., (public address equipment); Decca Record Co., Ltd., (radio gramophones and electrical record reproducers); the Automatic Telephone and Electric Co., Ltd., (telephone equipment); Philips Industrial (Philips Lamps) Ltd., (motor generator sets); Belling and Lee, Ltd., (interference suppression).

The Ideal Home Exhibition

THE first "Daily Mail" Ideal Home Exhibition since before the war began at Olympia on Tuesday, and will remain open until March 29.

Although the keynote of the exhibition is improvisation, from the constructional material of the stands to the 600 kW emergency generating plant which has made it possible for display lighting and demonstrations to be carried out during the restricted hours, the general impression gained by the visitor is that, in variety of exhibits and effectiveness of presentation, this year's display is well up to—and in some instances beyond—the standard of its predecessors. Evidence of the speed with which reconversion has taken place, particularly in the light-metal and plastics industries, is given by the fact that, unlike the articles seen at "Britain Can Make It" last year, nothing on show is for export only, almost all the goods being available for immediate purchase.

Among the innovations is the widespread use of fluorescent lighting, both for the illumination of stands and as a suggested means of lighting the modern home. Effective illumination technique, employing diffused background lighting and bright "spots" is seen in the Court of Fashion, where new textiles and other materials stand out, in their natural colours, against darkened surrounds.

In a special scientific display, demonstrations of radio-frequency cooking and a model uranium pile are attracting much interest, while among a number of exhibits in the radio and television section may be mentioned small portable receivers with built-in electric clocks and a luxury television set designed for use in hotels, employing a 24 in. cathode-ray tube.

The domestic electric appliances cover a wide range of household labour-saving and heating devices, from vacuum cleaners to air circulators, and on the several refrigerator stands are fifteen women demonstrators, specially trained for the occasion by the E.A.W. A four-days' intensive course, in which Miss Caroline Haslett and Mr. E. G. Batt, independent chairman of the British Refrigeration Association, took part, was held before the exhibition opened. To handle general inquiries, the E.D.A. has a stand of its own.

Finally, a touch of unconscious humour is lent by a sign over one of the larger exhibits, which announces, with reference to the emergency supplies, "All the electricity used in this display comes from generators."

Space precludes us from giving in this issue a full list of electrical manufacturers participating in the exhibition, but their names, together with a description of each of the new appliances shown will be published in later issues. Much that has not been seen before in the way of domestic electrical appliances is featured at Olympia, and the public interest in it is indicative of the attraction which electricity holds for the domestic consumer.

In Parliament

Some Electrical Questions Asked and Answered

Compensation of Consumers.—Answering Mr. De La Bère, who asked if any steps were to be taken to adjust the loss to consumers arising out of the reduction in voltage, since this practice tended to make electricity meters read fast, Mr. Shinwell said that, in general, meters only registered the amount of energy consumed; he understood that d.c. meters showed a small drop, but this was negligible.

Trunk Calls: Automatic Connection.—A question was asked by Viscount Hinchingbrooke regarding the present state of development of automatic trunk telephone connection; and which towns had been chosen for experimental interconnection. The Assistant Postmaster-General replied that automatic connection of trunk calls was carried out by the operators at 14 main centres, including London, Birmingham, Glasgow and Manchester. The problems involved in long-distance dialling by subscribers were being studied, but no experiments were at present contemplated.

Fluorescent Lighting: Official Buildings.—Sir Waldron Smithers asked the Minister of Works a number of questions regarding the installation of fluorescent lighting in the Palace of Westminster and official buildings as this method of lighting, he said, was up to date and scientific. Mr. Key replied that his Ministry was keeping in touch with developments in this type of lighting, and experimental installations had been made in certain Government buildings, particularly in drawing offices and typing rooms, but the shortage of fittings, and particularly tubes, prevented any large-scale programme of installation at present.

New Generating Plant.—Replying to a question by Mr. Ellis Smith, the Minister of Fuel and Power said that the figures for the production of electricity by authorised undertakers were, in millions of units: 1936, 20 200; 1945, 37 300; 1946, 45 200. The new plant now on order for power stations in this country totalled four million kW output capacity. Of this, completion was expected of approximately 600 000 kW in 1947, 900 000 kW in 1948, and 1 300 000 kW in 1949. In another reply the Minister said that since January 1, 1946, 40 turbo-sets had been ordered for home use, and these included one 45 000 kW set and sixteen 50 000 kW sets. High priority in manufacturing labour and materials was being given. The expected rate of commissioning of these sets was: 1947, one set; 1948, one set; 1949, 27 sets; 1950, 10 sets; 1951, one set. Orders had been placed, Mr. Shinwell went on, for boilers, switchgear, transformers and other equipment required for use with the turbo sets already on order. Work on the power stations was in hand, and it was expected that they would be ready for the plant. He was not aware of any orders placed in the U.S.A. for this type of equipment.

Hydro-Electric Schemes.—Replying to Mr. Ellis Smith, the Minister of Fuel and Power (Mr. Shinwell) said that four hydro-electric constructional schemes relating to seven projects and totalling 377 000 kW, with an output of 710 million units, had been approved. Contracts for all the plant and most of the civil works had been placed, and the generation of power in respect of the first two schemes was expected to commence in the winter of 1948-49. Other schemes were under consideration. In North Wales, preliminary surveys had been made for schemes totalling over 300 000 kW and over 600 million units, and the proposals were under discussion between the C.E.B. and the North Wales Power Co.

Electricity Bill.—The Electricity Bill was launched in Standing Committee on February 26, after the Opposition had made an unsuccessful attempt to postpone discussion in view of the fuel crisis. An Opposition amendment, designed to ensure that the British Electricity Authority should supply "cheap and abundant electricity," was defeated, by 26 to 17, after Mr. Shinwell claimed that he could guarantee neither a cheap nor an abundant supply until the physical resources enabling that to be done were available. After an amendment to exempt the whole of Scotland from the Bill had been rejected, the Minister admitted that the question of the Area boundaries was a vexed one, but claimed that these had been drawn up, taking all factors into account, with the agreement of the Electricity Commissioners. If necessary, he added, he could vary the boundaries by Order. The first amendment to be accepted came from the Labour side. This was intended to safeguard the potential consumer, and Area Boards will now have "to plan and carry out an efficient and economical distribution of supplies to persons in their area who require them." Another Labour amendment to which the Minister agreed provided that the policy of the Area Boards should be directed to securing the "development," as far as practicable, of supplies.

Electricity Supply

North West England.—Four new selected stations, each with an initial installation of 130 000 kW, are provided for in the North West England and North Wales (Alteration and Extension) Scheme, 1947. The scheme has now been adopted, without modification, by the Central Electricity Board.

Poplar.—Consent of the Electricity Commissioners has been issued to the proposed extension of the Brunswick Wharf generating station. The extensions will consist of one 11 kV turbo-alternator of 52 500 kW M.C.R.; two 320 000 lbs. per hr., 900 lbs. sq. in., 900° F. boilers and the necessary ancillary plant. The estimated cost of the scheme is £1 932 465.

Accrington.—Subject to approval by the C.E.B. and to delivery not later than June, 1950, the Electricity Committee has recommended acceptance of a contract by the General Electric Co., Ltd., for two 30 MW turbo-alternators for the £5 000 000 Huncoat station. The National Coal Board have given an assurance that they are desirous of collaborating on certain matters, including the supply of suitable coal.

Croydon.—Application has been made to the Electricity Commissioners for consent to the completion of the second section of the new station, at a cost of £2 916 400. The new plant includes one 50 000 kW turbo-alternator and an auxiliary alternator of 2 500 kW capacity; two 320 000 lbs. per hr. boilers, at a steam pressure of 650 lbs. sq. in. and temperature of 870° F., and one cooling tower, with a capacity of 2.5 million galls. per hr.

Newcastle-on-Tyne.—In what is understood to be the first case since the imposition of restrictions, a firm which used car batteries for lighting an exhibition of cars was fined £5 at Newcastle Police Court for " unlawfuly using electric fit-

(*continued overleaf*)

Loan Sanctions

The statement below, issued by the Electricity Commissioners, details the amount of loans sanctioned to public authorities and the Central Electricity Board, during the period April 1, 1944, to December 31, 1946:—

PUBLIC AUTHORITIES (excluding Central Electricity Board)

ITEM	PERIOD 1944-45	1945-46	Nine months ended December 31, 1946
	£	£	£
Purchase of property	13 907	124 165	308 277
Buildings (generation purposes)	6 711 285	10 710 085	6 570 393
Buildings (distribution purposes)	42 734	789,258	1 268 600
Plant (generation purposes)	20 323 383	19 077 935	17 308 201
Plant (distribution purposes)	593 327	2 381 948	3 025 515
Mains and services	491 422	3 667 759	5 000 519
Meters and instruments	31 249	246 418	361 470
Wiring installations	1 107	16 009	77 442
Apparatus	24 034	245 500	418 285
Other purposes	105 370	393 298	1 124 203
Total	£28 337 818	£37 652 375	£35 462 905

CENTRAL ELECTRICITY BOARD

	£	£	£
Purchase of property	—	—	—
Buildings (distribution purposes)	200,000	—	—
Plant (distribution)	230 000	—	—
Mains	400 000	—	—
Civil defence	100 000	100 000	—
Generating stations	1 075 000	—	—
Other purposes	20 000	—	—
Total	£2 025 000	£100 000	—

TOTAL AMOUNTS SANCTIONED DURING EACH QUARTER

	£	£	£
April 1-June 30	1 067 578	16 792 980	8 816 821
July 1-September 30	5 801 894	4 035 003	18 414 206
October 1-December 31	8 070 946	10 337 392	8 231 878
January 1-March 31	15 422 400	6 587 000	
Grand total	£30 362 818	£37 752 375	

tings contrary to the Control of Fuel Order." The defence called no witnesses, but contended that the Control of Fuel Order related only to electricity from the mains and did not include the use of batteries. The presiding magistrate said that "fuel" included electricity, and the magistrates therefore "somewhat reluctantly" found the firm guilty.

Electricity Generation.—The Official Returns rendered to the Electricity Commissioners show that 4 671 million units were generated by authorised undertakers in Great Britain during January, 1947, as compared with the revised figure of 4 142 million units in the corresponding month of 1946, representing an increase of 529 million, or 12.8 per cent. The total number of units sent out from the generating stations of authorised undertakers during that month (i.e., units generated less units consumed in the stations by auxiliary plant and for lighting, etc.) was 4 423 million, as compared with the revised figure of 3 917 million in the corresponding month of 1946, an increase of 506 million, or 12.9 per cent.

Scotland.—Now approved by the Secretary of State for Scotland, the details of the North of Scotland Hydro-Electric Board Constructional Scheme No. 4 have been laid before Parliament for the statutory 40 days. Under the scheme, the water-power resources of Glen Tarsan will be developed and supplemented by water from the Garvie Burn. The storage reservoir will be formed in the glen by building a dam across the Glen Tarsan Burn and another at the head of Glen Lean. Water will be taken from the reservoir by tunnel and pipe-line to a power station at the head of Loch Striven. The cost of the scheme will be £570 000 and the installed capacity 6 000 kW. An average annual output of 13 500 000 kWh is expected.

Hammersmith.—In preparation for the Jubilee of the undertaking, which falls on June 21 this year, a sub-committee has been appointed to consider and submit proposals for celebrating the occasion. Following the Council's decision to retail radio and television receivers from the Electricity Showrooms, replies received from manufacturers to whom inquiries were addressed indicate that they are not, in general, prepared to entertain new retail outlets until the supply position improves. The Chief Electrical Engineer has been authorised to arrange for the repair and servicing of receivers, and a sum of £100 has been sanctioned for the purchase of the necessary testing equipment. Because of delay in obtaining armoured cables for the two e.h.t. mains which are planned for the North-Western part of the borough, it has been decided to use plain lead-covered cables in earthenware conduits. The cost of the whole scheme, including switchgear, transformers, etc., is estimated at £48 900.

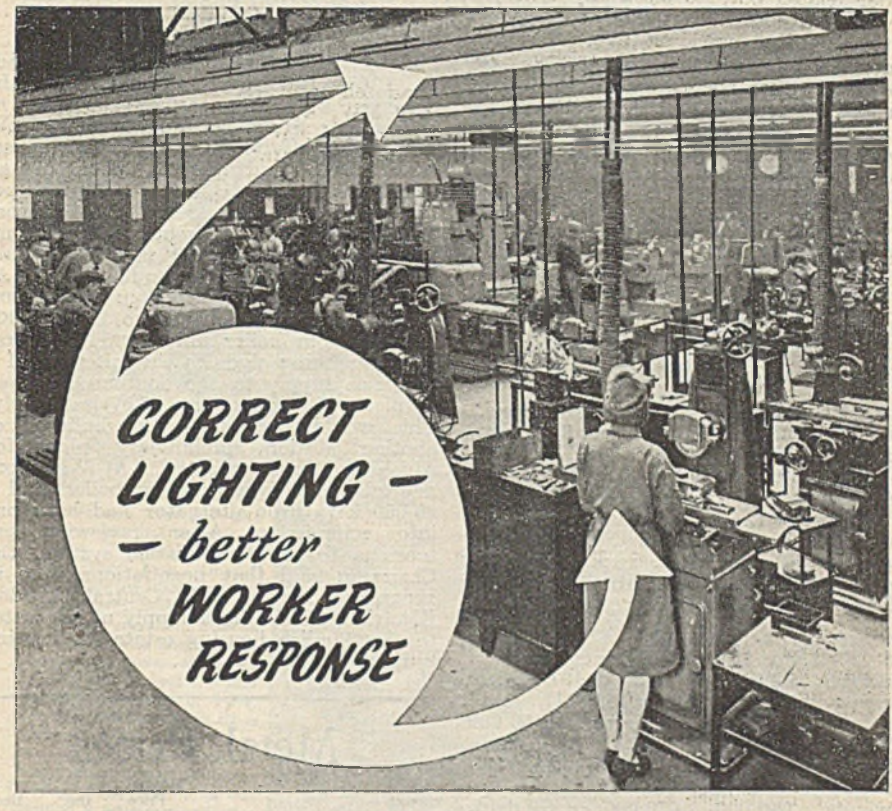
(*Undertakings and the Crisis—continued from p. 552*)

load fell from 480 MW, at 8.45 a.m., to 240 MW, at 9.15, while at Battersea, a fall of 115 MW in 20 minutes was experienced. Preparations were made for the mid-day pick-up of load by increasing exports to the Central Board system from about 11.30 a.m.

Because of anticipated damage to the plant, the large sets at Battersea were not normally shut down during the restricted hours, but the load on the 65 MW alternators was reduced to something like 10 MW, while on the 100 MW set, it fell to 20 MW. At Deptford West, on the other hand, with a total capacity of 215 MW, it was found possible to take certain sets out of service during the morning drop in load.

At the County of London Power Co.'s Barking station, which feeds a considerable proportion of the total demand of the London and South-Eastern area, the effect of domestic restrictions was particularly evident. Loads, which at 8 a.m. might rise as high as 400 MW,, were falling, after 9 a.m., to 160 MW, while the pick-up, at midday, was to the order of 385 MW. In the "B" station, where 75 MW sets supply the base-load, a change in frequency from 48.2 to 50.8 cycles in 15 minutes, as the midday load fell off, caused some difficulty on February 19 with governors, but in general, load variations were met by taking the smaller plant of the "A" station out of service, as required. Overall consumption during the emergency period was about 50 per cent. of normal, and coal savings amounted to about 2 000 tons per week.

In conclusion, one incident in the London area is of some interest. On Saturday, February 18, the system frequency, at 11.50 a.m., stood at 50.5 cycles. By noon, this had fallen to 49.5 cycles, and by 12.5 p.m., to 48.2 cycles. The shedding of 10 per cent. load was immediately ordered by the C.E.B., but before this could be brought in, the speed had fallen to 47.8 cycles. Readers may recall that the public had been informed that morning that for cooking purposes the restricted period on Sunday would end at 11.30 a.m. A broadcast warning was given, however, that unless the maximum economy was exercised, load-shedding might become necessary. The reason for the completely unexpected Saturday peak, it is thought, may well have been lack of public confidence in the continuity of supply on the following day.



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Company News

RICHMOND (SURREY) ELECTRIC LIGHT AND POWER CO., LTD.—Div. on. ord., 1946, 6%, less tax (same). Net prft., 1946, subject to audit, after prvdg. for depreetn. and txn., and after brngg. in surplus (net) on sale of British Govt. securities of £2 293, £20 491 (£18 954).

BRITISH POWER AND LIGHT CORP., LTD.—Net prft. 1946 was £349 611 (£363 203). to tax. prov. £195 500 (£200 000), pref. divs. net £47 100 (£43 500), intm. ord. 3% (2), net £33 495 (£20 300), lvg. £73 516 (£99 403). Fin. ord. 5% (6), mkg. 8% (8, plus bonus 2%), fwd. £219 672 (£201 981).

SOUTH LONDON ELECTRIC SUPPLY CORP., LTD.—Fin. 3%, less tax, on 6% cum. pref. shrs. Fin. 4%, less tax, on ord., mkg. with int. div. of 3% paid September last, a div. of 7% (same). Net prft. 1946, subject to audit, after prvdg. for deb. int., dpretn., txn. and trnsfr. to (No. 2) Reserve Fund, and after brgg. in surplus (net) on sale of British Govt. securities of £3 844. £52 463 (£24 657).

NORTH-EASTERN ELECTRIC SUPPLY CO., LTD.—Prft. for 1946, incldg. int. and divs. receivable, £2 013 543 (£2 178 104). After charging int. £185 330 (£189 911), dirs.' fees £5 000 (same), taxn. £450 000 (£745 000), depreen. £775 000 (same), redemptn. of deb. stks. £135 856 (£131 283), plant renewals and improvemts. £40 000 (£20 000) and defd. reprs. £45 615 (£40 000), there remains £376 742 (£271 910). Fin. divs. payable on March 31, of 3½% on the 7% cum. pref. stk., mkg. 7% (same), 2½% on the 5% pref. stk., making 5% (same) and 4½% on the ord. stk., mkg. 7% (same). Prov. for superann. fund deficiency £225 638 (nil), has been deducted from blce. brot. fwd. from 1945. Carry-fwd. to 1947, £112 812 (£246 980).

LONDON POWER CO., LTD.—Speaking at the annual general meeting, the Rt. Hon. The Earl of Lytton (chairman) said that in the twelve months ended December 31, 1946, 2 957 114 190 units were generated, an increase of 9 per cent. The maximum demand was 717 440 kW, compared with 650 780 kW in 1945. Two additions had been made to the fleet of colliers, bringing the total to 12 ships, which, during the year, had carried 864 485 tons of coal. The price of coal continued to rise during the year, the quality deteriorated, and the quantity delivered diminished to an alarming extent. The company's total coal consumption during the year amounted to 1 601 990 tons, the average price being 52s. 8d. per ton, compared with 51s. 10½d. in 1945. Referring to extensions, the Chairman said that work was in hand at the manufacturers' works on a 60 000 kW main turbo-alternator, a 6 000 kW house-service set, and three boilers of an evaporative capacity of 425 000 lbs. per hour, for the Battersea "B" station. They were originally scheduled for completion by the winter of 1948-49, but would not now be completed until 1950. At Deptford East, extensions in hand comprised the installation of two 180/225 000 lbs. per hour boiler units, and consideration was being given to the initiation of a 50-cycles supply to the Southern Railway in place of the present 25-cycles supply. This would necessitate the building of another station, preliminary plans for which had been prepared. At Willesden, new plant consisting of four boilers and a 30 000 kW turbo-alternator had been put into commission. After reviewing extensions to the transmission system, the Chairman said that negotiations were in progress, jointly with Central London Electricity, Ltd., for a supply of hot water to the Pimlico housing estate for heating purposes.

Metal Prices

		Monday, Price			Inc.	March 3 Dec.
Copper—						
Best Selected (nom.)	per ton	£125	10	0	£10	—
Electro Wire bars	„	£127	0	0	£10	—
H.C. Wires, basis	„	£144	0	0	£11	—
Sheet	„	£168	10	0	£10	—
Bronze Electrical quality 1% *Tin*—						
Wire (Telephone) basis	per ton	£165	15	0	£11	—
Brass (60/40)—						
Rod basis	„	1s. 1½d.			¾d.	—
Wire	„	1s. 5¾d.			¾d.	—
Iron and Steel—						
Pig Iron (E. Coast Hematite No. 1)	per ton	£8	19	0	—	—
Galvanised Steel Wire (Cable Armouring) basis 0.104 in.	„	£34	5	0	—	—
Mild Steel Tape (Cable Armouring) basis 0.04 in.)	„	£21	15	0	—	—
Lead Pig—						
English	„	£71	10	0	—	—
Foreign and Colonial	„	£70	0	0	—	—
Tin—						
Ingot (minimum of 99.9% purity)	„	£384	0	0	—	—
Wire, basis	per lb.	4s. 10½d.			—	—
Aluminium Ingots	per ton	£72	15	0	—	—
Spelter	„	£70	0	0	—	—
Mercury (spot)	per bott.	£21	0	0	—	—

Prices of galvanised steel wire and steel tape supplied by C.M.A. Other metal prices supplied by B.I. Callender's Cables, Ltd. The latter prices are nominal only and do not include any allowances for tariff charges.

Phascolarctos cinereus—the KOALA—the native bear of Australia is the original of the nursery Teddy Bear. Unusual features are its black, rubbery nose and large, bushy ears. Its colouring is grey, fawn, blackish and brown, with white underparts. Fully grown—about two feet long—at four years, it may live to fifteen years or more. Powerful limbs and stout claws make it perfectly adapted to climb the tall trees wherein it lives, subsisting upon the foliage of Eucalyptus. Timid in disposition it whimpers and cries like a baby when molested.

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Commercial Information

County Court Judgments

NOTE.—*The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be actions. But the Registry makes no distinction. Judgments are not returned to the Registry if satisfied in the Court books within 21 days.*

SHERIDAN ELECTRICAL AND RADIO CO. (firm), 111, Wood Street, Walthamstow, Essex. £28 15s. 4d. November 22.

SHERIDAN ELECTRICAL AND RADIO CO. (firm), 111, Wood Street, Walthamstow, Essex. £26 10s. 6d. December 4.

STONE, William, 789, Southchurch Avenue, Southend-on-Sea, Essex, radio electrician. £61 7s. 3d. October 30.

EDMUNDSON, J. E. (male), 12, Bradley Fold, Bolton, Lancs, radio dealer. £18 12s. November 19.

HALLIWELL AND HASSELL (a firm), 295A, Katherine Street, Ashton-under-Lyne, Lancs, electrical engineers. £20 2s. 8d. December 5.

COOPER, Ronald Morris, Hanway Works, Hanway Street, London, W.1, radio engineer. £58 19s. 1d. May 3.

PRICE, E. (male), 23A, Alexandra Road, Hendon, Mddx., electrician. £14 11s. 2d. November 25.

WOODCOCK, Harold, and WOODCOCK, Annie (his wife), 8, Heskey Street, Nottingham, electrician. £14 16s. 6d. December 4.

KITCHEN, S. F. (male), 321, Cowbridge Road, Cardiff, radio dealer. £22 1s. 6d. November 21.

GOMPERTY, G. (male), 27, Central Avenue, South Shields, Durham, radio and electrical engineer. £15 19s. 7d. December 14.

Coming Events

Friday, March 7 (To-day)

I.E.E.—London. Measurements Section. Discussion: "Recent Developments in Calculating Machines," opened by Prof. D. R. Hartree, F.R.S. *5.30 p.m.*

BLACKBURN ELECTRICITY UNDERTAKING.—Opening of power station extension and Jubilee celebrations.

Saturday, March 8

I.E.E., N. EASTERN STUDENTS' SECTION.—Visit to Victor Products, Ltd., Wallsend.

I.E.E., LONDON STUDENTS' SECTION.—Visit to Cable and Wireless, Ltd., Brentwood. *2.30 p.m.*

INSTITUTE OF PHYSICS, S. WALES BRANCH.—At University College, Swansea. "Applications of Photography to the Study of Nuclear Particles," Prof. A. M. Tyndall, F.R.S. *3 p.m.*

I.E.E., N. MIDLAND STUDENTS' SECTION.—Visit to Frickley Colliery. *1.15 p.m.*

Monday, March 10

I.E.E., N. EASTERN CENTRE.—Newcastle-on-Tyne. "Neutral Earthing of Three-Phase Systems, With Particular Reference to Large Power Stations," J. R. Mortlock and C. M. Dobson. *6.15 p.m.*

I.E.E., WESTERN CENTRE.—At Royal Fort, Bristol. Faraday Lecture on "The Generation and Wholesale Distribution of Electricity," J. Hacking. *6 p.m.*

Tuesday, March 11

BRITISH KINEMATOGRAPH SOCIETY.—At Manchester Geographical Society. "Kinema Engineering Efficiency," by H. E. Whitney. *10.30 a.m.*

I.E.E., E. MIDLAND CENTRE.—At Electricity Showrooms, Derby. "Electrical Control of Dangerous Machinery and Processes," W. Fordham Cooper. *6.30 p.m.*

I.E.E., CAMBRIDGE GROUP.—At the Cambridgeshire Technical College. "U.H.F. Triodes on Velocity-Modulation Tubes," G. W. Warren. *6 p.m.*

I.E.E., N. MIDLAND CENTRE. — Leeds. "The Extinction of Arcs in Air-Blast Circuit Breakers," A. Allan and D. F. Amer. *6 p.m.*

I.E.E., N. WESTERN CENTRE.—Manchester. "Occupation and Health," Prof. Ronald E. Lane. *6 p.m.*

I.E.E., N. IRELAND CENTRE.—Belfast. "The Analysis of Vibration Problems," Dr. A. J. King. *6.45 p.m.*

Wednesday, March 12

I.E.E., S. MIDLAND STUDENTS' SECTION.—Birmingham. "Modern Hydro-Electric Power Stations," J. Frey. *6.45 p.m.*

EDINBURGH ELECTRICAL SOCIETY.—At Electricity Showrooms. "Engineering War Experiences." *7.30 p.m.*

I.E.E. — London. Transmission section. "Economics of High-Voltage Transmission by Underground Cables," R. N. Berry. *5.30 p.m.*

I.E.E., SCOTTISH CENTRE. — Heriot Watt College, Edinburgh. "Industrial Applications of Electronic Techniques," Dr. H. A. Thomas. *6 p.m.*

Thursday, March 13

I.E.E. — London. Installations Section. Three short papers by younger members. *5.30 p.m.*

I.E.E., WESTERN CENTRE, Devon and Cornwall Sub-Centre.—Plymouth. "Engineering Principles Applied to the Design of Domestic Water-Heating Installations," R. Grierson and Forbes Jackson. Visit of the President.

Friday, March 14

JUNIOR INSTITUTION OF ENGINEERS.—At 39, Victoria Street, S.W.1. "Fuel for Industry—Coal to Oil Conversion," J. Duguid. *6.30 p.m.*

INSTITUTE OF WELDING.—Birmingham. "Some Novel Developments in the Design and Operation of A.C. Arc Welding Plant," E. C. Davies.

I.E.E., N. EASTERN STUDENTS' SECTION.—Newcastle-on-Tyne. "The British Warship as an Electrical Engineer Sees It," G. F. Crisp.

I.E.E., SCOTTISH CENTRE, N. East Scotland Sub-Centre.—Aberdeen. "Industrial Applications of Electronic Techniques," Dr. H. A. Thomas. *7.30 p.m.*

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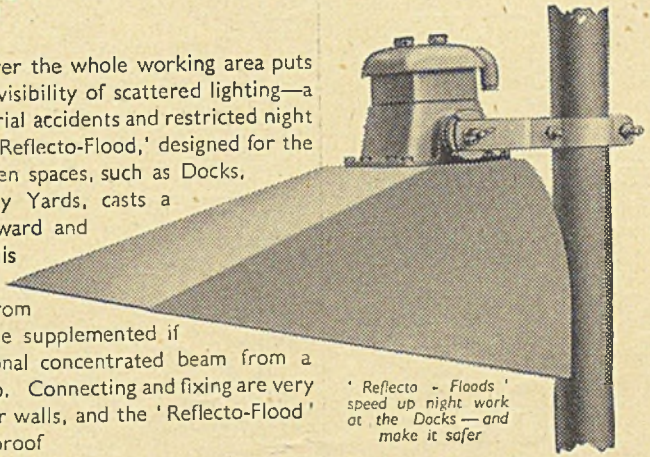
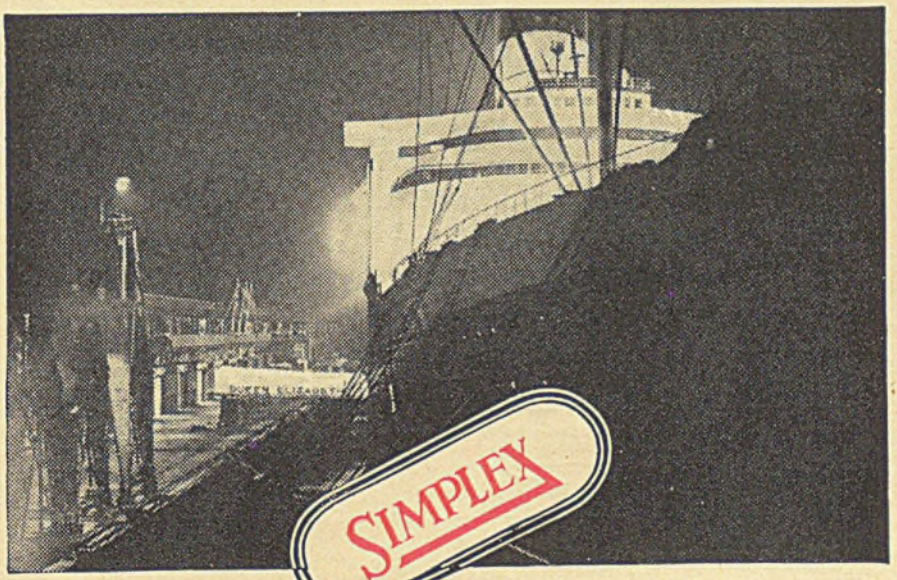


'Reflecto-Floods' speed up night work at the Docks — and make it safer



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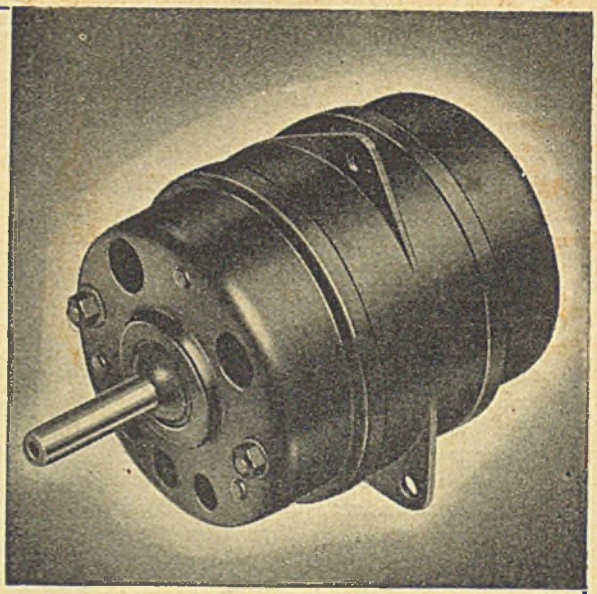

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