ELECTRICIAN

THE TECHNICAL NEWSPAPER OF THE ELECTRICAL INDUSTRY

21 MARCH, 1947
SIXPENCE

THE "Painted" WORD

- PREFABRICATED

One of the less obvious uses of Trapinex Paint Printing and of Trapinex Paint Transfers has been their application to the electric control unit used in prefabricated houses. This consisted of "paint" printing direct on to the metal outer cover and on to the inner plastic fuse box as well as the alternative method of Trapinex Transfers where preferred—both methods being approved by the Ministry concerned. A simple, efficient and durable method of applying permanent directions, diagrammatic instructions, or wiring layouts, which has official approval.

Every branch of industry can find extensive use for the advantages which "paint" printing has over printer's ink. Brilliant colours in any number, weather resisting durability, fastness to sunlight, and unlimited design are recommendations which have established the popularity of Trapinex Paint Processes—Direct Printing and patented Transfers—for publicity, display and packaging.

Advice freely given, but when you write for prices please state (1) Size, (2) Quantity, (3) Number of Colours, (4) Purpose, (5) Wording required, (6) a rough sketch would help, WE HAVE NO STOCK LINES OR PRICE LISTS.

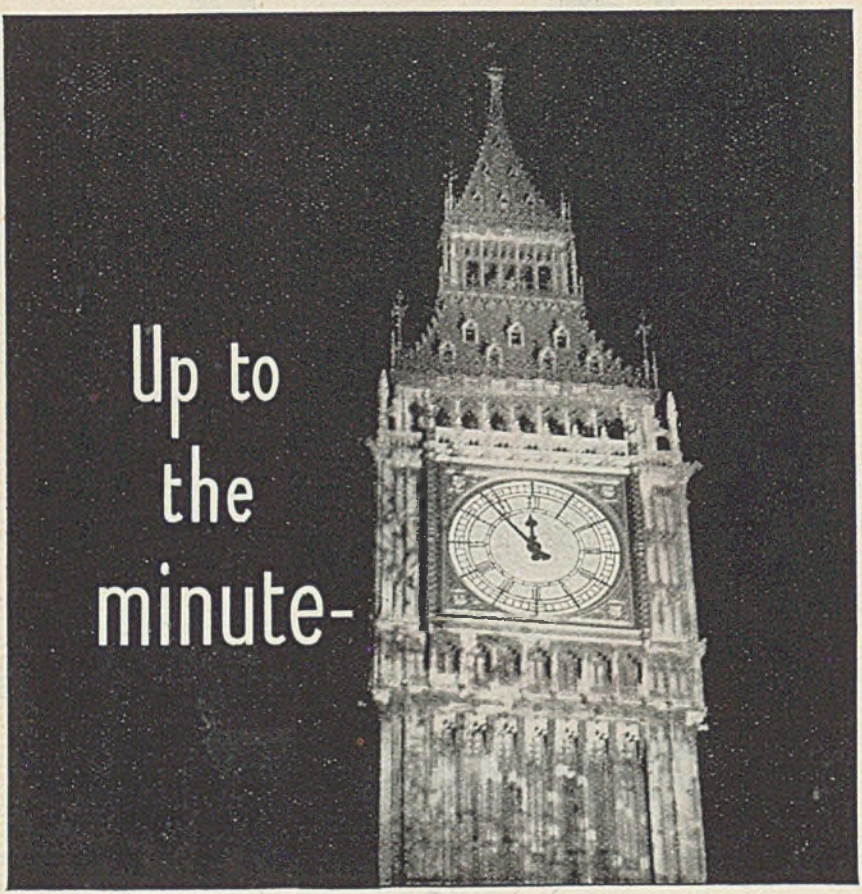
Ready for use in Workshop, Factory, Office ... for Nameplates, Brand Marks, Monograms, Patent Numbers, Instructions, Diagrams, Wiring layouts Warnings, Type, Catalogue, or Serial Numbers

TRAPINEX *Paint* **PROCESSES**

By the makers of TRAPINEX PAINT TRANSFERS (PATD.)

TRAPINEX LTD., 19, COMMERCE WORKS, HIGH ROAD (Opposite Town Hall), WOOD GREEN, N.22

Phone: Bowes Park 6811 *Grams: 'Trapinex, Wood, London'* *Cables: 'Trapinex, London'*



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

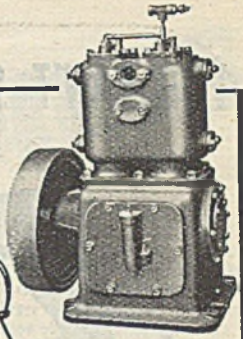
WM. SANDERS & CO. (WEDNESBURY) LTD., WEDNESBURY, STAFFS.

INDEX TO ADVERTISERS IN THIS ISSUE

"POWERED BY HOWELLS" No. 2

TILGHMAN'S

A Tilghman's Single Acting AIR COMPRESSOR



Courtesy of TILGHMAN'S PATENT SAND BLAST CO. LTD.

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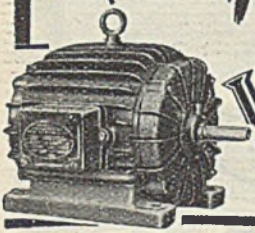

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Branches at LONDON : MANCHESTER : BRISTOL
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dm H.E.4

COOKER CONTROL - DS PLUG STYLE

THE DS Cooker Control Unit is a compact yet efficient switch and plug unit. It includes a 30-A double-pole switch for the cooker and the famous DS Fused Plug and Socket for the kettle.

Conduit Holes are provided at top and bottom for cable entry but may be provided elsewhere to special requirements.

COOKER DS CONTROL

Announcement of D.S. Plugs Ltd., Manchester, London, Glasgow.

E 1646

MISCELLANEOUS ADVERTISEMENTS

TENDER
CITY OF BRADFORD.
THREE-PHASE STATIC TRANSFORMERS.

THE Bradford Corporation invite Tenders for the supply and delivery of—

Three-Phase Static Transformers—Contract "C.61."

Copies of the Conditions of Contract, Specification, and Form of Tender may be obtained from the Electrical Engineer and Manager, 45 to 53, Sunbridge Road, Bradford.

Tenders 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 Transformers—Contract 'C.61,'" but not bearing any name or mark indicating the sender.

The Contract will be let subject to the Bribery and Fair Wages Clauses of the Corporation, which may be seen at the office of the undersigned. The lowest or any tender will not necessarily be accepted.

W. H. LEATHEM,
Town Clerk.

Town Hall, BRADFORD.
March, 1947.

SITUATIONS VACANT
COUNTY BOROUGH OF SOUTHEND-ON-SEA.
ELECTRICITY DEPARTMENT.

APPLICATIONS are invited for the following appointments from persons under 35 years of age.

The Appointments are subject to the Local Government Superannuation Act, 1937, and the persons selected will be required to pass medical examinations.

Appointments (1), (2) and (3) will be placed in Class G in the near future.

(1) **Constructional Engineer (Mains and sub-stations).**

Salary—Class F, Grade 6 (£509/530) or Grade 7 (£479/489) of the N.J.B. Schedule according to the qualifications of the applicant appointed.

(2) **Technical Assistant (Mains and sub-stations).**

Salary—Class F, Grade 7 (£479/489) of the N.J.B. Schedule.

(3) **Senior Maintenance Engineer (Domestic Apparatus).**

Salary—Class F, Grade 8A (£413/429) of the N.J.B. Schedule.

Applicants for the above three appointments should possess the minimum qualifications of Graduateship of the I.E.E. or the Higher National Certificate in Electrical Engineering.

(4) **Senior Demonstrator.**

Applicants should hold a Diploma in Domestic Science; the E.A.W. certificate in Electrical Housecraft will be an advantage.

Salary—A.P.T. 1 of the National Scales (£330-£375) plus war bonus, at present £48 2s. per annum.

Further particulars of the above appointments and forms of application may be obtained from the Borough Electrical Engineer and Manager, Electric House, London Road, Southend-on-Sea.

Applications must be received at that address not later than 9th April, 1947.

Canvassing will disqualify.

ARCHIBALD GLEN,
Town Clerk.

Municipal Buildings,
SOUTHEND-ON-SEA.

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.

SITUATIONS VACANT
MANCHESTER CORPORATION.
ELECTRICITY DEPARTMENT.

Principal Power Sales Assistant.

APPLICATIONS are invited for the position of Principal Power Sales Assistant, at a salary in accordance with Class M, Grade 8, of the N.J.B. Schedule (which is equivalent to £635 per annum, rising by two biennial increments to £664 per annum).

The duties are of a technical and administrative nature, and involve negotiations and correspondence with industrial power consumers.

Applicants should be Corporate Members of the Institution of Electrical Engineers, and should preferably have had similar experience with an electricity supply undertaking or with a manufacturing concern.

The appointment is subject to the City Council Superannuation Scheme, and the successful candidate will be required to pass a medical examination.

Applications, giving age and full particulars of technical training and experience, together with copies of recent testimonials, should be endorsed "Principal Power Sales Assistant," and addressed to me, and not to any member of the Council, so as to be received not later than 10 a.m. on Monday, 31st March, 1947.

Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
MANCHESTER, 2.
March, 1947.

COUNTY BOROUGH OF BRIGHTON.
ELECTRICITY DEPARTMENT.

Appointment of Buildings Draughtsman.

APPLICATIONS are invited for the appointment of a Buildings Draughtsman.

Candidates must be capable of preparing designs, specifications and bills of quantities and making progress measurements for small industrial buildings.

The salary will be in accordance with the National Joint Board Schedule, Class "J," Grade 9a (present salary £389 per annum).

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

Applications, in writing, stating age, experience, etc., are to be made to Mr. H. Pryce-Jones, M.Eng., Engineer and Manager, Brighton Corporation Electricity Department, Electric House, Castle Square, Brighton, 1, and received by him not later than Monday, 31st March, 1947.

J. G. DREW,
Town Clerk.

Town Hall,
BRIGHTON, 1.
15th March, 1947.

DRAUGHTSMEN required for work on radio test equipment and measuring instruments. Good pay and prospects. Write giving full particulars of experience and salary required to Taylor Electrical Instruments Ltd., 419-424, Montrose Avenue, Trading Estate, Slough.

DESIGNER-DRAUGHTSMAN.—Light Electro Mechanical Work. Academic qualifications. Higher National Certificate Standard. Production experience an advantage. Apply in writing, stating age, qualifications, training, experience, and wage required, to the Siemens and General Electric Railway Signal Co., Ltd., East Lane, Wembley.

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

SITUATIONS VACANT

COUNTY BOROUGH OF BRIGHTON.
ELECTRICITY DEPARTMENT.

Appointment of Engineering Draughtsman.

APPLICATIONS are invited for the appointment of an Engineering Draughtsman.

Candidates must have had experience in the design and layout of sub-stations and switchgear up to 33 kV. The salary will be in accordance with the National Joint Board Schedule, Class "J," Grade 9a, present salary £389 per annum.

The appointment will be subject to the provisions of the Local Government and Other Officers' Superannuation Act, 1937, and the selected candidate 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 "Engineering Draughtsman" not later than Monday, 7th April, 1947.

J. G. DREW,
Town Clerk.

Town Hall,
BRIGHTON, 1.
14th March, 1947.

SHEFFIELD CORPORATION ELECTRICITY DEPARTMENT.
JUNIOR ASSISTANT ENGINEER IN THE DISTRIBUTION DEPARTMENT.

APPLICATIONS are invited for the above position. Applicants must have had a sound technical training. Experience either in a manufacturing electrical engineering works or with an electricity supply undertaking will be an advantage.

The salary will be in accordance with Class "M," Grade 11, of the National Joint Board Schedule, commencing at £336 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937. Applicants must be not more than 40 years of age or have previous Local Authority service carrying a transfer value within the meaning of the Act. The selected applicant will be required to pass a medical examination.

Applications on forms to be obtained from the undersigned are to be returned to me not later than the 7th April, 1947, accompanied by copies of not more than three recent testimonials.

Canvassing or any communication to a member of the Council, either directly or indirectly, is prohibited and is a disqualification.

JOHN R. STRUTHERS,
General Manager and Engineer.

Commercial Street,
SHEFFIELD, 1.

METROPOLITAN BOROUGH OF FULHAM.
ELECTRICITY DEPARTMENT.

APPLICATIONS are invited for the position of permanent Female Tracer.

Candidates must be not less than 18 years of age and have good education and sound training and experience.

Salary, according to age, from £1 10s. to £4 per week, plus cost of living bonus.

The appointment is subject to medical examination and to the Local Government Superannuation Act, 1937.

Forms of application and conditions of appointment may be obtained on sending me a stamped adressed envelope (endorsed with title of position applied for). Completed applications must be posted to reach me not later than 12 noon on 15th April, 1947.

C. F. THATCHER,
Town Clerk.

Town Hall,
FULHAM, S.W.6.

SITUATIONS VACANT

MANCHESTER CORPORATION ELECTRICITY DEPARTMENT.

APPLICATIONS are invited for the position of Mechanical Draughtsman in the Constructional Section, at a salary in accordance with Class M, Grade 10, of the N.J.B. Schedule (£433 per annum, rising by two biennial increments to £454 per annum), plus a special payment of £26 per annum.

Applicants should have received a workshop training and possess at least the Higher National Certificate in Mechanical Engineering. Good experience in the design and layout of modern generating station equipment essential.

The appointment is subject to the City Council Superannuation Scheme, and the successful candidate will be required to pass a medical examination.

Applications, stating age and full particulars of technical training and experience, together with copies of recent testimonials, should be endorsed "Mechanical Draughtsman," and addressed to the Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2; and be received not later than Tuesday, 8th April, 1947.

Canvassing, directly or indirectly, will disqualify.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
MANCHESTER, 2.
12th March, 1947.

UNIVERSITY OF WALES.
UNIVERSITY COLLEGE OF NORTH WALES, BANGOR.

THE Council will shortly appoint the Sir P. D. Owen Professor of Electrical Engineering with effect from 1st October, 1947. Salary £1 450 per annum plus superannuation.

Applications should be lodged with the undersigned, from whom further particulars may be obtained, not later than 17th May, 1947.

GLYN ROBERTS,
Secretary and Registrar.

14th March, 1947.

SENIOR Draughtsman and a Junior Draughtsman required, experienced in the manufacture of radio components. Also a Draughtsman-Designer for press tools and estimates. Salary according to age and experience. Apply in writing to—The Personnel Manager, Philips Hamilton Works Limited, Wellhall Road, Hamilton.

LADY Tracers, light electro-mechanical engineering work, Wembley district. Apply, giving age, experience and wage required, to —Siemens and General Electric Railway Signal Co. Ltd., East Lane, Wembley.

REPAIRS

RUNBAKEN ELECTRICAL REPAIRS.—Rewinding to trade. Fractional h.p. motors a speciality, a.c. and d.c. Prompt service. Guaranteed work.—45, Oxford Road, Manchester. Tel.: ARD. 2507 (3 lines).

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

HOTPOINT, Hoover, Hoover Dustette, Electrolux, Armatures, Re-wound, 2 days' service, fully guaranteed, 35s. Trade enquiries invited. — Bateson-Turner Ltd., Gibralter Works, Parkinson Lane, Halifax.

ELECTRIC Motors and other electrical equipment rewound and repaired. Overhauls a speciality. Expert advice and prompt attention to all enquiries.—Walter Pratt, Eagle Works, Leighton Buzzard. Phone 3142.

FOR SALE

FLUORESCENT LIGHTING.—Write for details of our amazing OUTDOOR UNIT. Guaranteed weatherproof with rubber insulated unbreakable glass covering the 1, 2 or 3 tubes. Ideal for garages, sports stadiums, wharfs, etc. Scemco, Ltd., 6/7, Soho Street, London, W.1. Tel.: Ger. 1461.

FLUORESCENT LIGHTING.—CHOKES, extra quality, elongated, 4 ft., 40 W, tapped 200/250 V, silent working, each unit guaranteed, measurements 1⅞ in. by 1⅞ in. by 8½ in. Price £1 5s. each, net. Carriage extra.—Write Scemco, Ltd., 6/7, Soho Street, London, W.1. 'Phone: GERard 1461.

FLUORESCENT FITTINGS.—If he is electrically wise, it's Scemco he buys. For details of Fluorescent fittings, apply: Scemco, Ltd., 6/7, Soho Street, London, W.1. Tel.: Ger. 1461.

FLUORESCENT LIGHTING.—Constead units for sale, dispenses with all starter gear and gives instantaneous lighting, prevents maintenance worries; each unit guaranteed. -Apply Scemco, Ltd., 6/7, Soho Street, London, W.1. Tel.: Ger. 1461.

FLUORESCENT LIGHTING FITTINGS.—Extensive range including Trough and Flush type fitted with "All in one" "Constead Unit," and complete with tubes.—Write Scemco, Ltd., 6/7, Soho Street, London, W.1. Phone: GER. 1461.

FLUORESCENT LIGHTING.—30 watt fitting complete with self-contained control gear and 36 in. tube, £6 12s. 6d. Immediate delivery with guaranteed component and tube replacement service.—Scemco, Ltd., 6/7, Soho Street, London, W.1.

RUBBER STAMPS can assist in many ways. Are yours satisfactory and in good condition? W. L. Boughton, maker of all kinds, 53, Kenley Road, Merton, London, S.W.19.

SLEEVING.—A large quantity of new sleeving for disposal, cotton covered P.V.C. varnished cotton, Idaglass, synthetic rubber, etc., 144 yard coils and 1 yard lengths, 1 mm. to 10 mm.—John Walton and Co. (Castleside), Ltd., Metalex Works, Great Cambridge Road, Enfield.

UNUSED Lighting and Charging Plant (petrol electric), ex-R.A.F., ideal for supplying electric light to farms, cottages, yachts, etc., will operate 10-12 lamps and charge any battery from 12-32 volts max., output 288 watts, compact, self-contained, portable, fitted 1 h.p. J.A.P. engine (blower cooled) G.E.C. generator, switchboard ampmeter, variable resistance cut out, tank, etc., very economical, a sound simple practical machine, carriage paid, £33 10s., canvas cover 15s. extra; single new J.A.P. Engine only (similar to above), suitable for driving for pumps, lathes, saws, etc., price £17 10s., carriage paid from R. Johnson, Ltd., Old Station Buildings, Richmond, Surrey.

FOR Export Only.—Prompt delivery unlimited quantities "Reelek" 1 kW Electric FIRES.—Reeves Electrical and Radio Co., Ltd., Baldock, Herts.

"HOBART" M.5 LIGHTING SETS, 3 kVA, 125 volt, 3-phase, 60 cycle, with four cylinder 4 cycle water cooled P.E. LIGHTING SETS, 2.5 kVA, 100 volt single phase 60 cycle, self excited A.C. generator, 1 800 r.p.m. petrol engine.—HSE, 9, Chapman Street, E.1, Stepney 1645.

SUPERIOR Type Builders' Ladders now in production; also Steps, Trestles and Extension Ladders.—Phone: Shaftesbury Ladders, Ltd., 453, Katherine Road, E.7. Grangewood 3363/4.

ELECTRIC MOTORS.—1/3 h.p. 3 000 r.p.m. D.C. 110 V. Also 220 V Stock Delivery. £6 15s. each.—John E. Steel, Clyde Mills, Bingley, Yorks.

FOR SALE

SECTIONAL Buildings, 8 ft. by 6 ft. to 93 ft. by 19 ft.; timber framed; mineral surface board or asbestos; delivered in sections ready for easy erection.—Write for list (stating requirements) to Disposals Service, London Street Chambers, Norwich.

IMMEDIATE delivery new electric cable of C.M.A. Manufacture, T.R.S. Single, Twin and 3 Core, V.I.R. 250 and 600 Volt Class. Examples of prices for home market: T.R.S. 1/044 Single, £13 per 1 000 yds.; T.R.S. 3/029 3 Core, £40 16s. 6d. per 1 000 yds.; T.R.S. 7/029 Twin, £42 5s. per 1 000 yds.; V.I.R. 1/044, £6 18s. 6d. per 1 000 yds.; V.I.R. 7/036, £19 8s. per 1 000 yds.; V.I.R. 7/044, £28 4s. 8d. per 1 000 yds. Write for full stock list with complete home and export prices and discounts to:—The Civitas Trading Corporation Ltd., Civitas House, 10, Portman Street, London, W.1. Tel.: MAYfair 6522. Grams: Civitas, Wesdo, London.

FLUORESCENT LIGHTING.—5 ft. fittings. Trough, Swallow, or Batten types complete with all gear. With or without tubes. (80 w.). 4 ft. batten type fittings complete with all gear, with or without tubes. (40 w.). 3 ft. Flush type fittings complete with all gear. With or without tubes. (30 w.). Delivery from stock. Write or 'phone, Croft Electrical Services, 5, Middleton Buildings, Langham Street, W.1. Museum 9941.

SACKS and Bags in excellent condition for all commodities, as low as 4½d. each. Write: John Braydon Ltd., 230, Tottenham Court Road, W.1. Tel. No.: Museum 6972.

TO all manufacturers of radio and electrical goods.—L. Goodman (Radio) Ltd., 9, Percy Street, Tottenham Court Road, W.1, have the following surplus goods for disposal: 400 Syndanyo Panels, size 27 in. by 23 in., bevelled edges ¾ in. thick. Large quantity of Hellerman Rubber Sleeves in all sizes. Midget Radio Cabinets. 2 Tons 22½ S.W.G. D.C.C. Wire. Large quantity 16/012 3 Core Flex. 4 000 SBC Holders, Fluorescent Fittings 5 ft. and 4 ft. complete. Fluorescent Chokes. Power Factors. 15 and 30 amp. 2 way Fuse Boxes. 60 000 :01 Mica Condensers. Phone: MUSeum 0216.

ELECTRIC HOIST BLOCKS, capacity 5-cwt. to 7 tons. Reasonable delivery.—A Morgan and Co., 50, Wilkin Street, London, N.W.5. 'Phone: GUL. 1147.

1-H.P. Ransomes D.C. Electric Motor with 2 starter. Revs. 950, voltage 230, price £10.—Arnold and Son, Leatherhead.

FOR SALE.—Transformers—230 volts 50 cycles at 26 amps. Secondary—6 000 volts at 1 amp.—Synchromatic, Liverpool, 6.

PATRASSES, 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.

PENCIL Type Electric Fire Elements, sizes 8 in., 9½ in., 12 in. With Clip Ends, 8s. 6d., 9s. 6d., 10s. 6d. Usual Trade Discounts. Samples 5s. each. Packed in 10s. Special Rates for Fire Manufacturers.—Wellco General Supplies, Knebworth, Herts.

LEATHER FINGER STALLS.—Made of Chrome Hide. Very strong and hard wearing. Length 3 in. Price 4s. per doz. Prompt delivery. Sample on application.—Willson Brothers, Industrial Clothing Manufacturers, Epsom, Surrey.

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.

FOR SALE

LADDERS, Trestles and Handcarts, from Ramsay and Sons (Forfar), Ltd., Forfar.

TIME SHEETS.—Our stock-printed Time Sheets are remarkably cheap compared with specially printed ones. On decent quality 8 in. by 10 in. paper:—100, 3s. 6d.; 500, 15s.; 1 000, £1 7s. 6d. Post Free. Send for sample.—F. H. Brown Ltd., P.O. Box 26, Burnley, Lancs.

GOOD quality square and rectangular wood pattresses, from stock, 3 by 3 by ½ in. to 6½ by 6½ by 1 in., at 4s. 6d. to 16s. per dozen, carriage paid; larger sizes to order, quotations given.—Jack Hinton (Electrical), Ltd., 17, Crown Street, Bolton, Lancs.

ATLAS lamps from stock, delivery in London, Surrey, Sussex and Kent; other lines include clocks, toasters, fires, irons, kettles, fans, fittings, chargers, speakers, etc.—Drubel Radio Distributors, Ltd., 39a, Stafford Road, Croydon. Croydon 1107.

SECTIONAL TIMBER BUILDINGS

ALL LARGE BUILDINGS SOLD.—We can offer a few new timber-framed asbestos-clad huts, sizes 8 ft. to 6 ft., 16 ft. by 8 ft. and 20 ft. by 12 ft. Full particulars on request. No purchase licence required.—D. McMaster and Co., Mount Bures Works, 21c, Bures, near Colchester. Telephone: Bures 351/2.

WEE MEGGERS 500 V, £12 5s. 6d. Record 500 V test sets, £11. New. Carriage paid.—Robins' Electrics, 222, West End Lane, N.W.6. HAM 0879.

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.

9 IN. Pencil Bar Elements for Electric Fires, immediate delivery. Supplied as plain bars, wound, or complete with end fittings. Send 2s. 9d. for wired sample, or call Dicas (London) Ltd., 20, Mackenzie Street, Slough, Bucks.

TINNED STEEL ARMATURE BINDING WIRE.—All even numbered sizes from 16 s.w.g.-28 s.w.g. supplied from stock on 7 lb., 14 lb. or 28 lb. reels.
FREDERICK SMITH & CO. WIRE MANUFACTURERS LTD., CALEDONIA WORKS, HALIFAX.

JUNCTION Electric Irons, superior design and quality, supplied with suitable stand. Also Junction Nickel plated Torch Cases. Supplied for home trade and export. Also large selection of household electrical appliances, Fires, Radiators, other electric Irons, Toasters, Table Lamps, Torch cases, Dry batteries, etc. Please write for full list. —Brooks & Bohm, Ltd., 90, Victoria Street, London, S.W.1. Tele.: Vic. 9550/1441.

"ADDRESSING the Public."—A handbook devoted exclusively to the fundamentals of good public address technique and the problems of your P.A. department.—Obtainable at 3s. 6d. (post free) from the Acoustical Manufacturing Co., Ltd. (Dept. B.2), Huntingdon.

DYNAMO & MOTOR REPAIRS LTD.,
Wembley Park, Middlesex.
Telephone: Wembley 3121 (4 lines).
Also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.
Telephone: Northern 0898.
REBUILT MOTORS AND GENERATORS.
Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.
SEND US YOUR ENQUIRIES.
OVER 1 000 RATINGS ACTUALLY IN STOCK HERE.

FOR SALE

SWITCH BLOCKS.—Round I.W and W.E. Well finished in best quality hardwood. Satisfaction guaranteed. 3½ in. by ½ in., 54s. gross. 3 in. by ½ in., 52s. 6d. gross. 2½ per cent. discount. Carriage Paid.—Elf Manufacturing Co., 9a, Sansome Place, Worcester.

RUBBER STAMPS.—Every description. For office, shop and factory. With the usual pre-war cushion backed holders and polished handles.—W. L. Boughton, 53, Kenley Road, Merton, London, S.W.19.

WANTED

HYDRAULIC TURBO-GENERATOR or Turbine for 12 feet head, 300-1 000 g.p.m.—Snell, Paradise, Painswick, Glos.

FLUORESCENT Lamps, 5 ft., urgently required any quantity, best prices paid. Collected London area.—Box L.E.K., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

TWO H.P. D.C. MOTORS, 400/440 volts, speed 1 400, vertical running, flange mounting. Several required immediately.—G. and S., 21, St. George's Road, London, S.E.1.

SILICON STEEL SHEET or Strip Mild Steel Sheet. Annealed Mild Steel Wire, any gauge. Any quantity urgently required.—H. Frost and Co., Ltd., Walsall, Staffs.

AN unlimited number of modern A.C. motors urgently required for essential work. Highest cash prices paid for suitable units. We also want all types of motors for conversion and rewinding. Send details to Sales Dept., A. P. Watson, 104, Upper Brook Street, Manchester, 13.

LAMINATIONS.—Large types required in any reasonable quantities. T's and U's. Also 75's and 4A's.—Par Metal Company, Wallworth Bank, Congleton.

A.C. MOTORS, 1-100 h.p., 500-1,500 r.p.m. Any make fitted with ball and roller type bearings. Must be good machines, such as you yourselves would buy. Alternatively motors for rewinding will be considered.—Oldfield Engineering Co., Ltd., 96, East Ordsall Lane, Salford, 5.

ELECTRICAL steel sheet or laminations of reputable make, .014 in. to .020 in. thick will be purchased for cash in any quantity by Davenset Electrical Works, Leicester.

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NOTICES

ELECTRICITY (SUPPLY) ACT, 1926.
MID-EAST ENGLAND ELECTRICITY (ALTERATION AND EXTENSION) SCHEME, 1947.

WHEREAS the Electricity Commissioners have prepared and transmitted to the Central Electricity Board a Scheme bearing the above title and hereinafter referred to as "the new Scheme," for altering and extending the Mid-East England Electricity Schemes, 1929 to 1939, by determining that three new generating stations, if and when duly authorised, will become selected stations for the purposes of the Central Electricity Board.

Notice is hereby given that the Central Electricity Board have caused the new Scheme to be published and that any Authorised Undertakers or other persons interested in the new Scheme and desiring to make representations thereon may do so by forwarding the same by registered letter to the undersigned and posted not later than the 22nd April, 1947. Copies of the new Scheme with an Explanatory Memorandum, which the Electricity Commissioners have sent to the Board therewith, may be obtained at a price of one penny each from H.M. Stationery Office, York House, Kingsway, London, W.C.2.

Dated the 18th day of March, 1947.

O. A. SHERRARD,
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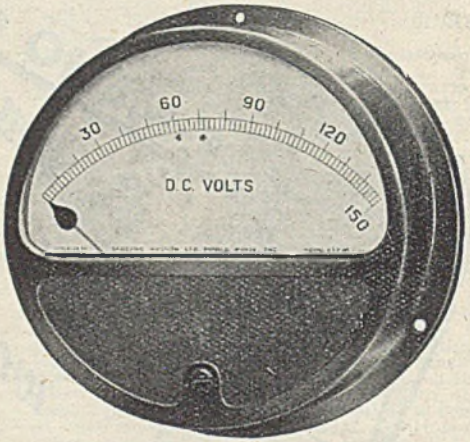

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Development Funds

MINISTERS responsible for introducing various nationalisation schemes have all declared belief in the proposals, in that they are said to be designed to bring about improved conditions in the respective industries, increase efficiency and output. Assuming the Ministers, and in particular the Minister of Fuel, to be sincere, they must realise that in the absence of any special allocation, nationalisation may seriously upset the income arrangements of many of the associations within the industry, in that so far as electricity supply is concerned the present contributions from the now independent components in the industry will, under nationalisation, cease. Attention has been drawn to the position by various supply interests and it is suggested as a result, that positive amendments to the Electricity Bill should be made to meet the situation. In the circumstances it would be assisting if the Minister of Fuel made known, and confirmed in the Bill, to what extent the Central Authority and Area Boards may, for example, be expected to support research in the event of their coming into being in place of the present contributors. The industry has attained its high state of efficiency largely as a result of adequate co-operative research, and it is to be hoped that recognition of the fact will find expression in larger grants and encouragement for many years to come—not for any charitable reason, but so that the technical lead established by this country

may be not only held but extended. The position under nationalisation as at present understood, is equally unsatisfactory when consideration is given to the future of those associations in the industry concerned with development and consumer interests. It may be that the Area Boards and district councils may ultimately assume responsibility in this connection, but coupled with their other charges it is unlikely that they will be able to give to the problems involved such individual attention as do the existing associations. The latter are at present supported financially by electricity supply to the benefit of both the industry and the consumer. If under nationalisation that support is withheld and the associations forced to withdraw, the electricity consumer will be the loser.

Work of the E.D.A.

CONSIDERATION of the opinion expressed above with respect to the effect of nationalisation upon the various associations concerned with development, is particularly deserving at the present time in that there is to-day being held the annual meeting and luncheon of the E.D.A.—functions at which the work of the association is publicised to good effect. Among the many interests being pursued, for instance, is one concerning the electrification of coal mines, a special committee made up of many well-known electrical personalities having been formed for the purpose. This committee will investigate and in due course report, presumably to the National Coal Board, on the economies in fuel and operating costs which can be made by the extension of electrical methods to the mines, and acceptance of its recommendations will, we hope, be reflected in greater output per man-hour shift, with no more physical effort on the part of the miner. The association has done, and is still doing, useful work in the housing field, while the increasing use by milk and bakers' roundsmen of battery-driven "prams" shows that good progress is being made in promoting the electric vehicle idea. All this activity is in the public interest; it is to the direct benefit of the consumer. If under nationalisation it is checked or lost, the industry will be the poorer and the public denied a service it can ill afford to be without.

Electricity Output in February

ALTHOUGH the electricity shut-down which began on February 10 naturally caused a reduction in the amount of current generated during the month, the Commissioners report that the output remained appreciably higher than in February last year. Generation figures by authorised undertakings in February, 1946, were 3 462 million kWh, whereas the figure last month was 3 680 million, an increase of 6.3 per cent. In January, when output was affected by load shedding, the increase, compared with the corresponding month of 1946, was 12.8 per cent., indicating thereby that but for the coal crisis the chances are that the February figure would have been considerably greater than has been reported by the Commissioners, and demonstrating the difficulty of keeping demand within the output generating capacity available. During the first two months of this year output increased by 9.8 per cent. when compared with the same two months of 1946, and so far as can be judged will need to continue to increase, despite the restrictions imposed upon the domestic consumer. With the problems born of shortage of plant is an embarrassment born of popularity, for at no time in the history of the industry has demand been greater nor more insistent. That it coincides with a period when the industry is hard put to it to make good the lee-way lost during the war years, and that it occurs at a time when the future of the industry is in the balance are facts which add to the aggravation.

Water Power in Scotland

THE North of Scotland Hydro-Electric Board, which received the approval of Parliament last month of the Mullardoch-Fasnakyle-Affric project in Inverness-shire, has already placed contracts for the scheme and preliminary negotiations for the transmission of power have begun. The board is also pressing ahead with its other major projects. At Loch Sloy, Dumbartonshire, work is progressing on the tunnel through Ben Vorlich. The foundations of the generating station at Loch Lomondside are being excavated, and

plant for the construction of the dam is being assembled for an early start. At Pitlochry, Perthshire, preliminary tunnelling is in progress for the 23 ft. diameter tunnel to carry the water from Loch Tummel to the generating station. Work is starting on the Clunie dam, and the construction of a coffer dam will begin next month. The contract for the 3¼-mile-long tunnel at Fannich has been placed, all of which substantiates the claims put forward by Mr. TOM JOHNSTON at the luncheon of the E.D.A. Scottish Area last week, that the board intends to become a productive unit as soon as is reasonably possible.

Radio-communication Convention

THERE will be held at the I.E.E. next week, a radio-communication convention every bit as important and well-filled with business meetings as was the radio-location convention last year. The proceedings will be opened on Tuesday evening, and on the following days and evenings until March 28, there will be revealed to audiences in the lecture theatre much that is not yet generally known. Not all the papers, however, will contain novel subject matter, for the convention, so far as we can judge from the advance programme, has been designed, as was the case with radio-location, to place on record the progress made since 1939, whether generally well known or not.

Speeding Up Plant Production

IT was made known in the House on Monday that the Ministry of Supply is to make every endeavour to ensure the necessary labour and materials for the manufacture of heavy electrical plant and boilers, so that production of these equipments may be speeded up. A special organisation built on war-time experience is being set up, following a meeting last week between the Government and representatives of the electrical industry and the boiler makers, whereat were discussed ways and means of increasing and accelerating the output of generating plant. The suggestions put forward at the meeting are to be considered by a Committee under the Minister of Supply, on which the Central and North of Scotland Electricity Boards and the industry will be represented. The various extension programmes have for some time been seriously behind schedule, while much of the plant at present in use is well over age. If by the formation of the new organisation the availability of suitable labour and materials for the production of new plant is increased, the industry will be grateful, for up to now red tape and regulations appear to have had a priority out of all relation to their place in the production line. Another hindrance to the building up of our generating capacity is the opposition in many cases to the siting of new power stations, including in some instances opposition by the Ministry of Works.

Criticism and Crisis

THAT the industry as a whole has been too modest and backward in its endeavour to educate political opinion on its practical achievements, as an antidote to the political theory of nationalisation, is an opinion, expressed by Sir ROBERT RENWICK at the County of London meeting on Tuesday, which will have wide support. Other remarks made at the meeting will be found elsewhere in this issue, and without referring to them here in detail it may be understood that they endorse all the views already expressed in these columns. As to the cost of the crisis restrictions to industry, Sir ROBERT considers this might be around the £110 million mark—all for a saving in three weeks of 550 000 tons of coal, at a cost per ton of at least £200. On the question of generating plant Sir ROBERT holds the view that the biggest contributory factor to the shortage has been the inadequate rate of new installation due to Government policy, and points out that by the end of this year—by which time the war will have been over 2½ years—we shall be lucky if post-war power station extensions total 350 000 kW. In 1948 an additional 615 000 kW, may become available, but with a present shortage of some 2 000 000 kW, progress is inadequate. A comparison of the results of present policy with those in the dark days of the war, shows that though in 1941 some official restriction on new generating plant might have been excusable, the additional capacity installed was 700 000 kW, while in 1942 a further 700 000 kW was introduced.

District Heating and Appliances

By John H. Fella, B.Sc., A.M.I.E.E.

Below is discussed the possible effect of the adoption of district heating schemes upon the development and sales of domestic electrical appliances, particularly water and space heating equipment. The views expressed are not necessarily those of the Editor and comment upon them is invited, either for publication or otherwise.

THE February coal crisis may possibly focus further attention on the possibilities of district heating on a large scale, and since in the U.S.A. district heating in competition with other heating media obtains about 50 per cent. of the space and water heating business in the area which it covers[1], the subject is worthy of consideration by the electric appliance industry.

RUSSIAN EXPERIENCE

In Russia the development of district heating went ahead so rapidly from the first installation in 1924, that by 1939 there were 106 stations. Some of the later installations in Moscow provided the heat requirements for mills and factories as well as the domestic needs of a population of 50 000.

In Britain there were two installations in Dundee in 1920 and 1922, but these were not followed in other areas. The position to-day may be different. On the economic side the country is faced with a demand for coal which will in all probability exceed supply for some time. The "Memorandum on District Heating as applied to Small Housing Estates," published by the Ministry of Fuel and Power in 1946, indicates that by the adoption of such heating, double the heat could be provided for each house with a consumption of less coal than by conventional methods. A scheme prepared for a housing estate in Lancashire recently estimates a saving of between one and two tons of coal per annum for each house. A circular was issued to local authorities by the Ministry of Health drawing attention to the subject.

POSITION IN THIS COUNTRY

The position by February, 1947, was that four local authorities had prepared schemes, and obtained the approval of the Ministry. In addition over 20 other towns and cities had been in communication with the District Heating-Sub-Committee and had schemes in preparation or under discussion.

Clearly this is a matter which merits the serious attention of the electrical appliance industry and especially that section dealing with heating equipment. The most direct effect might be in the field of water heating, since water heaters either of storage or immersion types would not be required. Electric kettles would remain for boiling small quantities of water.

It was estimated that the potential sales of water heaters in the second post-war year would be 93 000 electric and 275 000 gas[2]. The actual production in 1946 was 367 700 electric and 259 200 gas[3]. One reason for the high output of electric immersion heaters is the fact that they were invariably specified for temporary houses, of which 92 000 were built and 11 500 were under construction at the end of 1946.

HOUSING PROGRAMMES

Of the some 250 000 permanent houses built or under contract for construction at the end of 1946, about three-quarters were local authority council houses for letting, and it seems that this general policy will continue for the next few years. It follows that the adoption of district heating on a large scale will make serious inroads into the market for electric water heaters in new houses.

SPACE HEATING

For space heating the situation is rather different. The district heat supply should meet the basic needs of the house. It may be desirable, however, to have an emergency source of heat for exceptionally cold weather and for psychological reasons. This might well take the form of a built-in radiant electric fire. Another possible effect of district heating on small houses might be the provision of built-in ventilator fans to provide adequate air circulation in council houses.

[1] "The Steam Engineer," May, 1937. [2] "The Market for Household Appliances." P.E.P. October, 1945. [3] Monthly Digest of Statistics, January, 1947.

TRACTION DEVELOPMENTS

by J. H. CANSDALE, M.I.E.E.

As the first full year since the war ended, 1946 witnessed a burst of activity in electric traction, largely due to the release of work and orders which had been held up over the past six years. Although traction development as such has largely been in abeyance since 1939, there are certain war-time developments, particularly in connection with materials and processes, which can now be applied to the improvement of traction equipment generally.

Work has been restarted on the L.N.E.R. 1 500 V electrification between Liverpool Street and Shenfield and those who have to put up with the present inadequate steam service are looking forward keenly to the improvement which electrification will bring.

The L.M.S. Railway, which has pioneered the use of Diesel-electric shunting locomotives in Great Britain, now has a considerable fleet of these in service, and each of the other main line companies also has some of these units operating. In addition the L.M.S. is now considering the use of larger Diesel-electric locomotives for main line and mixed traffic duty. To

A Sunbeam-B.T-H. trolleybus at Hastings

enable such units to be tried out in service they are planning to build two experimental locomotives and it is hoped to have the first of these in operation in about 12 months time.

During the past 10 years Diesel-electric locomotives have made amazing progress in the U.S.A., and the majority of locomotives now on order in America are of this type. The conditions which particularly favour Diesel-electric operation, e.g., abundance of oil and long runs on which water and fuel are difficult to procure, do not obtain in this country, but nevertheless, the many advantages of the Diesel-electric locomotive, and in particular its high availability, make it an attractive proposition even here. British manufacturers have received substantial orders during 1946 for Diesel-electric locomotives and railcars for overseas, notably for Egypt and New Zealand.

GAS TURBINE EXPERIMENTS

As a possible rival to the Diesel-electric type, the gas turbine electric locomotive is now coming to the forefront. Experimental units have been tried out in Switzerland and the Great Western Railway has placed an order for a 2 500 H.P. locomotive of Swiss manufacture. At the same time it has ordered a second locomotive of this type which is being designed and manufactured in this country.

The experience of the Southern Railway during the war years proved that its vulnerability to air attack was no greater than was that of the other railways, and the speed with which services were restored after some of the severe raids on London was a tribute both to the organisation and to the individuals concerned. The Southern has announced plans for further extensions of its electrified system, particularly in the south-east section, and coupled with this, it is intending to use both electric and Diesel-electric locomotives on a very large scale.

During the war, the Southern tried out two experimental electric locomotives which embodied a novel control scheme with two flywheel motor booster sets. The flywheel sets are arranged to maintain power on the locomotive whilst the train is passing over rail gaps, and they appear to have been very satisfactory.

London Transport is actively engaged in carrying out the remainder of the large programme authorised just prior to the war. This includes the extension to Ilford and Ongar, the first section of which from Aldgate to Stratford was opened in December.

The completion of the large order for the 1938 tube stock was delayed during the war, but it is now almost finished and further orders have been placed for 225 motor coaches for surface stock. These will include the under-car mounted electro-

pneumatic control equipments, type PCM, as fitted to the 1938 tube stock.

The steady decline in trams was checked during the war period when every vehicle that could run had to be pressed into service; but this was only a temporary respite and numbers are again declining. During 1946, several systems ceased tramway operation and changed over, either to motor 'bus or to trolley-'bus operation.

Trams are still flourishing, however, in some of the large cities and Glasgow has ordered another 100 Coronation cars. These are of the bogie type with 4-motor equipments and electro-pneumatic control.

The latest type of American car, the PCC type, is to be demonstrated in this country and experimental units are being put into service at Blackpool and Glasgow. These will have special resilient wheels and multi-notch commutator type control.

TROLLEY-BUS EXPANSION

Trolley-bus building during the war was held up until 1942 and was then only resumed at a level just sufficient to enable the most urgent replacements to be made; in consequence during the past year a flood of orders has been released. Whereas the total number built from 1942 to 1945 was approximately 300, orders since then have amounted to upwards of 1 000 vehicles, both for this country and for overseas. About 200 of these are on order for South Africa, and other export orders are for three installations in New Zealand, two in Norway and one in Western Australia. Replacements are on order for nearly all the principal operators in Great Britain and an initial order is in hand for 20 vehicles for Glasgow, where trams have hitherto held the field.

The decision to replace the trams in South London by oil buses has been a disappointment, particularly in view of the very successful operation of the trolley-buses on the north side of the Thames. It is obvious that this decision has been dictated largely by the present restrictions caused by the coal shortage, a situation which should be considered as a temporary embarrassment, rather than as a permanent feature of our economy.

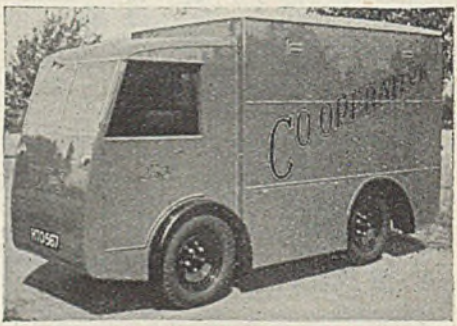
The equipment now being installed on the great majority of new trolley-buses consists of a non-regenerative motor arranged to give rheostatic braking. Due to difficulties associated with regeneration, particularly in cases where there is a supply from mercury arc rectifier sub-stations, the regenerative motor is used only in special instances.

Motors of improved design were produced during 1946, the latest being of floodproof construction, capable of being immersed in water up to the centre-line without harm. Motor ratings have tended to increase but with the vehicle weight limited to 14½ tons and with the practical limitation of acceleration to about 3 m.p.h.p.s., the maximum of about 125 H.P. at the one hour rating would appear to be approaching the economic limit for even the heaviest duty.

Automatic acceleration has been tried out experimentally but has not yet been adopted generally. It offers certain advantages, and is particularly useful when getting away in traffic, since the driver can obtain the maximum acceleration safely without fear of blowing his circuit breakers.

There was only limited activity in battery vehicle manufacture during the war but for the past 12 months business has been very brisk. Several new makers have entered the market, including, for the first time, one of the well-known motor car manufacturers. The home demand for vehicles, more than exceeds the present supply and in addition, orders for abroad have been received, including a large order for Belgium. The 15 cwt. and one ton types are still the most popular sizes though larger units up to 5 tons capacity are being produced for special work such as refuse collection.

Advantage has been taken of war-time experience in the design of aircraft motors and control, to produce equipment that is



A 1-ton Northern Coachbuilders' battery vehicle

lightweight but also able to stand up to the heavy duty imposed by battery vehicle service. One manufacturer is reported to be testing out all his vehicles on a 1 in 4 grade, a test which is beyond anything which the vehicle would normally be expected to perform.

In addition to battery road vehicles there has been renewed interest in industrial trucks and a wide range is now available, including a variety of stacking trucks which are being used increasingly for warehouse work.

• 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. A. M. ANDERSON, formerly of the Witton engineering works of the General Electric Co., Ltd., and for the last five years general manager of the company's Leicester factory, has been appointed personal assistant to Sir Harry Railing, chairman of the company.

MR. A. M. ANDERSON

MR. W. P. LILWALL, chief electrical engineer and manager of the Fleetwood electricity department retires on May 31.

MR. CHARLES HUGHES has been elected a director of the Kalgoorlie Electric Power and Lighting Corporation.

MR. KEITH FRASER has been appointed a director of Babcock and Wilcox, Ltd.

MR. G. W. LEACH, Mr. W. Hartley and Mr. A. A. Clery have been appointed directors of Drake and Gorham, Ltd. Mr. M. G. Drake and Mr. F. Jarrett have resigned.

MR. H. G. STEEL, first assistant mains engineer with Tynemouth Corporation, has been appointed mains engineer. Mr. T. B. Cole, second assistant mains engineer, has been promoted to first assistant.

MR. G. A. T. BURDETT has joined the sales production department of the Plessey Co., Ltd., in the capacity of press officer. Latterly with Odhams Press on the editorial staff of Electrical and Radio Trading, Mr. Burdett was, before joining the R.A.F. at the outbreak of war, sales engineer with Central London Electricity, Ltd., and was previously with the North Wales Power Company.

MR. G. A. T. BURDETT

MR. HARRY TOWERS has been elected a director of the Bushing Co., Ltd. It was recently announced that Mr. Towers had been appointed director and general manager of A. Reyrolle and Co., Ltd., with whom the Bushing Co. is associated. Until the end of 1946 Mr. Towers was general manager of Edmundsons Electricity Corporation, Ltd., having been associated with that company since 1933.

MR. W. G. CHIVERS, of the Cardiff electricity department, has been appointed area officer for the North-West England and North Wales area of the British Electrical Development Association.

MR. W. B. D. BROWN, managing director of the Glacier Metal Co., Ltd., at the request of the President of the Board of Trade, has agreed to serve on the first Council of the British Institute of Management.

MR. FRED MORROW, assistant secretary of the Eastbourne branch of the E.T.U., during the war, when serving with the Royal Marine Commandos, taught his comrades the art of Ju-jitsu. He has now started an athletic club in Eastbourne, teaching local youth and grown-ups the art of ju-jitsu, fencing and boxing purely in a voluntary capacity. He is with H. Beney and Sons, Ltd., of South Street, Eastbourne.

MR. F. MORROW

MR. V. W. BONE has been appointed deputy chairman in addition to his duties as managing director of Ruston and Hornsby, Ltd., and Mr. E. W. Spalding and Mr. V. R. Prehn have been appointed directors of the company.

SIR FREDERICK STEWART, the Scottish industrialist, has joined the board of S. Smith and Sons (England), Ltd. Sir Frederick is chairman of Thermotank, Ltd., the North British Locomotive Co., Ltd., and of Kelvin, Bottomley and Baird Ltd.

DR. L. E. C. HUGHES has been re-elected president of the British Sound Recording Association. The other officers are Mr. R. W. Lowden, hon secretary; Mr. L. R. H. Walker, hon. treasurer; and Mr. D. W. Aldous, hon. technical secretary and editor of the association's publications.

MR. E. EDWARDS, chief electrical engi-

neer with Dorman Long and Co., Ltd., Middlesbrough, has retired. Parting gifts, subscribed to by the electrical engineers' staff, included a wrist watch, and cheque, with a handbag for Mrs. Edwards, and an illuminated address and writing bureau from the electrical department.

MR. F. G. ALLEN, who has retired after over 48 years with the General Electric Co., Ltd., was for the last 30 years in the electrical accessories department. He was chairman of the Electrical Accessories Association for four years, and when this wound up, devoted his energies to building up the accessories section of B. E. A. M. A. Mr. Allen was chairman of this section for eleven years and until his retirement was for several years a member of the Fair Trading Council.

MR. F. G. ALLEN

MRS. J. YOUNG has been elected president, and Mrs. W. S. Carty, chairman, of the Sunderland branch of the E.A.W.

MR. C. H. CROWLIE, for many years southern sales manager for Hoover, Ltd., has been promoted to sales manager for Great Britain, of the company. Mr. W. Norden, southern branch manager has been promoted to southern sales manager in succession to Mr. Crowlie.

MR. E. HARGREAVES has been appointed sales engineer manager to the commercial and industrial refrigeration organisation of Electricity House, Ltd., and will control the company's activities in this field. Before joining the company, Mr. Hargreaves was refrigeration manager to Joshua Hindle and Sons, Leeds.

MR. IAN R. GALLOWAY, who has been appointed mains assistant with the Kirkcaldy electricity department, was educated in Edinburgh at Daniel Stewart's College and at the Heriot-Watt College. He received his training with the Lothians Electric Power Company with whom, later, he held the position of sub-station engineer before being directed in January, 1941, for service in the Department of Scientific and Technical Posts, Admiralty.

MR. T. ERIC B. MARSH, chief electrical engineer to Bickershaw Collieries, Ltd., Lancs., has resigned from that position to take up an appointment as electrical engineer to Mufulira Copper Mines, Ltd., in Northern Rhodesia.

MR. N. S. WALKER, North-Eastern Electric Supply Co.; Mr. R. L. Gaunt, Yorkshire Electric Power Co.; Mr. L. Howles, South Wales Power Co.; Mr. P. Wardle, Cannock electricity department; Mr. A. G. Connell, Halifax electricity department; a representative of Derby and Notts Electric Power Co.; a representative of Lancashire Electric Power Co.; and a representative for Scotland, to be nominated by the Scottish Area Committee, have been invited to serve on an E.D.A. Electrification of Collieries Committee established to investigate and report on the economies, in fuel and operating costs, which can be made by the extension of the use of public electricity supply in coal mines.

MR. E. T. LLOYD WILLIAMS, a former director of the Gramophone Co., Ltd., Marconiphone Co., Ltd., Electrical and Musical Industries, Ltd., and other companies, left £639 286 (net personalty £601 219).

Obituary

MR. W. FENNELL, director of the Mid-Cheshire Electric Supply Co., Ltd., and the Mersey Power Co., Ltd., on March 13, aged 70 years. Mr. Fennell became manager and engineer of the Mid-Cheshire Electric Supply Co., Ltd., in 1918, and was responsible for the development of the company's overhead transmission services which gave heating and lighting to the rural parts of mid and east Cheshire. He retired from his managerial appointment some years ago. He was a member of the I.E.E. and had served as chairman of the local centre and of the Transmission Section.

MR. WILLIAM R. HOLLAND, of the a.c. engineering department of the British Thomson-Houston Co., Ltd., Rugby, on March 10. After obtaining his B.Sc. degree with first class honours at the University of Bristol, at the age of 19, he joined the B.T-H. Co. in 1916, in the test department. He served with the Royal Engineers (Signals) in East Africa from August, 1917, until the end of the war, and then resumed his career. In 1920 he went to the a.c. engineering department, becoming head of the section dealing with the design of all types of synchronous machines, in 1922. Mr. Holland introduced new and more exact methods of design resulting in greater efficiency and better utilisation of the material, enabling a considerable reduction to be made in machine sizes for the outputs required. One of his most successful designs was the salient pole synchronous motor with slip ring winding in the faces of the poles and known as the AMT type. He made a complete study of the parallel operation of alternators, particularly for the operating together of several alternators of widely differing ratings, speeds and types.

The Bill in Committee

Ministerial Powers Under Criticism

CONTINUING the discussion on the Electricity Bill in Commons' Standing Committee, Mr. Shinwell defined the relationship between the Minister of Fuel and Power and the Central Authority. As in the case of the National Coal Board, he explained, there would be no interference from Whitehall in day-to-day administration, but the Government would be compelled to exercise some vigilance to ensure that no action taken by the Board was inimical to the public interest.

Several Opposition members complained that under Clause 5 the Minister was taking more powers than were strictly needed. After debate, Mr. Shinwell declared that he did not want to endow himself with more powers than were necessary, and he would, therefore, accept an amendment which met some of the Opposition's case.

When the Committee reached Clause 7, Mr. Shinwell outlined the functions of the proposed consultative councils, which, he said, would have far wider powers than the Industrial and Domestic Consumers' Councils set up under the Coal Industry Nationalisation Act. They would have specific duties imposed on them and would have to deal with all matters affecting electrical distribution. He hoped they would be live bodies exercising great influence over the Area Boards.

The chairman of each council, he explained, would be a member of the Area Board and there would be effective liaison between the two bodies. Provision was made to enable the councils to establish district committees within their area so that there would be a link from the chairman of the Central Authority right down to the consumer.

On Tuesday, the Minister promised to review the machinery of the Consultative Councils, after criticism from both sides, and later agreed that the work of the Councils should be publicised as much as possible. He thought their reports might be included in those of the Area Boards.

To ensure that organised labour should be represented on the Councils, Mr. Gaitskell said an amendment would be introduced at the report stage.

When the Committee adjourned, an Opposition amendment that the Minister's power to prohibit publication of his instructions to the Central Authority should only be used in the interests of "national security" and not in the "national interest" was still under discussion.

Marine Installations Described

AN informative account of the electrical equipment encountered on a modern liner was given at the monthly meeting of the Association of Supervising Electrical Engineers, on March 18, by Mr. C. P. Harrison.

After summarising the special conditions governing the design of marine installations, which included extreme reliability under a wide range of climatic conditions, freedom from noise and radio interference and compactness, the author went on discuss the type of equipment normally installed. In modern British ships, he said, electricity was usually generated at 220 V d.c.—which, quite apart from the natural conservatism of owners. still had several distinct advantages—and distributed on an insulated two-wire branch system, although a few merchant ships had adopted a ring main system. The output of the generators, which might be steam- or Diesel-driven, varied from three or four sets of 300 kW each on refrigerated cargo liners up to 7-10 000 kW on transatlantic passenger liners.

The principal distribution circuits were usually divided into at least two groups of essential and non-essential plant, and by arrangement of time relays, the non-essential circuits were tripped out in the event of a persistent overload on any one generator. If the overload was removed before the end of a few seconds, all relays were reset. Apart from preventing black-outs. Mr. Harrison explained, this non-essential circuit tripping allowed economical running of the plant, since one generator might be run at a high load factor, instead of two on low load.

Turning to motor starters, which, he said. were generally more robust than the simple face-plate type found ashore, the author said that individual starters for the auxiliaries in the engine room could be dispensed with.

The remainder of Mr. Harrison's paper consisted of descriptions of winches, windlasses and other types of on-deck equipment, ventilating fans, cookers, cables and lighting and telephones.

Neutral Earthing

I.E.E. Discussion on Problems of Protective Gear

SUGGESTIONS regarding the ratings of the resistors, reactors and circuit-breakers used for neutral earthing of power systems were made in a paper on "Neutral Earthing of Three-phase Systems, with Particular Reference to Large Power Stations," delivered before the I.E.E. by Messrs. Mortlock and Dobson (B.T-H. Co.) on February 20.

The paper reviewed the various methods of neutral earthing and gave recommendations. Methods of analysis were considered and the simplicity obtained by using symmetrical-component circuits was demonstrated. A description was given of the effect of cyclic restriking in building up large neutral displacement voltages with an insulated neutral and subsequently the authors considered reactance earthing from a general aspect, particular attention being given to the effects of an unbalanced system and mutual reactance when using arc-suppression coils. The cause of neutral inversion when earthing through three-phase transformers was dealt with.

Attention was paid to multiple earthing and methods of reducing the circulation of third-harmonic currents. The authors also referred to interference with communication circuits and insulation stresses.

Opening the discussion, Mr. A. J. Gibbons (London Power Co.) thought that with systems of the urban type, consisting entirely of underground cables, the solid connection at the neutral point was the best method of earthing for pressures up to 11 kV. For the higher-voltage systems, on the other hand, there was nothing to beat a well-proportioned resistance earth. Experience showed that quite a low value of earthing resistance sufficed to eliminate shock to the system on the occurrence of a fault, while providing sufficient fault current to give rapid operation of the protective gear.

He would like to ask what should be done when a fault failed to be cleared by the protective gear. In one large job which they were considering at the moment they were flirting with the idea of shutting off all power sources to that section of the network should there be anything in the nature of a hanging fault lasting for half a minute or more.

Speaking of the authors' comments on direct earthing, Mr. C. W. Marshall (C.E.B.) said that on the grid there had been only one case of apparatus failure due to switching, and subsequent investigation showed that the maximum voltage was about 300 kV on a 132 kV system. The difficulties of obtaining good selective protection, however, were always considerable, but they were less with multiple direct earthing than with any other method. With regard to earth-fault current, on the grid system they got up to about 3 000 A for close-up faults where the transformers were very large, but in practice it was very seldom that they got more than 1 000 A. They aimed at a maximum duration of 2 sec., and the average clearance was in less than half a second.

Mr. J. E. Stubbs (Metropolitan-Vickers) said that if automatic breakers were used in the neutral, it was desirable to use sequential switching to ensure that the main breaker came out before the neutral was broken, but even then an arcing ground might exist on the winding due to residual or decrement until the field died down. It was the policy of his firm to put a non-automatic switch in the neutral unless automatic operation was specifically requested, in order to avoid transient voltage stresses due to oscillatory arcing, and that had been found satisfactory. The neutral breaker was then used for isolation only, but was rated so that it could be used to change over earth connections under load when starting up or shutting down plant.

Agreeing with the authors that there were many instances in which a neutral circuit-breaker was likely to be required, Mr. H. Trencham (B.T-H.) thought that, though there was much to be said for hand operation if the neutral had to be opened, the big difficulty was that it was not easy for the man in charge to know what had happened and make up his mind within about half a minute that the neutral breaker had to come out. If he could not make up his mind, the system did it for him.

Mr. E. E. Hutchings (E.R.A.) dealt with the main requirements of the earth electrode and Mr. J. P. Cranmer (B.T-H.) thought the amount of neutral equipment now required in, say, a 33 kV power station was rather frightening. It was therefore with a sigh of relief that he turned to the future, where one would probably generate at 15 kV and step straight up to a switching voltage of 132 kV or higher.

After Mr. E. G. Hands (Birmingham Electricity Dept.) had referred to the restrictions on protective systems to comply with Post Office requirements, Mr. Dobson replied to the discussion.

Correspondence

The Editor welcomes the free expression in these columns of genuine opinions on matters of public interest, although he disclaims responsibility alike for the opinions themselves and the manner of their expression

Ripple Control

[To the Editor]

Sir.—Some two years ago, following the reading before the Institution of Electrical Engineers of the paper " Remote Control by Superimposed Currents " by J. L. Carr, you commented on certain aspects of ripple control, notably concerning the possibility of interference due to spillover of ripple signals from one undertaking to others. In the course of his remarks during the discussion before the I.E.E. on this paper, Mr. H. Nimmo read a draft regulation which had been prepared for inclusion in the Electricity Commissioners Safety Regulations and which stipulated certain standards by which spillover and interference were to be judged.

Since that time, the situation has been continuously under review by the manufacturers of ripple control equipments, as it is obvious that the adoption of a good neighbourly policy by all concerned is in their interests as much as to the benefit of the ultimate users of ripple control installations.

It is now appreciated that, as a technical proposition, some degree of spillover of ripple signals between interconnected a.c. networks cannot be avoided entirely. At the same time, however, methods, other than using voltage discrimination, are available in practice which would ensure that such spillover signals would not cause actual maloperation of relays on other networks, and in view of this, the draft regulation as previously published is not entirely acceptable to all manufacturers of ripple control equipment.

The manufacturers actively interested in this situation are the Automatic Telephone and Electric Co., Ltd., the General Electric Co., Ltd., Measurement Ltd., and the Metropolitan-Vickers Electrical Co., Ltd., and as a result of technical discussions between their representatives an alternative draft has been evolved as below:—

" An undertaker shall not instal or operate a new ripple control installation unless the method of signal injection and layout of the undertaker's own network and that of adjacent networks will not prevent the correct functioning of any existing ripple control installations."

It is appreciated that this draft formulates the policy in a broad sense only, but it is felt that it would be almost impossible to word a regulation to cover the many varied conditions and applications likely to arise in practice. In order to ensure that details of the policy can be satisfactorily agreed should, for example, difficult or unusual conditions occur on any jobs, the four manufacturers named above have agreed to maintain technical liaison on matters pertaining to ripple control generally, and as from January 1, 1947, they have formed a co-ordinating technical body, to be known as the " Ripple Control Technical Committee " for this purpose.

The proposals outlined above have been discussed with Mr. H. Nimmo who has, on behalf of the Electricity Commission, indicated his approval of them. Mr. Nimmo has stated that there is no present intention of making the original draft statutory before the electricity supply industry is nationalised and as an interim measure the steps being taken by the Committee would assist in ensuring that the non-interference policy would be effectively applied for all new ripple control installations.

Yours faithfully,
R. M. A. Smith.
Hon. Secretary,
Ripple Control Technical Committee.

Location of Power Stations

[To The Editor]

Sir,—We are told that the railways and electricity undertakings are to be nationalised. I have been studying a railway map of England and Scotland, and superimposed upon it a map showing the principal coal deposits.

I have previously written to the Press advocating the burning of coal in large power stations at the pits—converting the energy into high tension current and transmitting it by a vastly improved grid system to localities where it can be transformed as required.

By utilising the rail routes to carry the necessary grid lines, either above or below ground, there need be little interference as regards land acquisition, and all present power stations not in the vicinity of the coal pits could be made into local transformer stations.

If this were agreed as a policy, I feel sure it could be accomplished as a five-year plan.

How absurd for coal ships to have to battle their way to Battersea from Newcastle and Cardiff, so that London should

have electricity. Consider the man-power wasted in building ships, barges and rail wagons—the steel, iron, timber, etc., to make them—the personnel employed on ships, barges and railways—all for the purpose of transporting fuel to local power stations—apart from fuel wasted in the process. After very careful thought, I submit that this unproductive man-power of possibly 2 000 000 could be put to better use.

The solution is for all new generating plant to be installed in power stations at or near the coal pits, increase the capacity of those stations to the utmost (if necessary by improvised buildings), and gradually abolish local power stations and convert them into transformer stations.

Yours faithfully,

H. J. HUMPHREYS.

Hindhead, Surrey.

Installation Problems

THE meeting of the Installations Section of the I.E.E., on March 13, was devoted to the presentation of three short papers by younger members of the Section. Each paper was followed by a discussion in which speakers were limited to two minutes, but the subjects of the papers were not known to the meeting beforehand. Mr. J. F. Shipley was in the chair.

Mr. L. H. Berridge (switchgear engineer, Johnson and Phillips, Ltd.), presenting the first paper, dealt with automatic fused switchgear, which, he said, was often regarded as equipment intended to replace the circuit-breaker, and its merits were therefore assessed by a direct comparison with the modern circuit-breaker; it should, however, in fact, be considered as a completely new approach to the problem of switching and protection, employing a new technique and with its own field of application, which to a large extent overlapped that of the circuit-breaker.

Mr. G. E. Bishop (assistant engineer, Troughton and Young, Ltd.) dealt with electrical installations and said that the principal considerations of the user could be summarised under cost, adequate capacity, flexibility, maintenance and safety. With regard to cost, taking as a basis an installation comprising v.i.r. cables in enamelled screwed welded conduit, the relative costs of other methods were t.r.s. cables 60-70 per cent., lead sheathed cables 70-90 per cent., light gauge close joint conduit, with lug grip inspection fittings 80-90 per cent., light gauge brazed or welded conduit with similar fittings 85-95 per cent. The actual figures depended on many installation factors, one of the most important being in the case of existing buildings, consequential damage. In domestic installations, the introduction of the ring main system of wiring to socket outlets represented a considerable step towards providing flexibility. For industrial premises, liberal rating of all main and sub-main cables and distribution gear would meet normal extensions or alterations, but attention might be given to the use of adaptable boxes provided with spare outlets fitted with knockouts, to take additional conduits. Due to the trouble-free nature of most wiring installations little, if any, consideration was given by the ordinary user to the need for periodical maintenance.

Mr. E. Jacobi, Mr. R. H. Rawll, and Mr. R. O. Ackerley entered into discussion.

Mr. W. J. Killick (assistant engineer, Northmet Power Co.), the author of the third paper, said that tests carried out by a supply authority before a consumer's installation was connected to the mains were often regarded by the consumer as a guarantee of reliable installation and were considered by some members of the electrical contracting industry as an imposition. Both views were incorrect, and it seemed desirable to examine the present basis for the inspection and testing of installations and to suggest alterations which would to some extent guarantee the consumer a safe and efficient installation, while removing the feeling of imposition from the contractor. The legal basis was covered by Regulations 26-33 of the Electricity Supply Regulations, 1937.

The most important basis for the inspection and testing of electrical installations was service to the consumer. He suggested that a simplified code of basic wiring rules should be drawn up to include such requirements as were considered necessary to ensure safety and efficiency, and covering such points as the current-carrying capacity of cables, the earthing of installations and apparatus, etc., and including a schedule of tests to be carried out on completed installations with details of acceptable results. This code should then be embodied in the Electricity Supply Regulations in place of Regulations 26-30. The existing I.E.E. Regulations would not be displaced, but would remain the basis of specification of electrical installations.

Mr. Forbes Jackson and Mr. E. Jacobi also spoke.

Tests on Commercial Mouldings

Determining Characteristics from Small Samples

THE problem of applying standard tests to commercial mouldings was the subject of the I.E.E. Measurements Section paper on February 21 on "Quantitative Tests on Finished Mouldings," the author being Mr. William D. Owen (B.E.A.I.R.A.).

Moulded materials made from a given base by heat and pressure, Mr. Owen said, differed appreciably according to the type of mould and the moulding technique used. To avoid anomalies from this cause when comparing alternative materials, manufacturers had adopted a standard test and test-specimen for each of the salient properties, but it was recognised that the values obtained in this manner might be higher or lower than those manifested by commercial mouldings other than standard test specimens.

Since it was not possible to apply the standard tests to non-standard specimens, a new set of tests and test-specimens was required, the latter being cut from commercial mouldings.

In the discussion which followed, Mr. N. J. L. Megson (Ministry of Supply) said that a tremendous amount of labour was devoted to trying out mouldings in actual working conditions, but that was time wasted and did not always lead to conclusive results. Therefore any method such as the micro method described in the paper was of the greatest value.

In specification work the question arose of from where in the moulding the specimen was to be taken. These materials were very rarely isotropic. In a moulding of a cup-like shape, the properties of a specimen taken from the sides were likely to differ considerably from those of a specimen taken from the base. The answer probably was that the specification would lay down from where the specimen was to be taken, but the point needed to be stressed because specimens from the same mouldings could differ enormously in their properties.

Mr. C. R. Todd (Birkbys) said that during the war it was noticed that the moulding of moulding powders by the transfer method produced results different from those produced by the compression method. The present theory was that the extra pressure used in transfer moulding impregnated the fibres to a greater extent and so caused them to be more brittle. In developing this technique, were any comparative experiments made on compression methods of moulding as against transfer methods?

After Prof. W. J. John (Queen Mary College) had explained that his connection with the work had been through three of his students—Fleming Williams, Rogowski and Strong—Mrs. B. Shearman (E.R.A.) said that when the investigation was planned, the investigators were only asked to evolve tests; they were not asked for any results of tests. As the work drew to a close, however, a lot of numerical results were available, and, as was only human, it was decided to compare them with the results of the standard tests to see whether there was any correlation between the results for the miniature and full-size specimens. The degree of correspondence between the two sets of results in so many cases was rather a surprise. But before any idea of the real usefulness of the tests could be gained, it would be necessary to apply them to much greater numbers of specimens of a larger number of materials of as many types as possible.

Mr. D. J. Strong (Crompton Parkinson), dealing with the electric strength test, said the main difficulty in testing small samples was flashover. A flashover shield round the specimen would work very well, provided certain elementary precautions were taken, and the test approximated to normal working conditions.

Mr. B. C. Fleming Williams felt that the micro tests could be made to give more accurate results than tests on the larger pieces. With a small sample there was a better chance of getting a knowledge of the properties of the substance in the neighbourhood of maximum stress.

Mr. F. C. Fuke (British Mechanical Productions) thought that the usefulness of the paper was considerable, but while these micro test pieces were a valuable contribution to the subject because they showed how mouldings varied from part to part and between moulding and moulding, he feared they gave very little help to the designer, who had to use his common sense and to have a good general knowledge of mouldings.

Mr. F. E. J. Ockenden (Everett Edgcumbe and Co.) said that to determine the water resistance of the moulding as a whole, the surface given to it in the moulding process should be retained. In the surface resistivity test a clearance of substantially more than 2 mm. was necessary.

Book Reviews

The Principles of Technical Electricity.—By M. NELKON (Blackie and Son, Ltd.). Pp. 246. Price 17s. 6d. net.

The steady flow of books on Elementary Electricity was interrupted by the war, and this is amongst the first in the post-war era; it covers the subject up to the standard of the examinations in "Technical Electricity" for the City and Guilds Institute and in "Principles of Electricity" in the Joint Section A papers for the Professional Institutions. The subject matter and method of presentation do not differ materially from that adopted by other authors on this subject except that in the chapters on alternating currents equal prominence is given to power, audio and radio frequency circuits and problems. The author is to be commended on using the calculus where necessary or desirable although, in the preface, he apologises for so doing; he should, however, at least have mentioned the m.k.s. system of units which were adopted as an international standard over ten years ago. Many worked examples are included, and questions, with answers, are given at the end of each chapter; the latter are taken largely from C. and G. and I.E.E. exam. papers—this procedure, of course, simplifies matters for the writer, but a text-book question should aim at elucidating or amplifying the text and an exam. question, is not always the most suitable for the purpose. E. O. T.

Elementary Vectors for Electrical Engineers.—By G. W. STUBBINGS (London: Sir Isaac Pitman and Sons, Ltd.). Pp. 110. Price 6s. 6d. net.

The author aims at explaining the use of vectors and vector algebra for representing alternating currents and voltages; although a number of illustrative examples are given, the book is in no way intended to be a treatise on general a.c. theory. Mathematics are confined to elementary algebra, geometry and trigonometry, ingenious devices being used for finding the average and r.m.s. values of a sinusoidally-varying quantity. The j symbol is introduced by regarding it simply as a label to indicate that the vector so labelled must be turned through 90° before being added to its neighbour, and this idea is then developed to give the usual laws for multiplication and division. The 120° operator, λ, also receives attention. Particular attention is devoted to three-phase problems in which difficulty often arises due to lack of proper understanding of the meaning of polarity. The final chapter deals briefly with the geometry of hyperbolic functions. Mr. Stubbings is well known for his range of books, giving clear and comprehensive explanations of the elements of various aspects of electrical engineering, and we can recommend the present volume, now in its second edition, as a useful addition to the range.

First Course for Electricians.—By T. C. GILBERT, A.M.I.E.E. (London: Morgan, Laird and Co., Ltd.) Pp. 62, with 36 diagrams. Price 3s. 6d. net.

Mr. Gilbert limits his interpretation of the word "electrician" to those engaged on the wiring-up of domestic light and heating installations, and within that compass his book contains some useful information on the principles to be followed. After a brief introduction to Ohm's law, the book outlines the uses of series and parallel connections, and describes the types of house-wiring cable in general use. Mr. Gilbert then turns to his main subject, installations, which he treats thoroughly, with chapters on calculating power costs, earthing, fusing, fire precautions, circuits, and various switching arrangements. Electric bell circuits are also discussed in some detail.

Boys' Hostels Association

Mr. Oliver Lyttelton, M.P., a former President of the Board of Trade, will speak at the annual dinner of the Boys' Hostels Association to be held at Grosvenor House, London, on April 23. Lord Portal of Laverstoke will take the chair, and will be supported by Viscount Leverhulme and Sir Ernest Benn.

The Boys' Hostels Association maintains two residential hostels for working boys in London—the John Benn Hostel, Stepney, where 80 boys are now living, and King George's House, Stockwell, which has accommodation for another 200 boys but is awaiting repair from heavy air raid damage. Acting up to their motto "No Pains, No Gains," the boys themselves contribute over £3 800 from their earnings towards the cost of running the Hostels. The acute housing shortage has made the work of the Association more than ever necessary, nearly 80 per cent. of the boys in its care being orphans or having no homes because their parents are separated.

Tickets for the dinner on April 23 (price one guinea each) may be obtained from Mr. John Benn, Bouverie House, Fleet Street, E.C.4.

Gas versus Electricity

Comparisons on Basis of Coal Economy

THAT no decided difference in regard to coal economy existed between gas and electricity for domestic heating purposes was one of the conclusions put forward by Mr. P. Schiller, in his paper "Comparisons Between Gas and Electricity on the Basis of Coal Economy," read before the I.E.E. on March 6.

Figures stated by independent authorities and in recent reports, the author said, suggested that electric heating involved 60 per cent. to over 100 per cent. higher coal consumption than gas heating. Such inferences, however, were erroneous. In the case of joint products, such as gas and coke, the promiscuous use of percentage efficiencies could be very misleading; a reliable method of comparison consisted in estimating the quantities of solid fuel, gas and coke required to supply a given schedule of domestic heating, and calculating the comparative total of raw coal necessary. Such a method showed, the author claimed, that coal economy could be eliminated from comparisons between the two rival commodities.

Opening the discussion, Sir John Kennedy (Electricity Commission) said that if the steam from back-pressure turbines was used for process work or for district heating, the electricity supply industry could claim an increased thermal efficiency, but they would not claim the average thermal efficiency of the process as a whole, because the steam or hot water could be produced merely by boiler plant, whereas the turbine and the alternator had to be added for the production of electricity. It had to be borne in mind that the coal available in this country was very variable in nature, and less than half of it was suitable for the gas industry. It would be deplorable, he thought, if in domestic or industrial use people were required to use a fuel which did not provide the service required.

Mr. A. H. Barker (Consultant) said he had always deprecated as useless any academic comparison between gas and electric efficiencies, because the two industries were widely different and used what might almost be regarded as different fuels. There were only two ways in which a comparison between the efficiencies could have any meaning, the thermal basis and the commercial basis. Both gas and electricity were necessary, he said, and it would be necessary to distil coal even if no heat was required from the gas, and to produce electrical power even though the thermal efficiency were low. Where the extra quality was worth the additional cost, in his opinion, electricity should be used in the national interest.

Agreeing that electrical energy was for the most part generated by fuel which was rejected as useless by the gas industry and by domestic users, Mr. A. G. Connell (Halifax Electricity Department) said that, in future, electrical undertakings might instal carbonising plants, burn the gases under the boilers to produce electrical energy and sell the by-products. Recent events had shown the public's over-powering demand for electricity.

The viewpoint of the gas industry was put by Mr. F. M. Birks (deputy governor, Gas Light and Coke Co.) who said that the electrical industry had great cause for pride in the realms of lighting and power production, but had, however, some hundreds of rather incomprehensible tariffs, and there had been occasions when these were used to exploit ordinary industry and enable it to enter the fields of cooking and heating, whereby at least two tons of coal were used by the electrical industry where gas would use one.

Investigations he had made into the question of whether fuel was wasted when electricity was used domestically instead of gas, were referred to by Mr. E. B. Powell (London Power Co.). He came to the conclusion that for cooking there was very little in it, although for water-heating gas had definite advantages. It would be unreasonable to try to force a consumer to take a certain fuel; he should be allowed to take what he wanted, but an effort should be made to persuade him to use electric topping-up heat and electricity for cooking, and gas for water-heating.

Concluding the discussion, Mr. Forbes Jackson said that it might be that in forty years' time someone would pick up the Egerton Report and be astonished that, standing on the threshold of the atomic age, we were to-day so pre-occupied with gas efficiencies and closeable stoves. The inference behind all the propaganda was that coal saving was of overriding importance, but it would reasonable to argue that with several hundred years' supply of coal under our feet, coal conservation for its own sake was not a worth-while aim, and remote posterity might be left to look after itself in that respect.

Mr. Schiller briefly replied to the discussion.

H.V. Cable Economics

Some of the Factors Influencing Installation Costs

THE total costs of cable installations were analysed and examples given of the increase in the cost of energy resulting from transmission, in a paper on "The Economics of High-Voltage Transmission by Underground Cables," read before the Transmission Section of the I.E.E. on March 12, by Mr. R. N. Berry (Central Electricity Board).

After reviewing the general trend of cable design and costs, the author showed that for the higher voltages the costs of the dielectric loss and reactive compensation were more important than the I^2R loss. These fixed costs and also the charging current and impulse strength were dependent on the value of the designed maximum stress on the dielectric, and this stress should not be increased without consideration of all its effects.

Discussion of the economic problems involved, the author said, should assist manufacturers to direct their technical development along the most beneficial lines.

The discussion following the delivery of the paper was opened by Mr. C. W. Marshall (C.E.B.), who said that the instruments provided for the supervision of cable loadings were grossly inadequate in relation to the importance and value of cables. He had lived through the period in which the criterion of overloading was the amount of carbon which exuded from the unfortunate cables at peak, and there seemed to be some danger of a return to that unhealthy situation. He hoped that adequate recording or alternatively protecting equipment would be installed on all future cables.

CAUSES OF HIGH COSTS

Mr. S. E. Goodall (W. T. Henleys), emphasised that the high ratio of cost of 132 kV as compared with 11 kV cable was due not merely to the cost of development work and to the fact that not so much 132 kV cable was produced, but also to the very large amount of capital which had to be sunk in plant capable of making it.

Speaking of stresses in super-tension cables, he said that any attempt to raise stresses very much with the present form of dielectric would result in serious difficulties from the performance point of view and in meeting the impulse tests which were beginning to be imposed.

Thanking him for emphasising the need to consider costs other than capital costs when deciding the type or size of cable for a particular job, Mr. C. H. Jolin (Merz and McLellan) said that the author had suggested placing the charging current losses against the cable, but in most cases the charging current was beneficial. Until such time as the load on the cable had a leading power factor, he thought the cable should be credited with the benefits which it gave in reducing the I^2R losses and in improving the regulation.

Mr. D. P. Sayers (City of Birmingham) suggested that there was room for a thorough investigation into the effective temperature rise of cables, and particularly super-tension cables, under service conditions and with service loads. Sheath losses with single-core high-voltage cables could become very serious.

PROVIDING FOR THE FUTURE

The transmission or distribution engineer had to exercise wide judgment and design his cables and sub-stations with an eye to the future. For instance, in Birmingham on the 11 kV distribution system, nothing smaller than 0.35 sq. in. was used for new extensions, and on the 33 kV system nothing less than 0.4 sq. in. cable. Those large cables could not always be economically justified in relation to the immediate loadings, but the small saving effected by the use of smaller cables would be lost in a few years by the need to instal additional capacity.

Dr. A. M. Arman (B.I. Callenders Cables) said the cable-maker seldom had to deal with a case of putting in a cable larger than the actual size required to carry the load; nearly every inquiry and nearly every purchase seemed to be based on the smallest cable which could be put in to take the load. He thought that the manufacturers would be interested to take part in some of the discussions which must precede the placing of such an inquiry.

Replying to the discussion, Mr. R. N. Berry agreed that the charging current was beneficial up to a point, but said that it depended on what the power factor of the system was. It undoubtedly provided power factor correction, but whether that was the right place to have it he was not sure. It might be better to have the power factor correction at lower voltages almost at the machines which gave rise to the lagging kVA. rather than to plump it on the high-voltage network, because that would not relieve the lower voltage system.

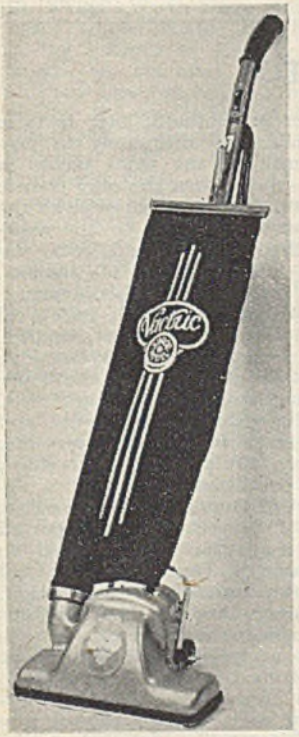
Equipment and Appliances

Heaters and Cleaners at the Ideal Home Exhibition

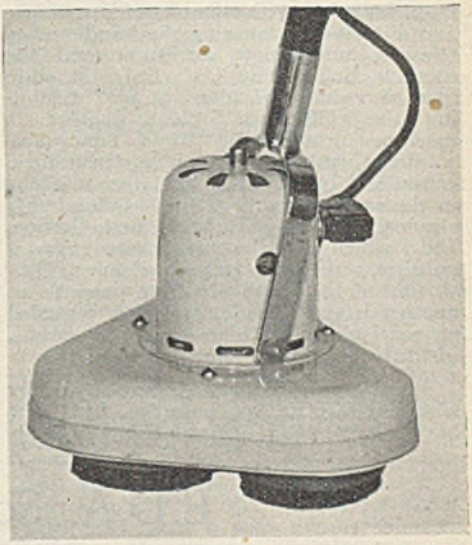
IN this issue we continue our review of the electrical exhibits seen at the " Daily Mail " Ideal Home Exhibition.

British Diamix, Ltd., are showing a small push-button operated cooker, designed for the small kitchen. It measures only 16 in. long, 11 in. high, and 12 in. deep, and has an oven, grill and hot-plate. Double-purpose lifting handles on the sides of the cooker can be turned upside down to form a 14 in. extension to the hob flush with the hot-plate.

A variety of electric fires, both of traditional and modern design, includes a product of Berry's Electric, Ltd., which consists of a complete fireplace with removable heaters set against an illuminated background, giving either heat in winter or an alcove setting for flowers in the summer time, and several models by Brightglow, Ltd. Belling and Co., Ltd., are also exhibiting a range of fires and other heating appliances, and a pre-view is given of their post-war cooker, shortly to be marketed, finished in cream and black vitreous enamel, with a boiling plate, grill - boiler and thermostatic oven control. Other new products in the heating field are the " Mycalex " low-temperature panel heaters, displayed by Morphy-Richards, Ltd. These wall-mounted units, made of a fused mixture of powdered mica and glass, surrounding a nickel-chrome 450 W heating element, are supplied in a natural grey colour, resembling a glazed porcelain tile, and can be coloured to suit surroundings. Since all the electrical connections are below the surface level, they are recommended for use in normally " out of bounds " positions, such as the bathroom or scullery. The same firm is also showing a series of thermostatically-controlled electric irons. Low and medium temperature panel heaters may also be seen on the stand of the Richard Crittall Group.



Vactric external bag cleaner



The " Electrix " floor polisher

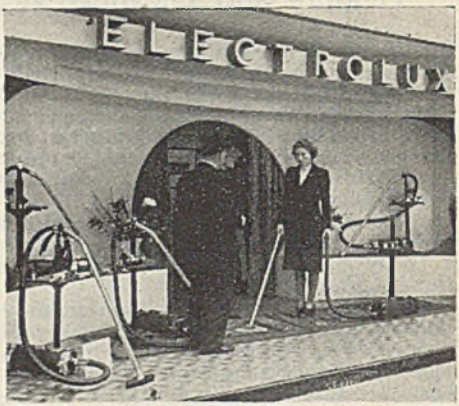
One of the most interesting models among the vacuum cleaners at the Exhibition is a new cylinder type now being manufactured by Hoover, Ltd. Selected by the Council of Industrial Design for inclusion in the " Britain Can Make It " exhibition, last year, but subsequently withdrawn in view of production difficulties, this model represents a departure for the firm, and is a low-priced cleaner designed for the small house with mainly lino or parquet flooring. By means of a new emptying device dust is removed from the inside of the fabric bag by the operation of a handle on the side of the cleaner, without touching the bag itself, and the cleaner is designed to be stored vertically, with a view to saving space in the small house. On the same stand, larger cleaners, incorporating a small light for working in dark corners, are being shown. Other manu-

facturers showing suction cleaners include Bylock, Ltd. Electrolux, Ltd., have taken two large stands, one exhibiting three types of internal-bag suction cleaners, including a new model in which solid runners form an integral part of the body casting. On their other stand, the firm is showing domestic refrigerators.

Vactric, Ltd., show an external-bag type model fitted with a brush height adjustment for varying thicknesses of carpet pile and a device for lowering the handle when cleaning under low furniture, and the Sterling Engineering Co., Ltd., in addition to vacuum cleaners, is also exhibiting the "Electrix" floor polisher, a machine incorporating three changeable rotating brushes and with a stream-lined cream and black finish. A larger machine in the same category is the "Columbus" cleaner, made by Rollnick and Gordon, Ltd., which can be used either as a polisher, scrubber or vacuum cleaner. Conversion of this appliance from one rôle to another is easily made, and it is regarded as particularly suitable for large houses, institutions, etc.

A variety of appliances are shown by Hotpoint Electric Appliance Co., Ltd., who have a large stand, as have H.M.V. Household Appliances, Ltd., at which many post-war developments may be seen.

In the exhibit of the British Refrigeration Association is a representative collection of refrigerators, such as the new Frigidaire model for domestic use, which incorporates an automatic tray release, permitting frozen-in trays to be easily removed.



The latest model is being demonstrated on the Electrolux stand

E.D.A. Scottish Area

MR. H. J. RANDALL, chairman of the E.D.A. Council, who was to have been one of the principal speakers at the annual luncheon of the Scottish Area, in Glasgow, on March 13, was unable to reach the city, owing to the severe weather conditions.

The luncheon, the first since 1939, was presided over by Mr. H. K. Hulme, chairman of the Area Committee, who introduced Mr. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board.

Mr. Johnston, proposing the toast of the association, stressed the need of increased productivity. He pointed out that the country was faced with four alternatives, based on the fact that the nation could not provide for the service of its war debt, plus its social reforms and maintain the standard of living, with its present yield of productivity.

The North of Scotland Hydro Electric Board allowed for the harnessing of many units of power which to-day ran as waste to the sea. They had already either begun operations or had schemes ready to begin operations which would produce some 875 000 000 million units, and it was hoped to produce, at first, one fourth of the total power in Scotland, later to raise this to one half, and ultimately to provide one seventh of the total power in Britain. The scheme was the only chance for the Highlands and it might well be the last. Mr. Johnston pointed to the assistance which the E.D.A. could give, by bringing hope into the lives of millions, for whom life was at present drudgery.

Mr. W. J. Cooper, borough electrical engineer of Hamilton, who replied, thought that something should be done about the wastage at plant. In the boiler room, they had reached 82 per cent. efficiency, in the turbine 83 per cent., and in the alternator 98 per cent. There was, however, some 40 per cent. wastage, which should be utilised.

Lord Provost of Dundee, Archd. Powrie, who proposed "The Guests," supported Mr. Cooper's suggestion and referred to the indebtedness of Dundee, as a local authority, to the work of the association.

Reply was made by Mr. Melville Dinwiddie, M.C., Scottish Director of the B.B.C., who suggested that the recent crisis had done good, by bringing home to the public the necessity for utilising electricity properly and in realising its true value. Electricity to-day seemed to be suffering from its popularity.

Electricity Supply

Guildford.—In view of the proposal that industrial consumers should stagger working hours and undertake as much night work as possible, the Electricity Committee recommends making an endeavour to assist them by granting a rebate on charges. A rebate of 100 per cent. of the fixed charges to consumers on the all-in rate for the March quarter, is recommended, by the Electricity Committee.

Birkenhead.—The estimated cost of the final extension by a further 50 000 kW set, will be £1 545 600, it is reported. For extensions to the distribution system, the Electricity Committee has obtained sanction to borrow £19 562 for switchgear and transformers and £7 429 for mains and services.

Mid-East England Generating Stations.—The Central Board have received from the Commissioners a further amending scheme for Mid-East England providing for three new generating stations, with first sections each comprising an installation up to 130 000 kW. Of these, one station is proposed to be located on the River Trent in the vicinity of Keadby, one will probably be required in west Yorkshire and the other in south Yorkshire. Copies of the scheme "The Mid-East England Electricity (Alteration and Extension) Scheme, 1947," are on sale at the Stationery Office.

Electricity Generation in February.—The Official Returns rendered to the Electricity Commissioners show that 3 680 million units were generated by authorised undertakers in Great Britain during February, 1947, as compared with the revised figure of 3 462 million units in the corresponding month of 1946, representing an increase of 218 million units or 6.3 per cent. During the first two months of 1947 (*i.e.*, up to the end of February) the total number of units generated by authorised undertakers was 8 351 millions as compared with the revised figure of 7 604 millions for the corresponding period of 1946, an increase of 747 million units or 9.8 per cent. The total number of units sent out from the generating stations of authorised undertakers during the month (*i.e.*, units generated, less units consumed in the stations by auxiliary plant and for lighting, etc.) was 3 474 millions, as compared with the revised figure of 3 272 millions in the corresponding month of 1946, an increase of 202 millions or 6.2 per cent. During the first two months of 1947 (*i.e.*, up to the end of February) the total number of units sent out from the generating stations of authorised undertakers was 7 898 millions as compared with the revised figure of 7 189 millions for the corresponding period of 1946, representing an increase of 709 million units or 9.9 per cent.

Hydro-Electric Progress

APPROVED by Parliament on February 15, the North of Scotland Hydro-Electric Scheme No. 7—for the Mullardoch-Fasnakyle-Affric project — is already under way.

The first major contracts in connection with this scheme have been placed by the Board. The whole of the civil engineering works will be carried out by Messrs. John Cochrane and Sons, Ltd., of 39, Victoria Street, London, and Inverness, and the English Electric Co. will supply three 22 000 kW turbo-alternators for the Fasnakyle generating station. These will be driven by three 33 000 H.P. vertical shaft Francis turbines. Arrangements are also completed for the erection of camps which will house a peak number of 2 000 workers. Preliminary negotiations in connection with transmission from Fasnakyle to Beauly have commenced.

At the same time, the Board is progressing with other major projects. At Loch Sloy men are working night and day on the tunnel through Ben Vorlich. The foundations of the generating station at Loch Lomondside are being excavated and work will soon start on the diversion of the main Balloch-Crianlarich road. Plant which will be used in the construction of the dam at Loch Sloy is being assembled on the site, and work will commence in the near future.

At Pitlochry excavations for the site of the Clunie power station are being made. Preliminary tunnelling in connection with the 23 ft. diameter Clunie tunnel, which will carry water from Loch Tummel to Clunie generating station, is being carried out. Work is also starting on the Clunie Dam at the east end of Loch Tummel. The construction of a coffer dam will be begun next month.

At Fannich, accommodation camps are under construction, and the Diesel generators which will be used during construction of the project are being assembled. The contract for the 3¼ mile long 10 ft. diameter tunnel has been placed with Balfour Beatty and Co., Ltd.

Contracts Open

WE give below the latest information regarding contracts for which tenders are invited. In the case of overseas contracts, particulars are to be had from the Board of Trade, Millbank, London, S.W.1 (corner Horseferry Road), unless otherwise stated:—

Birkenhead, March 22.—Supply and delivery of: (a) 150 MVA metal-clad switchgear at 11 kV and 6.6 kV; (b) transformers, various sizes and types. Specifications from Borough Electrical Engineer, Craven Street, Birkenhead.

Windsor, March 24.—Wiring maximum of 228 existing Corporation houses at Dedworth. Particulars from Borough Engineer, 16, Alma Road, Windsor; deposit, £1 1s.

Wallasey, March 24.—Supply and delivery, for 12 months, of various distributing equipment. Specifications from Borough Electrical Engineer, Wallasey Road, Wallasey.

Newark, March 24.—Supply and delivery of two sheet steel kiosk sub-stations and equipment, including 300 kVA 11 000/415 V transformer. Specifications from Borough Electrical Engineer, Municipal Buildings, Baldertongate, Newark.

Bath, March 31.—Supply and delivery, for 12 months commencing June 1, of various electrical equipment; also, supply of high-voltage testing set and 16 insulation testing sets. Specifications from City Electrical Engineer, The Old Bridge, Bath, Somerset.

Farnworth, April 1.—Supply of p.i. cables, e.h.t. and l.t., overground pillar boxes and underground boxes. Specification from Electrical Engineer, Electricity Works, Albert Road, Farnworth, Lancs.

Victoria, Australia, April 2.—State Electricity Commission of Victoria invites tenders for steel-cored aluminium conductor and steel earth conductor for 220 kV transmission line, in accordance with Specification No. 46-47/114. Particulars from Agent-General for Victoria, Victoria House, Melbourne Place, London, W.C.2.

Leyton, April 2.—Supply and delivery of: (1) Cables; (2) meters; during 12 months commencing April 1, 1947. Particulars from Borough Electrical Engineer and Manager, Electricity Offices, Cathall Road, Leytonstone, E.11.

Belfast, April 3.—Supply, delivery and erection of 33 kV armourclad switchgear. Specification from City Electrical Engineer and General Manager, East Bridge Street, Belfast; deposit, £2 2s.

Dundee, April 3.—Supply, delivery and erection of 33 kV, three-phase, metal-clad switchgear at Clepington static sub-station; also, 33/6.6 kV, three-phase 10 000 kVA outdoor type "on-load" tap-changing transformers, and liquid type 6.6 kV neutral earthing resistances at the same sub-station. Specifications from City Electrical Engineer, Dudhope Crescent Road, Dundee; deposit, £1 1s. each.

Bury, April 9.—Supply and delivery of one 5 000 kVA, three-phase, 50 cycles, oil-immersed naturally cooled transformer for outdoor installation, 6 600/11 000 V. Particulars from Engineer and Manager, Electricity Department, Market Street, Bury.

Dundee, April 10.—Supply, delivery and erection of 33 kV, three-phase metal-clad switchgear, for extensions at Carolina Port generating station; also, supply, delivery and jointing, supervising the laying of three-core and one-core, 33 kV cables for Carolina Port/Clepington feeders. Specifications from City Electrical Engineer, Dudhope Crescent Road, Dundee; deposit, £1 1s. each.

Bolton, April 12.—Supply for twelve months of three-phase, 50 cycles, 6 600/422 V, naturally cooled transformers, of various sizes ranging from 100 kVA to 1 500 kVA, with extra prices for automatic "on load" tap-change equipment on certain of the larger sizes. Specification from Borough Electrical Engineer, Back o' th' Bank, Bolton; deposit, £1 1s.

Bradford, April 22.—Supply, delivery and erection of two 350 kW glass bulb type mercury arc rectifiers. Particulars from Electrical Engineer and Manager, Sunbridge Road, Bradford.

Middlesbrough, April 26.—Supply and delivery of: (a) one 11 kV, three-phase oil-immersed and compound filled metal-clad ring main tee-off unit, comprising two oil-break isolators and one circuit-breaker; (b) one 250 kVA, 11 000/440/250 V three-phase oil-cooled indoor transformer; (c) one meter testing set, single-phase, 0/500 V, 0/100 A, unity/zero power factor, complete with voltmeter, ammeter and power-factor meter and suitable for use on 240 V, single-phase supply or a three-phase four-wire 415/240 V, 50 cycles supply. Specification for items (a) and (b) from Borough Electrical Engineer, Corporation Electricity Department, Snowdon Road, Middlesbrough, deposit, £1 1s. each.

Industrial Information

Modern Lighting in Showroom

The fluorescent lighting installation adopted for the interiors of the tailoring and showroom premises of Gieves, Ltd., 27, Old Bond Street, London, was planned and supervised by their architect in conjunction with the illuminating engineering department of Siemens Electric Lamps and Supplies, Ltd., 38-39, Upper Thames Street, London, whose equipment was used throughout. For the showroom special fittings were designed, each arranged for the operation of three "Sieray" 80 W fluorescent tubes. Industrial fittings equipped with 80 W "daylight" lamps were employed for the tailoring and office sections, approximately 200 lighting points being fixed. The installation work was carried out by Rashleigh Phipps and Co., Ltd., electrical engineers, 2, Hanover Square, London, W.1.

Fluorescent lighting in the showroom of Gieves, Ltd., Old Bond St., London

The Ferrantians

Some 70 old and present Ferrantians met at the Savoy Hotel, London, for their fourth reunion dinner on March 11. The guest of honour was Mr. V. Z. de Ferranti, who was complimented on his election to the presidency of the I.E.E. Mr. Arthur E. Hadley presided, and the principal toast was proposed by Mr. Allen West, who, with Mr. Hadley, was with the firm at Charterhouse Square in the 'nineties. Mr. de Ferranti replied in happy and reminiscent vein, and other speakers included Mr. T. F. Lister, Mr. D. Z. de Ferranti and Sir Robert Watson-Watt. Arising out of the function it was agreed to form the Ferrantians' Association, with Mr. V. Z. de Ferranti as first president and Mr. F. J. Hebbert (Ferranti, Ltd., Hollinwood, Lancashire) and Mr. W. E. Warrilow (24, Bath Hill Court, Bournemouth) as joint hon. secretaries.

New Telephone Number

The telephone number of the Electrical Wholesalers' Federation has been changed to Holborn 7186 (P.B.X.—2 lines).

G.E.C. Rangoon Branch Re-opens

The Rangoon premises of the G.E.C. (Burma), Ltd., which were occupied by the Japanese over four years ago, have been restored to the company, refitted and re-opened for business. The Japanese used the building as a shipping agency and it became a Toc H when the city was re-taken in 1945. Soon afterwards the G.E.C. returned, and Mr. Paxton, the manager, recovered the building from the military authorities. It was necessary to do a great deal of improvisation and all office furniture was made on the premises. Some equipment, including a safe, storage bins and air-conditioning plant, was recovered from the Japs, who left behind a solitary lighting fitting. The only remaining traces of the Japanese occupation are some signs on the

After being used as a shipping agency by the Japanese and as a Toc H by the British authorities, the G.E.C.'s Rangoon branch is open again

front of the building and a rising sun cut-out over a fireplace.

Rail Car Fluorescent Lighting

A third full-scale trial of fluorescent lighting on railway rolling stock is being

One of the experimental fluorescent lighting installations in a Metropolitan Line coach. The centre lamps are for emergency purposes

made by the L.P.T.B. on two Metropolitan line cars. In previous experiments, fluorescent tubes have been connected in series across the 600 V d.c. traction supply, and also run in parallel from a 1 200 c.p.s. motor-alternator set. Although both methods have given good results in service, drawbacks have been the necessity of carrying an additional rotating machine and the considerable amount of wiring involved. The third system is expected to give equally good performance without these disadvantages. A dual purpose, totally enclosed motor-generator designed by the Metropolitan-Vickers Electrical Co., Ltd., supplying both 50 V d.c. for normal purposes and 110 V 850 c.p.s. a.c. for the tubes, is mounted below the car. This is rated for 48 20 W parallel-connected tubes, frequency and voltage being controlled by a vibrator-type regulator excited by the d.c. output voltage. Each of two cars is fitted with 22 tubes run in rows from end to end of the saloon along the monitor rails. One car has the circuit arranged for straight resonant starting with a condenser connected in series with the choke, the 110 V a.c. being applied across the choke and lamp with no time delay. In the other car a thermal starter switch introduces a time delay of 2-3 seconds to allow for electrode pre-heating. The relative life of the lamps in the two cars will show whether this additional apparatus is justified.

Experimental Stress Analysis

The recently-formed informal Experimental Stress Analysis Group announces that its first conference will be held at University College, London, from March 25-27. The programme includes an opening address by Prof. J. F. Baker, of the University of Cambridge, on "Experimental Stress Analysis," and discussions on brittle lacquers, photoelasticity and electric strain gauges. The hon. secretary is Mr. E. K. Frankl, University of Cambridge, Department of Engineering, Trumpington Street, Cambridge.

Advance in Prices

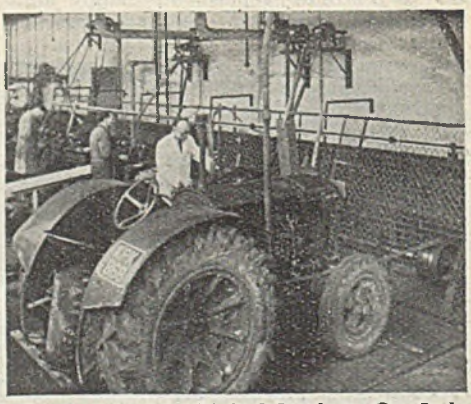
The Airedale Electrical and Manufacturing Co., Ltd., announce that it has been found necessary to advance the increase on their catalogue prices from 80 per cent. to 100 per cent. as and from March 10. All goods will be invoiced at the price current at date of despatch on and after April 1.

Diesel-Electric Coaches for Iraq

An order has been placed by the Iraqi State Railways with the English Electric Co., Ltd., of Queen's House, Kingsway, London, for nine two-coach 275 H.P. Diesel-electric units, and one 350 H.P. Diesel-electric shunting locomotive. A repeat order for units of a similar type for Ceylon is in hand, and an extensive programme is also under construction for the Egyptian State Railways, covering Diesel-electric trains, express locomotives, and shunting locomotives.

Power by Improvisation

By improvisation and adaptation United Insulator Co., Ltd., Tolworth, Surrey, were able to keep 700 of their 750 employees occupied during the recent power cuts. Two second-hand 1¼ kVA single-phase, Petter petrol-driven alternators, a second-hand Lister Diesel 15



A tractor used by United Insulator Co., Ltd., to drive the line shaft in the tool room and two d.c. motors working as generators

kVA single-phase alternator and a Fordson tractor were the means of energy em-

ployed to replace the normal power supply of 300 kVA three-phase. Despite these drawbacks, production of the simplest and cheapest type of capacitors was maintained.

New Service Department

Runbaken Electrical Products have opened a service department at 45-46, Oxford Road, Manchester, to deal with the repair and servicing of their products and equipment. Spares and replacement parts are dealt with at the same address.

E.D.A. Diplomas

The E.D.A. have decided to resume the award of their domestic electricity salesmanship diplomas and the sales engineers' diplomas. Holders of the E.D.A. salesmanship certificate who desire to qualify for either of these diplomas can now make application to E.D.A. headquarters.

Five Day Working Week

Following the introduction of a five-day working week in their factory, Victor H. Iddon, Ltd., of Wythenshawe, Manchester, announce that similar arrangements have now been made for their office staff. The company's offices and works will be closed on Saturday mornings.

B.B.C. Adopts Frequency-Modulation

Marconi's Wireless Telegraph Co., Ltd., are to supply a 25 kW frequency-modulated broadcasting transmitter to the B.B.C. It will be the first frequency-modulated transmitter to be put into regular service by the B.B.C., a major step towards the adoption of the new system in this country.

B.I.F. Record Exhibitors

The British Industries Fair opens in London and Birmingham on May 5. The number of exhibitors will exceed 3 000—more than in any previous year—and will represent nearly 80 United Kingdom trades. There will be seven exhibitors of suction cleaners at Earl's Court, and 201 electrical and 411 engineering exhibitors at Birmingham.

Electrical Wholesalers' Federation

The following firms have been elected members of the Electrical Wholesalers' Federation:—The Gresham Electrical Co., 17, Percy Street, Tottenham Court Road, London, W.1; J. Dyson and Co., Ltd., Olympia, 111, Thornton Road, Bradford; and Newey and Eyre Electrical Co., Ltd., 45, Westgate Street, Cardiff.

Overhead Line Regulations

The Electricity Commissioners have had the Overhead Line Regulations, E.I.C. 53, reprinted as a revised code. Regulation 19 is amended so as to extend to other types of overhead lines carried on single wooden poles (with certain exceptions) the relaxations in regard to the provision of anti-climbing devices permitted under the special Regulation 20, in the case of lines constructed to B.S.S. No. 1320. A new Regulation 20 dealing with the question of unauthorised climbing of overhead line supports has been made and the special Regulation made on August 16, 1946, now becomes Regulation 21.

Agents for Silicon Products

As from January 1, Charles Tennants, Ltd., Hillington, Glasgow, have been appointed agents for Scotland, Northumberland, Cumberland and Westmoreland, for Silesters O.1 and 2, Kexacrete, Kexcement, Silica White, Silicon Tetrachloride, products of Silicon (Organic) Developments, Ltd.

Car Radio for Royal Tour

The Diamler limousines supplied for the use of the Royal party in South Africa were equipped by E. K. Cole, Ltd., with their latest model, Ekco CR60, radio receiver. Installed below the instrument panel, they are directly controlled from the driving compartment. One 6 in. speaker is located in front in the near side scuttle and two 5 in. speakers are in the rear-head lining over the back seat, the latter having an independent volume control just above the off-side arm rest. Under-car aerials are employed.

Welding the New House of Commons

Welding, in conjunction with black bolting, is being used for site connections to the structural steelwork of the new House of Commons in order to eliminate the noise which is indispensable from riveting. As most of the welding is to be done in the vertical-up position, electrodes specially suitable for this condition have to be used, and the " Vodex " type was chosen. These are being supplied by Murex Welding Processes, Ltd., who also carried out the testing of the welders on behalf of the consulting engineer.

University College Calendar

An imposing volume of 374 pages, the calendar of University College, London, for the 1946-47 session contains an interesting outline of the history of the college over the last century, contributed by the late Dr. G. Carey Foster, F.R.S., Professor of Physics from 1867 to 1898; followed by a list of outstanding events; former professors; the officers of the college; officers on the Senate, or the Professional Board, Deans of Faculties, Honorary Fellows and Fellows, the college Committee and subcommittees, the Professorial Board, Governors and representatives, administrative and other staff; the London Union; students' societies, and clubs and other

organisations; particulars of the faculties and courses of study, including electrical engineering, and other information.

International Trade Fair

Arrangements are being made to open an International Trade Fair in Sydney, N.S.W. Australia, and later transfer the exhibition to all the capital cities of the Commonwealth and New Zealand. The co-operation of British manufacturers is invited. Particulars may be obtained from Cagaley Mills and Co., Ltd., West Indies House, 96, Leadenhall Street, London.

Enterprise—Scotland 1947

Under this title, the Scottish Committee of the Council of Industrial Design will hold an exhibition in the Royal Scottish Museum, with complementary displays in a group of selected shop windows in Princes Street, Edinburgh, during August and September. The purpose is to stimulate interest in the good design of Scottish products. The exhibition, which coincides with the International Festival of Music and Drama, will open on August 25.

Surplus Generating Sets

More than 3 500 generators and 300 alternators were sold from Government surplus stocks during the fuel emergency in February, and numerous applications are being dealt with. Most in demand were those of substantial capacity and of the Diesel engine-driven a.c. three-phase 50 cycle type, and although Government surplus stocks consisted mainly of smaller capacity sets unsuited for use in large factories, large numbers have been sold and put to good use.

Trade Publications Received

Bulletin B-580-A, issued by Muirhead and Co., Ltd., Elmers End, Beckenham, Kent, describing the principles and functions of Muirhead magslips.

New catalogue, No. 25, issued by Steatite and Porcelain Products, Ltd., of Stourport-on-Severn, Worcestershire, dealing with metallised ceramic insulators and hermatic seals.

A convenient folder from the Telegraph Construction and Maintenance Co., 22, Old Broad Street, London, E.C.2, giving details of Telcon cables for radio frequencies, with data for equipment designers.

An illustrated booklet, with price list, issued by Ardente Acoustic Laboratories, Ltd., Compton, Guildford, Surrey, describing some of their new sound and communication equipments, which are available for reasonable delivery.

The latest catalogue and price list of the General Lighting Equipment Co., Ltd., 99, Great Eastern Street, London, E.C.2, covering their "Gleco-Plastica" lighting fittings—distinctive floor standards, table lamps, pendants, etc., giving translucent indirect illumination, and torch cases.

New Lamp Factory

THE foundation stone of a factory which is being built for Thorn Electrical Industries, Ltd., for the manufacture of Atlas lamps at Cyfarthfa, near Merthyr Tydfil, South Wales, was laid by Mr. John Belcher, Parliamentary Secretary to the Board of Trade, on Friday, March 14. Pending the completion of the new building, production has already commenced in temporary premises at Hirwaun with a nucleus staff of local girls trained in the firm's factories at Tottenham and Edmonton. The Mayor of Merthyr and members

MR. BELCHER *laying the foundation stone of the new lamp factory. Also in the picture (left to right) are* MR. A. S. SHIER (*director, Thorn Electrical Industries, Ltd.*), MR. E. ROBERTS (*Town Clerk*), REV. T. G. JONES (*Mayor's chaplain*), *the Mayor of Merthyr* (ALD. D. J. MORGAN), MR. S. T. HOLMES (*Thorn*)

of the Borough Council were among those who attended the ceremony.

Mr. Belcher said Thorn Electrical Industries, Ltd., were making a valuable contribution towards the future security of the people of Merthyr.

In the absence, through illness, of Mr. Jules Thorn, chairman and managing director of the company, Mr. A. S. Shier, a director, thanked Mr. Belcher and said that at Hirwaun Merthyr girls were making lamps of excellent quality which were being sent to the four corners of the world.

Presiding at a luncheon at Merthyr, Mr. Shier said that as production was transferred to the new factory from Hirwaun the floor space there would be occupied by new lines turning out radio receivers, lighting fittings and accessories and some types of domestic electrical appliances, which would give employment to a large proportion of disabled miners, especially those suffering from silicosis.

Company News

NOTTING HILL ELECTRIC LIGHTING CO., LTD.—Net rev. 1946 £127 570 (£96 634); invest. inc. £3 378 (£2 074), from res. for arrears skg. fund £54 000 (nil). To deb. int. £5 947 (£6 090), loans int. £29 (£31), deposits int. £1 241 (£987), deb. redemp. £88 (£85), skg. fund "A" £35 050 (£3 465), "B" £62 060 (£16 691), tax £31 189 (£25 516), res. No. 2 £16 245 (nil), div. 5% (nil), fwd. £23 387 (£610).

NORTHMET POWER CO.—Blce.-sheet shows fixed assets £13 667 211 (£13 376 151), curr. assets £5 698 917 (£5 134 360), incldg. invests. of £3 482 701 (£3 229 922), and debtors £1 378 963 (£1 244 717); dep. and res. acct. £8 130 322 (£7 734 989), other resrvs. £969 092 (£876 501), current liabilities £2 680 312 (£2 283 419), incldg. creditors £2 149 028 (£1 766 850); blce-sheet total £19 366 128 (£18 510 511). Total units sold 1 219 902 000, inc. of 161 469 000 units.

YORKSHIRE ELECTRIC POWER CO.—Rev. for 1946 £3 422 671 (£3 014 810) and exes. £2 562 106 (£2 188 942), lvg. net rev. £860 565 (£825 868), plus int. recvd. £36 722 (£32 034). Net prft. after paymt. of int. £812 670 (£778 441). To pref. div. £53 559 (£48 690), ord. div. 9% (same), depreen. and res. fund £420 817 (£375 000), contings. res. £150 000 (nil), war damages res. nil (£50 000), taxn. res. nil (£150 000), pensions res. £20 000 (nil); fwd. £133 994 (£130 268).

NORTH METROPOLITAN POWER STATION CO., LTD.—A statement made in the Commons Transport Committee by Mr. Glenvil Hall, Financial Secretary to the Treasury, in connection with L.P.T.B. stock, is taken to mean that the company's outstanding £480 000 of Five per Cent. debenture stock, 1957, will receive the same special treatment for compensation purposes as that to be accorded to the L.P.T.B. Three per Cent. stock, 1967-72. In view of the new ruling, it appears that when compensation is paid to undertakings acquired by the State under the terms of the Electricity Bill, a special stock carrying the same Treasury guarantee as to principal, interest and redemption will be issued in replacement for the Five per Cent. debenture stock.

COUNTY OF LONDON ELECTRIC SUPPLY CO., LTD.—Recpts. for 1946 from sale of current and meter rentals, etc., £8 062 964 (£7 690 366), plus rentals of apparatus, etc., £48 832 (£45 671), sundry recpts. £165 593 (£113 283), transfer fees £745 (£557), int. and divs. £454 151 (£458 644), mkg. £8 732 285 (£8 308 521). To generation of elec.—Sals. and wages £246 567 (£205 470), coal and other fuel £3 063 316 (£2 857 268), reprs. and maintenance £454 672 (£337 677). Purchase of current £569 676 (£628 649), rates and insur. £512 510 (£516 229), gen. salaries, wages, etc., £394 291 (£298 581), pensions, printing, stationery, fees, paymets. to statutory bodies and other exp., £663 723, lvg. blce. of rev. £2 827 530 (£2 929 666). Add surplus (net) on sale of Brit. Govt. secs. £127 164 (nil) (last time £219 123 transferred from contings. and other res.). To int. on deb. stks. and on tempy. lns. £381 598 (£385 091), provn. for difference between iss. and redemption price deb. stk. £6 759 (same), depreen. £941 390 (£1 071 997), taxn. £850 000 (£890 000), contings. £75 000 (nil), staff superann. nil (£50 000), gen. res. nil (£150 000), pref. divs. (6% and 4%) £177 604. Fin. div. on ord. 7%, mkg. 10% (same); fwd. £993 398 (£868 820). Blce.-sheet shows invests. £10 778 647 (£10 279 112), stores and work £783 681 (£643 085), debtors and gen. suspense accts. £1 823 129 (£1 445 083), owing by sub. cos. £449 004 (£537 844), tax. res. certs. £1 456 475 (£1 831 075), cash £964 940 (£879 580). Res. for depen. £13 962 747 (£13 114 685), for contings. £330 261 (£261 241), creditors, etc., £2 728 915 (£2 524 078).

Metal Prices

	Monday, Price	Inc.	March 17 Dec.
Copper—			
Best Selected (nom.)...per ton	£125 10 0	—	—
Electro Wire bars ... „	£127 0 0	—	—
H.C. Wires, basis ... „	£144 0 0	—	—
Sheet ... ... „	£168 10 0	—	—
Bronze Electrical quality 1% *Tin*—			
Wire (Telephone) basis per ton	£165 15 0	—	—
Brass (60/40)—			
Rod basis ... ... „	1s. 1½d.	—	—
Wire ... ... „	1s. 5¾d.	—	—
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.

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.*

WILSON, A. F. (male), 96, Halifax Road, Rochdale, radio engineer. £11 18s. 6d. December 20.

SMITH, Geo. Edwd., 107, Lonsdale Road, Southend-on-Sea, electrical engineer. £26 1s. 10d. November 28.

MUSSELL, Ted, 118, Roberts Street, Grimsby, electrical engineer. £22 6s. 6d. December 17.

AUTO RADIO (a firm), Swiss Cottage Garage, Guildford, radio engineers. £13 15s. 4d. November 28.

Receiving Order

BERTKEN ELECTRICAL INSTALLATIONS (a firm), 213, Boston Road, London, W.7, electrical engineers. Court: Brentford. Date of Receiving Order:—February 26, 1947. Act of Bankruptcy proved in Creditor's Petition—Section 1-1 (G.), Bankruptcy Act, 1914.

ATKINS, Douglas Stanley, 58-58a, Guildford Street, Russell Square, London, electrical engineer. Court: High Court of Justice. Date of Receiving Order:—February 18, 1947. Act of Bankruptcy proved in Creditor's Petition—Section 1-1 (G.), Bankruptcy Act, 1914.

Order for Discharge

WINSTANLEY, Albert Edward, lately at 6, Parkside, Egremont, Wallasey, and now at "Brooklea," Highbury Avenue, Prestatyn, Flint, and carrying on business at 165, Brighton Street, Egremont, and 31, Burnaby Street, Wallasey, Chester, plumber, painter and electrician. Court: Birkenhead. Date of Order: January 29, 1947. Bankrupt's discharge suspended for three months, and that he be discharged as from April 29, 1947.

Coming Events

Friday, March 21 (To-day)

I.E.E.—London. Measurements Section. "The Design and Construction of a New Electron Microscope," M. E. Haine. *5.30 p.m.*

Saturday, March 22

I.E.E., N. MIDLAND STUDENTS' SECTION.—Leeds. "The Place of the Engineer in the Post-War World," Sir Arthur P. M. Fleming. *2.30 p.m.*

I.E.E., LONDON STUDENTS' SECTION.—Joint meeting with the Inst.C.E. and Inst. Mech.E. "Hydro-Electric Power Schemes," three short papers. *7 p.m.*

Monday, March 24

I.E.E. N. EASTERN CENTRE.—Newcastle-upon-Tyne. "Industrial Applications of Electronic Techniques," Dr. H. A. Thomas. *6.15 p.m.*

I.E.E., S. MIDLAND RADIO GROUP.—Birmingham. "The Elements of Wave Propagation Using the Impedance Concept," Dr. H. G. Booker. *4 p.m.*

Tuesday, March 25

I.E.E., N. MIDLAND CENTRE AND SHEFFIELD SUB-CENTRE.—Manchester. Joint meeting. "Rehabilitation of Electricity Supplies—Italy," Col. W. M. Lapper. *3.30 p.m.*

I.E.E.—London.—Radiocommunication Convention. Opening ceremony, Sir Stafford Cripps, and "Telecommunications in War," Col. Sir Stanley Angwin. *4.30 p.m.*

I.E.E., SCOTTISH CENTRE.—Glasgow. Colonial telecommunications systems and plant; Joint meeting with Inst. of P.O. Electrical Engineers. Paper by C. Lawton and V. H. Winson. *6.15 p.m.*

COVENTRY ELECTRIC CLUB.—"Electric Space Heating." *6.30 p.m.*

Wednesday, March 26

BRITISH KINEMATOGRAPH SOCIETY.—Sub-Standard Film Division. Euston Road, London, N.W.1. "Problems of 16 mm. Projection," G. H. Sewell and H. S. Hind. *7.15 p.m.*

I.E.E. London. Radiocommunication Convention. Papers on long-distance communication, naval, military and aeronautical communication and pulse communication. *9.45 a.m.*

INSTITUTE OF WELDING.—Wolverhampton. "The Inspector's Approach to Radiographs of M.S. Butt Welds," E. Fuchs, L. Mullins, S. H. Smith.

Thursday, March 27

I.E.E.—London. Radiocommunication Convention. Papers on short-distance communication, direction-finding and war-time broadcasting. *9.45 a.m.*

I.E.E., MERSEY AND N. WALES CENTRE.—Liverpool. Faraday lecture on "The Generation and Wholesale Distribution of Electricity," J. Hacking. *6.30 p.m.*

Friday, March 28

I.E.E.—London. Radiocommunication Convention. Papers on propagation, radio components, and "Review of the Convention and Future Trends," Sir Clifford Paterson, F.R.S. *9.45 a.m.*

I.E.E., RUGBY SUB-CENTRE.—Rugby. "Power Supply for Generating Station Auxiliary Services," W. Szwander. *6.45 p.m.*

INSTITUTION OF MECHANICAL ENGINEERS.—London. Annual General Meeting. Papers on "The Norwich Heat Pump," by J. A. Sumner, and "The Air Cycle Heat Pump," by T. F. Thomas. *5 p.m.*

I.E.E., N. EASTERN STUDENTS' SECTION.—Newcastle-upon-Tyne. "The Place of the Engineer in the Post-War World," Sir Arthur P. M. Fleming.

Company Meeting

County of London Electric Supply

The Nationalisation Proposals—Bill Confiscatory and Bigoted—Compensation Grossly Unfair — Financial Prudence Penalised — Sir Robert Renwick on Load-Shedding

The fifty-third ordinary general meeting of the County of London Electric Supply Company, Limited, was held on March 18 at River Plate House, London, E.C., Sir Robert Renwick, Bt., K.B.E., the chairman, presiding.

The secretary (Mr. J. M. Graham, A.C.A.), having read the notice and the auditors' report,

The Chairman said: Ladies and gentlemen, —I take it that it is your wish, following normal procedure, that the report and accounts be taken as read. (Agreed.)

Addition to the Board

One of the few pleasant tasks I have to-day is to tell you that during the year my colleagues and I invited Mr. Eric Butler-Henderson, chairman of the London Electric Supply Corporation, to join our board. At my request, he has also joined the board of the South London Electric Supply Corporation, which is one of the companies in our group, and I have joined the board of the London Electric Supply Corporation.

This has not involved, and will not involve, any of our companies in any direct financial commitment but the area of the London Electric Supply Corporation adjoins those of our company and of the South London Corporation, and in certain areas there are competitive rights. This merely cements a long-standing and friendly working relationship that has existed between our organisations. There is thus a link-up through ourselves between all company undertakings in London south of the Thames, which is to the general advantage of consumers throughout this densely populated area.

The Accounts

I will now ask you to turn to the accounts. So far as the balance-sheet is concerned I propose to be extremely brief since if the Electricity Bill goes through, all your assets, which you will see from the accounts total no less than £45 211 000, will, I regret to say, be taken over by the proposed Central Authority. You will notice from the increases in our capital expenditure and stores on hand that normal development has been continued so far as material shortages have allowed.

Turning to the revenue account, our total receipts on the credit side come to £8 732 000, compared with £8 308 000 last year; receipts from sale of current are up about 4 per cent. at £8 063 000; the other major difference from last year's figures occurs in the item sundry receipts, which have increased by some £52 000 to £165 000, due principally to increased receipts for renewed public lighting maintenance, and to increased surpluses earned in showrooms on a turnover that has more than doubled.

Growth of Expenses

On the debit side of the account, expenses have increased by £526 000 to £5 904 000. Of this £526 000, the greater part is accounted for by the prime cost of current. Salaries and wages at generating stations are up £41 000; fuel costs have increased £206 000. Repairs and maintenance are up by no less than £117 000 at £454 000—an annual cost of approximately 17s. per kilowatt installed as compared with our pre-war figure of about 8s. per kilowatt. Of the increase no less than £66 000 is on account of boiler maintenance, for which we must blame to a not inconsiderable extent the unsuitable coal directed to us by the Ministry of Fuel and Power over the war period and subsequently. Part of the increase is due to the rise in the cost of labour and materials.

Apart from generating costs, you will see that other items of expense show substantial increases. Distribution costs represented by the next three items in the account, totalling £274 000, show an increase of £61 000 over last year. These may appear high, but are, in my opinion, very reasonable seeing that they are only 12½ per cent. above our costs in 1939. General salaries, wages and directors' fees at £394 000 show an increase of £96 000. The major part of the cost, apart from the factor of reinstatement, is due to a re-grading scheme for the staff, upon which the management have been busy during 1946. During the war, we continued on our pre-war basis of salaries plus the addition of the official cost of living bonus, but with the advent of peace and the prospective return of thousands of employees from the Forces, your board decided that this old basis was not in line with revised conceptions nor with our duty to returning employees: a new grading scheme and new conditions of service have been brought into effect as from January 1, 1947, but in the interim we introduced temporary increases to all salaried employees earning up to £600 per annum.

I should add that when our new grading scheme was prepared we had in the forefront of our minds the national necessity for economy in manpower, and the grading scheme therefore lays down, within reasonably flexible limits, maximum numbers to be employed on each section of our work. Therefore, whilst the gross cost must be high in the early stages—in other words the first year or two—the scheme promises the prospect of ultimate economies on a considerable scale.

My last remarks on the revenue account are in connection with the increase of £36 000 in the item general charges, advertising and travelling. Much the biggest item accounting for this increase has been incurred by the company in respect of the various activities of the company's sports and social club, which since the war have stood in need of very substantial rehabilitation. Incidentally, I would like to dispel any idea that any substantial part of this increase is due to the anti-nationalisation campaign which we have supported, as I informed you that we should do, at our meeting last year. In the past we have preferred to let our deeds—in the way of reductions of prices—speak for

themselves. The industry as a whole has been too modest and backward in its endeavours to educate public opinion on the practical achievements of the industry as an antidote to the political theory of nationalisation.

Net Revenue Account

I will now ask you to look at the net revenue account. On the credit side the only item to which I will refer is the surplus arising from a switch in British Government securities during the year amounting to £127 000. On the debit side, you will see that the addition for 1946 —namely, £941 000—to our reserve for depreciation is less by £130 000 than the provision we made last year. This is due to the fact that much of our plant still in service, and particularly the "A" station at Barking, is now substantially provided for.

I would also draw your attention to the reserve for contingencies amounting to £75 000. Last year we made a transfer from contingencies and other reserves no longer required, but this year, on quite other grounds—namely, the uncertainty arising from the fuel emergency that faces us in 1947—we have deemed it prudent to make a transfer to contingencies.

The Dividend

The provision for final dividends, less income-tax, absorbing £367 000, is, subject to your approval, at the same gross rates as were payable last year, and here some explanation is due to the ordinary stockholders of this company.

Under the new Electricity Bill the directors are precluded from recommending to the stockholders a dividend in excess of that paid last year. Prior to the war you will remember that our ordinary dividend was and had been for a number of years 10½ per cent. In fact, you will recall that when our last issue of ordinary shares was made in 1938, it had to be made at 43s. 6d. per share on the basis of the 10½ per cent. dividend at that time paid.

Last year I told you that in 1944 we could have paid more than the 8 per cent. actually paid, but the war was still raging and secret weapons were still being launched against this country, and we had, therefore, as a board, deemed it prudent only to recommend maintenance of the cut rate of 8 per cent. Last year in respect of the year 1945 we could—and, as it turns out, should—have recommended to you at least the restoration of the pre-war dividend of 10½ per cent., but again we recommended a 10 per cent. dividend, which gives a yield of £4 12s. per cent. only on the cash subscribed in 1938, when we made our last issue. I must say that while your board were of the opinion that 1946 might prove a difficult period for us, a strong reason we had for not restoring the 1945 dividend to its pre-war rate was that the Chancellor of the Exchequer had publicly asked all companies throughout the country, during the period of transition from war to peace, not to dissipate resources by the payment of much increased dividends.

Under the terms of compensation, which presumably have the blessing of the Chancellor of the Exchequer, the ordinary stockholder receives the market price of his shares which have been deflated by the threat of nationalisation as compared with the share prices of other industrial concerns not so far subject to this threat. The market price, of course, bears a relationship to the dividend paid. Had we paid last year 10½ per cent. instead of 10 per cent. you would have got 10½ per cent. again this year, and in my opinion the ordinary stockholders would be due to receive nearly three-quarters of a million pounds more for their shares than the Government now propose. The Government in fact ask us not to increase dividends substantially and when we, as patriotic citizens, carry out their request they buy our shares on the lower valuation that the shares in consequence command. If this is not a case of "rigging the market" I do not know what is.

Before the publication of the Bill the Minister held three meetings with the company associations, representing practically all the companies in the country. At the first, held in December, 1945, there were representatives of the municipal undertakings present as well. At this meeting the Minister stated that he was not prepared to discuss the principle of nationalisation but only the methods. The object of the second meeting was to discover whether the companies would assist him in framing the Bill for nationalisation. Since directors are the agents of the shareholders and since the question of whether or not your property should be expropriated was not discussable the company associations felt unable to agree. At the third and final meeting held on December 2 last representatives of the company associations, while firmly maintaining their opposition to nationalisation, strongly urged that the recently announced basis for taking over the railways on Stock Exchange values should not be followed, and were told by the Minister that he hoped that the terms of compensation would be regarded as fair and reasonable.

Subsequently when the Bill was published we found that the basis of Stock Exchange prices had been adopted. Our stockholders will receive compensation in Government stock, so far specified neither as to terms of issue nor rate of interest, approximately as follows: 49s. 5d. for ordinary stock, 36s. 4d. for the 6 per cent. preference stock, 23s. 9d. for the 4 per cent. preference stock, £119 16s. 8d. for every £100 of 5 per cent. debentures and £102 10s. for every £100 of 3½ per cent. debentures. On the basis of these prices compensation will total £37 239 726.

Effects of War Ignored

I consider that the basis of compensation—namely, Stock Exchange prices—is grossly unfair. It penalises those companies who manage their affairs prudently and do not distribute dividends up to the hilt. Furthermore, no cognisance appears to be taken of the effect of the war. Our main interests are in South London, Essex and Kent, stretching down to Folkestone and Ramsgate, areas which I think it fair to say were as badly disrupted by the war as any areas in the country. Other more fortunately placed supply undertakings have maintained their pre-war rates of dividend throughout, or even in certain cases have increased their pre-war rates. They will, therefore, obtain relatively better compensation. It is also grossly unfair because the value of electricity supply shares had already been deflated by the threat of nationalisation. It is true that the alternative basis proposed is the average prices ruling on dates before nationalisation of our industry was specifically announced, but since then interest rates have hardened very considerably.

Continued on p. 724.

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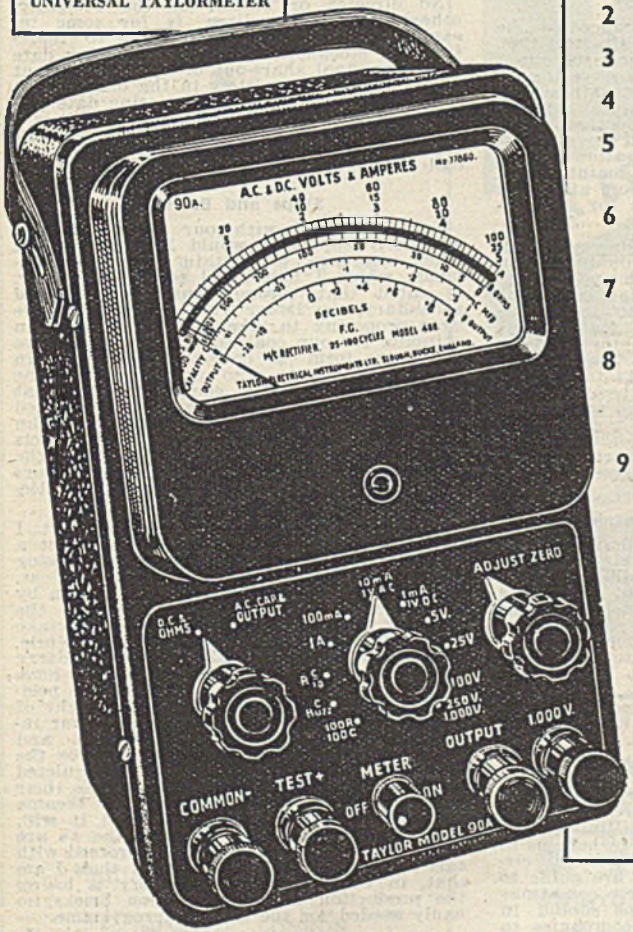

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Continued from p. 722.

In this company alone we have stockholders, including debenture holders, numbering over 40 000. Assuming the new stock yields 2½ per cent., which is about the best that can be hoped for, our stockholders will receive an income of just under £931 000 compared with their present income of £1 418 626. This represents a drop of over 34 per cent.

An Outrageous Injustice

I say that the Government are doing them an outrageous injustice, and the reason given by the Minister is in effect that to do justice would take too long. No time is too long to do justice, and in any case this question of time is over-emphasised by the Government because they have already cluttered up the Parliamentary machine with so much legislation.

In 1937 a White Paper was produced by the Minister of Transport (the Minister then responsible for electricity) which set out a basis for arriving at a purchase price if compulsory powers to acquire undertakings were used. This basis was to take capital expenditure less depreciation and to add thereto net liquid assets plus compensation for the loss of future profits. This compensation was to be measured by the excess of maintainable profits over income derivable from gilt-edged investment of the capital sum for the unexpired period of the franchise.

No one who knows the industry can maintain that such a basis would take an undue time to work out for each undertaking and few will consider that that basis was unduly generous. If justice is not to be done by an independent arbitrator making his own valuation, I consider that the Minister should have offered each constituent company at least the option of taking as an alternative this suggested method of compensation. I do not consider it prudent in your interest, since the Bill is not yet law, to publish your board's idea of the value of your undertaking, but I can assure you that it is very substantially in excess of the proposed price.

A Petty and Unfair Restriction

Under the Bill shareholders have further restrictions placed upon them since we are not allowed to distribute dividends after January 10, 1947, greater than those paid in the previous year, nor can such dividends be paid except out of the net earnings for the year in respect of which payment is made. I consider it petty and unfair to those companies who have suffered most in the war that electricity undertakings in certain instances, including our own, are not allowed at this last stage of their activities to pay their pre-war rate of dividend.

I regard it as grossly unfair that dividends up to the vesting date cannot be paid out of reserves and amounts carried forward, always granted that there is a restriction on the total amount payable. The Minister has failed us on coal, he has failed to help us to get plant. The prospects for 1947, due to circumstances outside our control, are going to be extremely difficult and in these conditions I consider that the restrictions should in fairness be relaxed to enable companies to declare dividends not exceeding the highest rate paid within the last ten years, irrespective of whether these are paid out of revenue earned during the current year or in previous years.

Stockholders' Representatives and Position of Directors

I must also briefly refer to the position of directors. For some reason, unlike members of the Central Electricity Board and the Electricity Commissioners, no director, unless he is an executive of the company, is entitled to compensation and his contractual arrangements with the company are ignored. The company undertakings, as the Minister himself has stated on more than one occasion, have done well, and this, as I am sure you will agree, is in no small measure due to the devoted service and valuable advice given by directors. And yet under this Bill there are vindictive clauses prescribing penalties on directors jointly and severally for transactions that may be deemed subsequently not to have been reasonably necessary or made with an unreasonable lack of prudence, even, it seems, though the directors acted with good intention—no time limit is placed on the proposed Central Authority for the reopening of such transactions.

No director or official of the company, other than the auditor, is for some inexplicable reason, to be allowed to represent the stockholders from the vesting date until the final share-out of the Government stock. We are completely in the dark at the present time as to when the vesting date will be, but I must warn stockholders that it will be necessary to appoint a stockholders' representative and it may be necessary to call a meeting specially for this purpose.

Ships and Bricks

Before dealing with our main business, electricity supply, I would like to make a brief reference to certain other developments which I mentioned to you last year. I stated that through our wholly owned subsidiary, the Lower Thames Company, we were proposing to take a direct interest in shipping for our coal and on a co-operative basis to form a company with certain shipping interests who would provide the management. On this company, known as Coastwise Colliers, Ltd., we are represented on the board by Mr. Wood and Sir John Dalton, and I can tell you that the prospects of this company are good, but of course the future fruits of this development of ours will fall to be enjoyed by others if the Electricity Bill is passed.

With regard to the other development I mentioned last year, which was to erect a brickmaking plant adjacent to our Barking power station to convert clinker into bricks, progress has definitely been slowed down by the threat of nationalisation. Unlike the shipping, we were proposing to undertake management in an entirely new field. While, if we had been left to ourselves to carry on under private enterprise, we should have taken certain short cuts and risks, the position had to be reconsidered in the light of the Government's intentions towards our industry because if troubles developed and losses were incurred in the early stages the shareholders, it seemed, might be mulcted without any prospect of getting back their money when the brick project later became profitable, as we are confident that it will. We are therefore seeing that all the t's are crossed and i's dotted before we proceed with this project, and no one is sorrier than I am that, in consequence, the country is losing the production of several million bricks, so badly needed for the housing programme.

Service to Consumers

If you will turn to the statement of electricity generated, sold, etc., on the back page of the accounts, you will see that in 1946 the quantity generated and purchased amounted to nearly two thousand four hundred million units; Barking alone generated over two thousand and seventy-

Continued on p. 726.

Continued from p. 724.

eight million units and the stations within our group as a whole generated their record figure of just over two thousand seven hundred million units. This is equivalent to approximately 7½ per cent. of the total for the country.

You will see also that our company sold nearly one thousand seven hundred million units—but again this is not the whole story of our activities. I told you last year that I hoped that in 1946 the sale of units by our group of companies would exceed the two billion mark. In actual fact this was exceeded; our total sales, excluding, of course, inter-company bulk supplies and exports to the Central Electricity Board, amounted to over two thousand, one hundred million units. The average price showed a reduction—I repeat a reduction—of over 3 per cent. from last year. Our revenue per unit from lighting, heating and cooking showed a decrease of approximately 8 per cent. for the group. Domestic consumption during the year increased by no less than 38 per cent. and in more normal times would have been a matter for unqualified rejoicing on our part. It is a pleasure to me to be able to report that the price of electricity is a stabilising factor in the cost of living, which, in most other directions, unless subsidised by Government, has been steadily rising.

Reductions in Charges

During the year we have made reductions in our lighting flat rates in rural areas throughout the group, involving reductions up to 22 per cent. in the accounts of the consumers affected.

Last year I told you that we had suffered war damage to no less than 39 showrooms within our group, out of a total of 55, but in spite of this, and as part of our service to consumers, our sales turnover of wiring installations and domestic apparatus from our showrooms has increased from approximately £485 000 in 1945 to over £1 000 000 in 1946—this despite the acute shortage of all materials.

General Developments

There are many interesting developments within our group of companies which, but for the nationalisation proposals, I would be describing in more detail—extensions of generating plant at Barking and for the South Metropolitan, Kent and Bournemouth Companies, three extensions of main transmission lines involving approximately £1 million in Essex, in Kent, and in our Bournemouth area.

There are also many schemes, held up by the war, for rural electrification on a realistically ambitious scale which, while immediately unremunerative, would, we are confident, ultimately pay their way, and in any case are as vital as exports to this country, since agriculture, owing to the manpower shortage, requires electrification as never before. I am sorry to say that although the farming load is largely off-peak, the National Farmers' Union, who approached the Ministries concerned for priorities for equipment, have been cold-shouldered by them.

Load Shedding

Having dealt with the services that we have rendered to consumers, you will expect me to say something on the fact that since the war consumers who have in the past relied implicity on our service now find that their trust in the industry has apparently been misplaced. I want to say as emphatically as I can that neither the companies nor the municipal undertakings are in any way responsible for the shedding of load or the recent emergency restrictions.

So much has already appeared about the emergency restrictions due to the failure of the Ministry of Fuel and Power to direct enough coal to the power stations, particularly in South East England, that I do not propose to say much more on this lamentable subject. I must, however, say that I consider it most unfair of the Minister of Fuel and Power to attempt in the House of Commons to attribute the emergency restrictions to bad estimating by the Central Electricity Board. The Central Electricity Board's estimates had to be stepped up sharply at a late stage because the Ministry had failed consistently to live up to their promised deliveries of coal. The crisis arose because deliveries due before the cold spell were short of allocated quantities, and not because of any substantial error in estimating requirements.

I also ask myself how much this blunder has cost the country. Though it is too early to estimate the cost really closely in terms of money, particularly since the dislocation will be felt in industry for many months, I shall be surprised if the figure is lower than £110 millions.

The Prime Minister has stated that the coal saved by the power stations during the three weeks of major restrictions amounted to 550 000 tons—so that one could say that this coal has cost the country at least £200 per ton. Why was not coal bought from the U.S.A. some eighteen months ago, even at £5 a ton? In reply to a question in the House the Chancellor of the Exchequer has promised to provide information on this subject in 1948. The Government is quick enough to make its calculations when it decides to expropriate the property of sections of the community. Why not the same speed when it slashes the national income as a whole?

Effect of Plant Shortage

With regard to load shedding due to shortage of generating plant, far and away the biggest contributory factor is the entirely inadequate rate at which new plant has been and is being brought into commission since the war ended, owing to lack of Government priority. By the end of this year, by which time the war will have been over 2½ years, the country will be lucky if the additions to generating capacity since the war total 350 000 kilowatts. In 1948 we may, if we are lucky, get an additional 615 000 kilowatts. Yet at this moment we are short of some 2 000 000 kilowatts. Compare our present progress with that achieved in one of the blackest years this country has ever faced—the year 1941. In 1941, when some panic restrictions on new generating plant might have been excusable, the additional capacity installed was 700 000 kilowatts, and in 1942 we got another 700 000 kilowatts.

We, in our industry, whether we are directors, officials or engineers of companies or whether we are concerned with municipal undertakings, are proud of the enormous progress our industry has made until now. We have had to fight for this progress—both technically and financially. Before the late war started, we had at last reached the stage when consumers were really becoming electricity minded. We encouraged them to believe that they had only to press a switch and the wonders of electricity were available to them. We have had to fight against strong competition from gas, and the strenuous competition in the industrial field put up by manufacturers of private plant. During the war the achievements of our industry were immense and the confidence of the public in electricity supplies enhanced.

What has happened since the war? Industrialists are being persuaded, I might almost say bribed by a subsidy on fuel oil, to change back from public to private supply. The commercial user who has his private plant is congratulated by his colleagues. The domestic consumer has the feeling that the restrictions on his use of electricity will go on for years. Much of the work municipal and company men have put in in the past is now being undone by or on behalf of the Minister of Fuel and Power.

In a recent speech I accused our present Minister of Fuel and Power of fiddling while Britain froze. This, frankly, is an understatement. Many others besides myself consider that so far as our industry is concerned, he has fiddled ever since he has been in office.

Future Organisation of the Industry

With regard to the future organisation of the industry, the new Bill proposes that generation and transmission shall be owned and operated by the Central Authority and the Minister has stated that he is confident that this is the best method. I venture to disagree since I believe it will be a mistake to clutter up the over-all planners with the detailed task of managing all the generating stations throughout the country. The Minister is flying in the face of present practice, which leaves the over-all planning of generating capacity and the operating of the transmission lines interconnecting the generating stations with the Central Electricity Board, but makes the management of individual generating stations a local responsibility of the individual undertakings concerned. To-day labour relations at each station are handled by local management and local trade union officials. In the future, as I read the Bill, this problem will be handled from Whitehall.

In respect of distribution, there are to be 14 Area Boards. On average, the size and scope for each board will comprise nearly 4 700 square miles and a population of over three millions. The first question I ask myself is where are the prototypes in our industry for organisations of this size.

Obviously our own organisation approaches this new conception. Leaving out our Bournemouth region, it operates over practically contiguous territory serving a population of nearly three millions and covering nearly 3 000 square miles—and there may be perhaps two or three other such organisations. But all these 14 new Area Boards are to be created throughout the country at one and the same time. Yet we know only too well that the building up of a large and expert administrative team is a long-term operation.

"Smashed to Smithereens"

You might think, therefore, that as one of the prototypes of the future organisation our team work and general set-up would be retained under the Bill. Not a bit of it! Our group, and its management team, built up over many years, will be smashed to smithereens. Part of our assets and presumably part of our management will go to the Central Authority and the rest of our present responsibility will be divided up between no less than four area boards. Yet Government speakers can get up in the House on behalf of this Bill and belittle the prospects of any dislocation in our key industry.

Nor is this all. Too much power is reserved by the Central Authority and through the Central Authority by the

Minister; these vast area boards will, if the Bill goes through as at present drafted, possess less authority than the managements of small undertakings at the present time. It is with very great concern, therefore, that I find in the Bill so little protection for the consumer, whose interests in the near future will be in the hands of nominees of the Minister for the time being. I suggest that it would be more in the British tradition of justice that the Electricity Commissioners, who can give protection to consumers, should be retained and not eliminated.

Expropriation Harsh and Unfair

Finally, it is due to you that I should briefly summarise the provisions of the new Electricity Bill which seeks to expropriate your business on harsh and unfair terms, dissolves your company and its associated companies, splits our organisation into five parts and relegates your directors to the near-criminal class. (Laughter.)

There is no modesty about the Bill. The present-day panoply of a great industry is to be wiped out on what is called the "vesting day." On that day 365 municipal undertakings, 195 company undertakings, eight joint authorities and joint boards, the Electricity Commissioners and the Central Electricity Board are dissolved—eliminated—or, perhaps, a better word, assassinated. There is wiped out the whole organisation which carried this country through a dreadful war, not only without dislocation but at the same time meeting successfully an increased demand for war industries of some 90 per cent.

In the 61 clauses of the new Bill, the Right Hon. Emanuel Shinwell, as Minister, makes no less than 99 personal appearances. He makes regulations, he prescribes, he directs, he determines, he considers necessary, he thinks necessary, he appoints personally no less than 558 gentlemen to run the industry and he fixes their salaries, allowances and pensions. The Right Hon. Gentleman will not, of course, do all these things. Much will be done for him by his civil servants who have no training or aptitude for running day-to-day vital business—however admirable they are in their proper sphere.

No Justification for Bill

It is fair to ask the purpose of this tremendous upheaval. It is fair to inquire whether there is justification or need for this violence. We turn to the Bill itself to enable us to form impartial judgment. What do we find? The whole policy which dictates this upheaval is contained in 10 lines of platitude in Clause 1 of the Bill. The new boards to be formed are to secure the use of the best methods of generation and transmission, the cheapening of supplies—only so far as is practicable—the avoidance of undue preference and the simplification and standardisation of charges and systems.

Every one of these objectives, if they can be so described, have already been performed or are in process of completion by the industry as it stands to-day. This Bill adds nothing to the operation of a complicated and technical industry. Indeed, it takes away protection which consumers have to-day regarding prices and subordinates the consumer to the producer, it takes away a whole code of law regarding compensation to employees and promises a new and at present unknown code to be made by regulation, it eliminates the impartial and technical body, the Electricity Commissioners, and it erects 15 groups of gentlemen to operate a personal service over areas larger in terms of population than any yet conceived in this country.

I ask myself how this Bill will serve the interest of the country as a whole. It is quite clear that this Bill which postulates extreme centralisation has been rushed forward without consideration of any wider objective than to capture a strategic outpost of "private enterprise." Vast State corporations outside the scope of existing local or regional concepts will, I believe, be much less responsive than the present set-up to rightful local negotiations. Again, not even the most biased supporters of the Bill can rightly claim that it will increase by one iota the productivity of this country in the next few years. On the contrary, the experts are convinced that the Bill, if proceeded with, is bound to create dislocation throughout our key industry at this most critical stage when all of us should be going "hell for leather" to increase the capacity of our industry, to extend its benefits to the whole community and thus assist the drive for greater productivity.

Your board will continue to oppose the Bill, since they regard it as confiscatory, ill-timed, ill-considered, vain, vexatious and bigoted, and most unlikely to assist in the realisation of greater prosperity and happiness for this country, which men of all political beliefs should determine to put first.

Thanks to Staff

In conclusion it gives me, as always, great pleasure on your behalf to thank the staff and employees for the loyal work they have done during the past year. I feel, myself, that you, as stockholders, are getting a very raw deal from the Government. I do not regard this as a good omen for the staff and employees, who have always rendered such sterling service to the company.

I will now move the first resolutions before the meeting, which is:—

"That the report of the directors produced, together with the balance-sheet and statement of accounts to December 31, 1946, duly audited, be now received, approved and adopted."

"That the interim and final dividends paid on the preference stocks of the company on account of the year 1946, as shown in the report and accounts, be confirmed."

"That the interim dividend paid on £7 232 109 ordinary stock of the company on account of the year 1946, as shown in the report and accounts, be confirmed."

"That a final dividend on £7 232 109 ordinary stock at 7 per cent. be declared (making 10 per cent. for the year), and that this dividend be payable, less income-tax, on March 19, 1947, to all members registered in the books of the company on March 4, 1947."

Sir Thomas Bethell, J.P., deputy chairman, seconded the resolution, and it was carried unanimously.

The retiring directors, Sir Robert Renwick, Bt., K.B.E., Sir Thomas Bethell, J.P., and Lord Dunglass, were re-elected, and the auditors, Messrs. Robert H. Marsh and Co., were re-appointed.

The proceedings terminated with a cordial vote of thanks to the chairman, directors, management, staff, and employees on the proposition of Mr. P. V. Hunter, seconded by Mr. H. P. Lawson.

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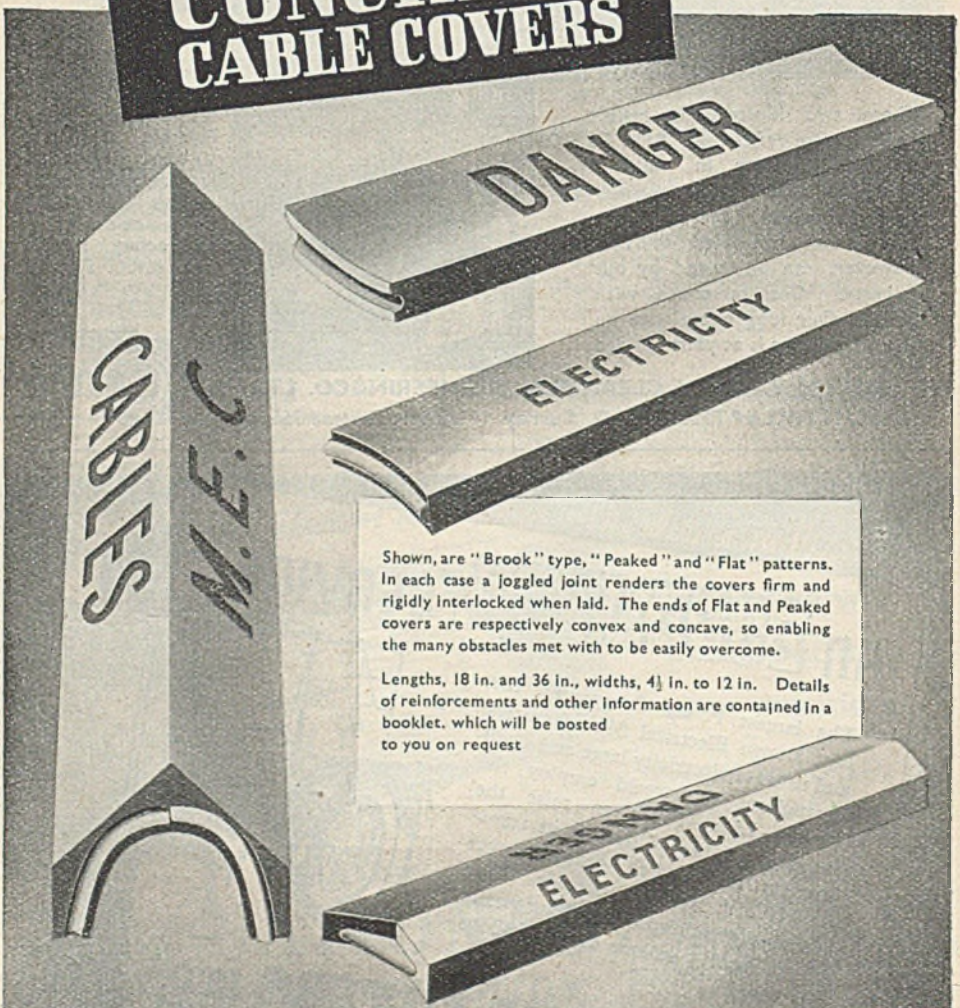

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