

2448 III cr.

THE

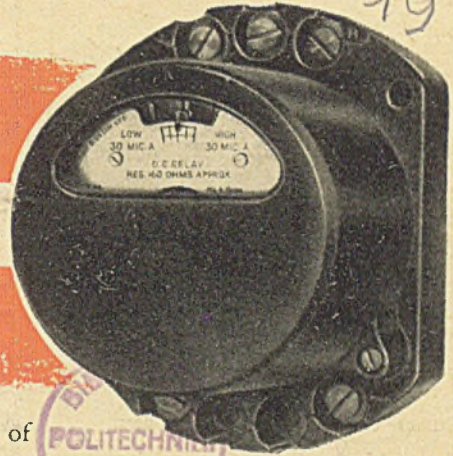
ELECTRICIAN

THE TECHNICAL NEWSPAPER OF THE ELECTRICAL INDUSTRY

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19

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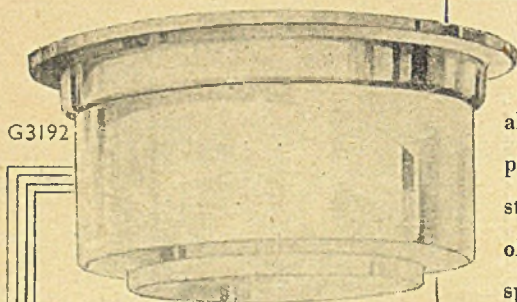
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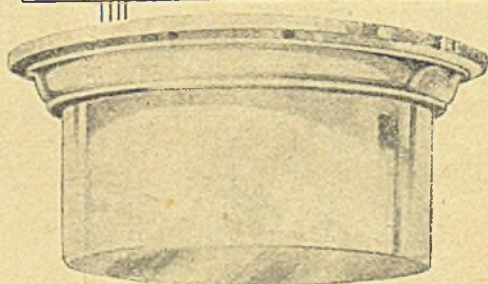


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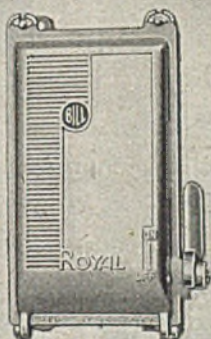
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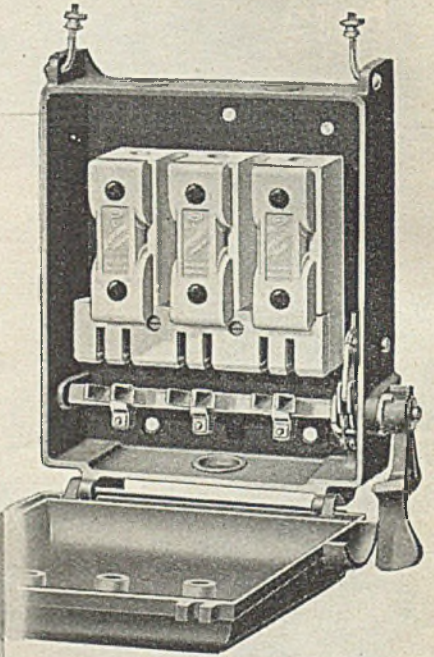
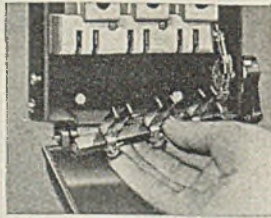
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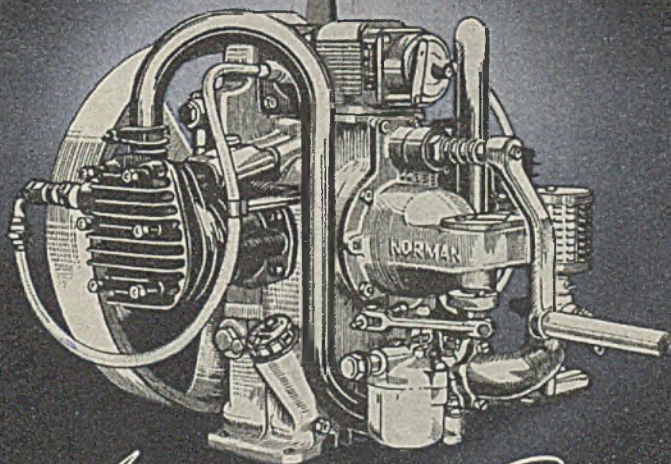
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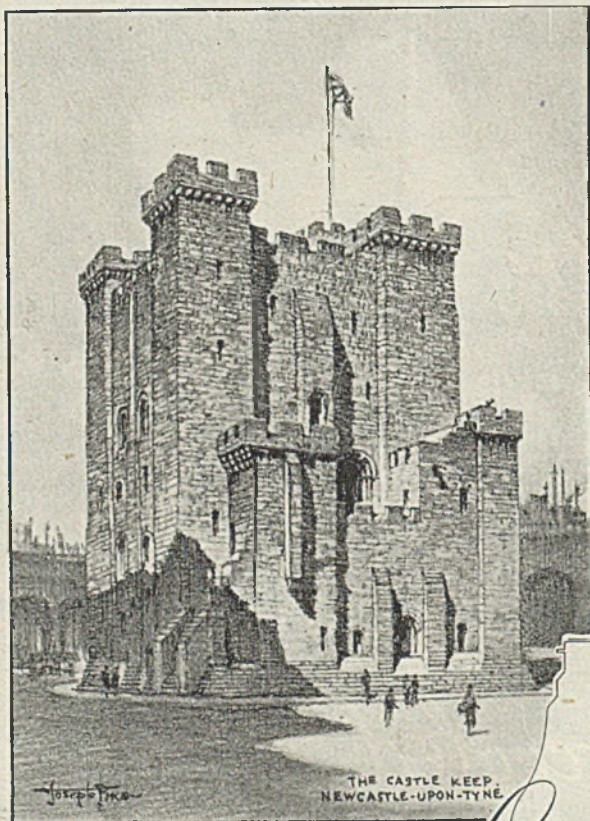
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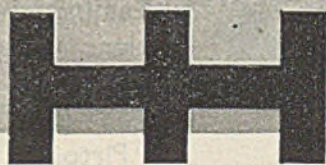
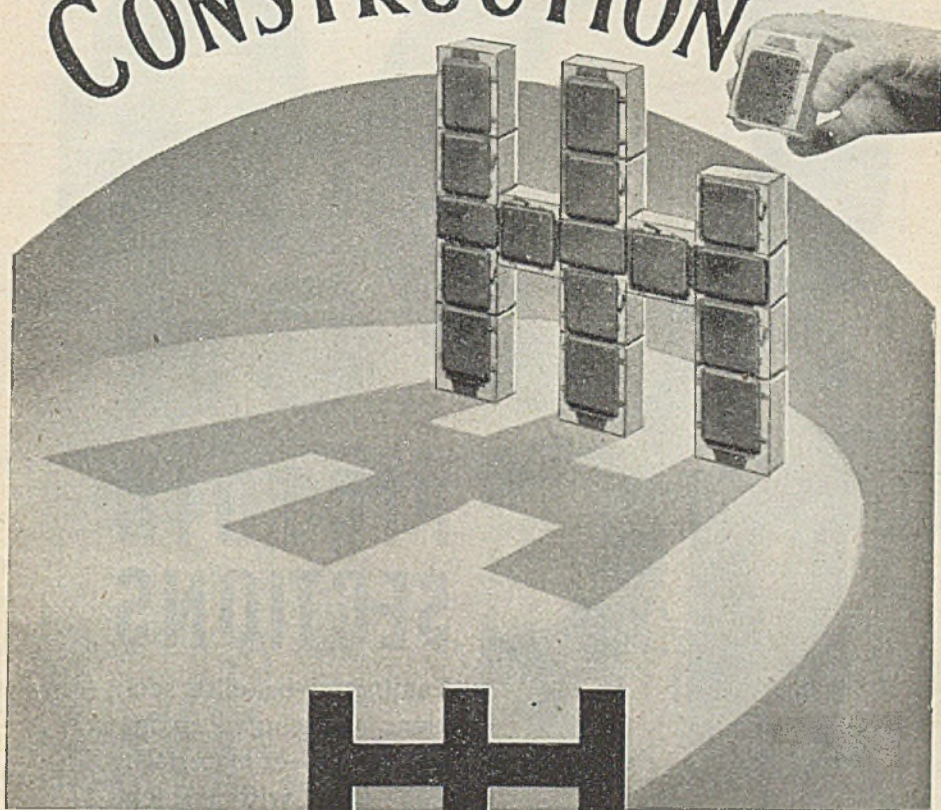
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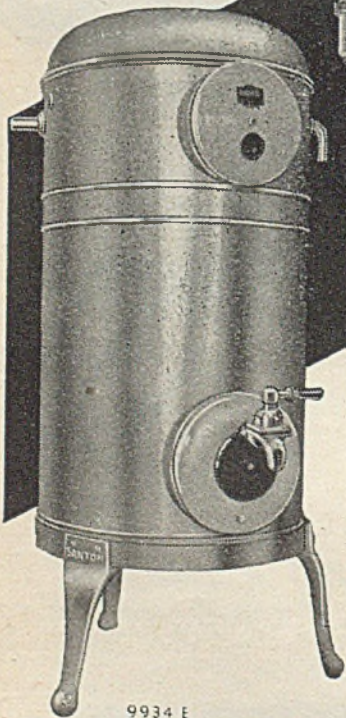
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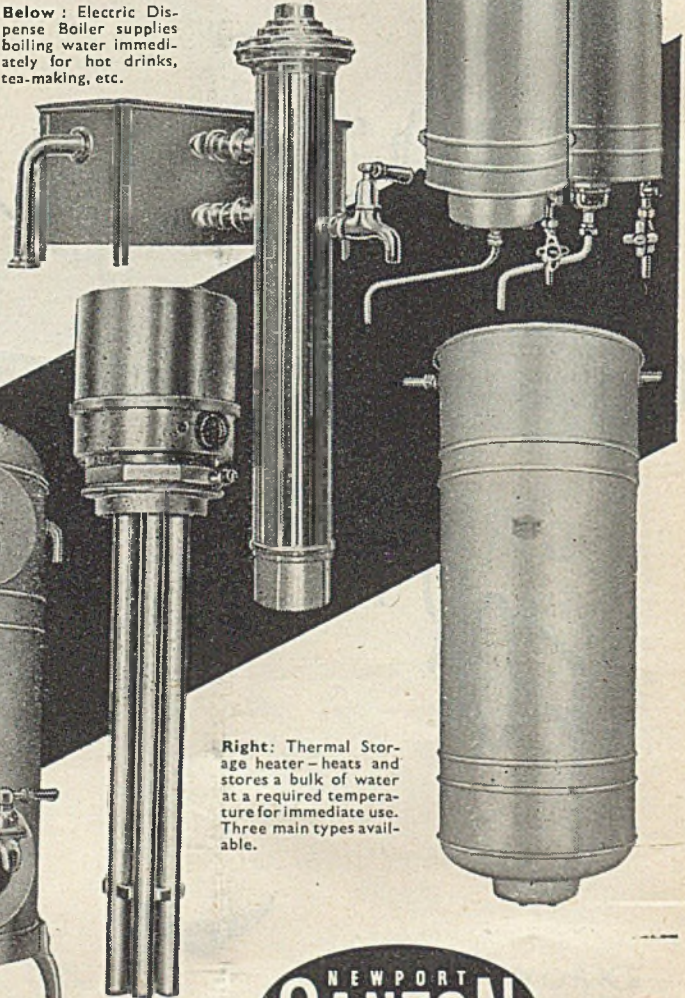
Below Right: Typical immersion heater. SANTON Circulators and immersion heaters, with or without thermostat, meet all domestic and industrial requirements.

Below: Automatic Boiler - provides a constant and immediate bulk supply of boiling water for tea making, etc.

Below: Electric Dispense Boiler supplies boiling water immediately for hot drinks, tea-making, etc.



9934 E

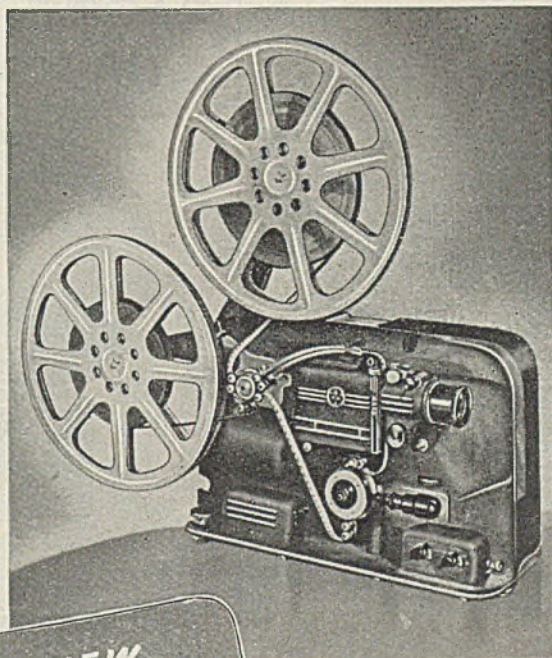


Right: Thermal Storage heater - heats and stores a bulk of water at a required temperature for immediate use. Three main types available.



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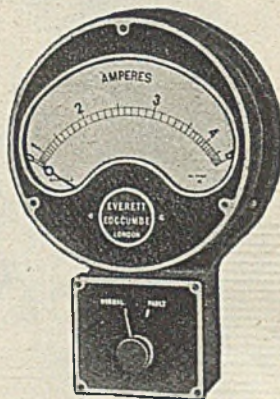
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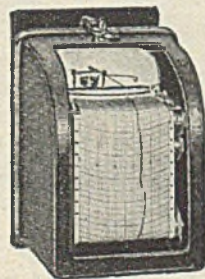
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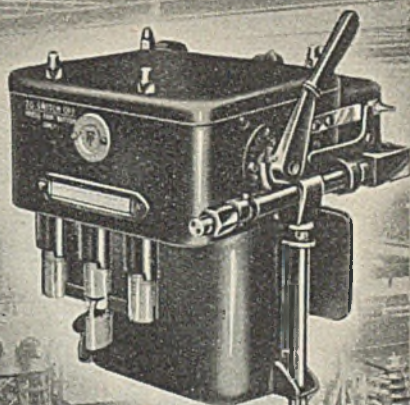
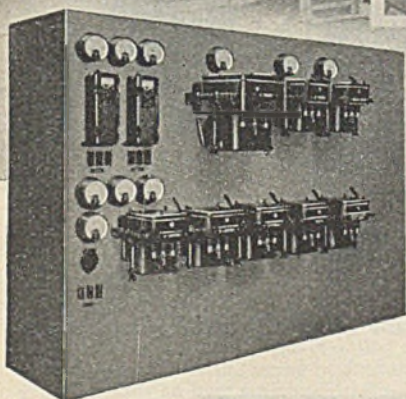
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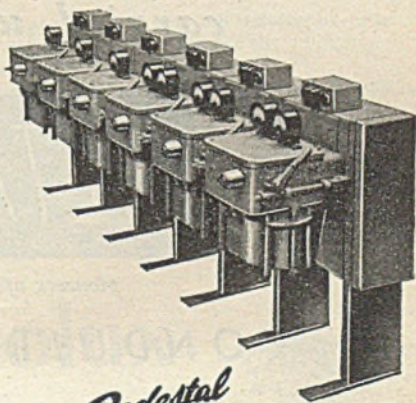
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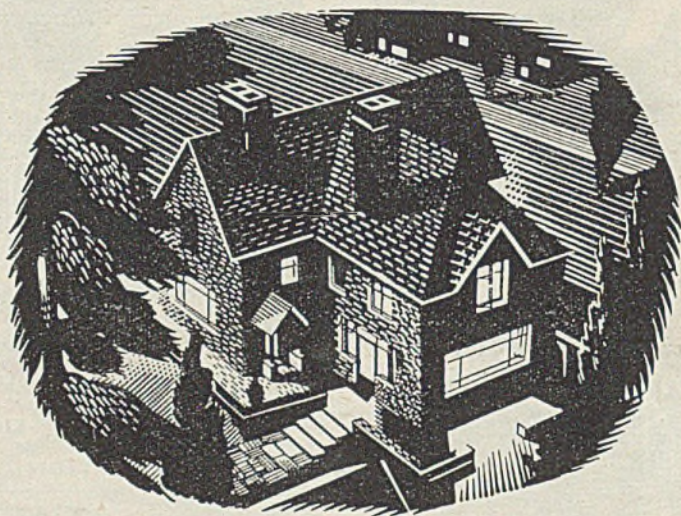
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23 MAY 1947

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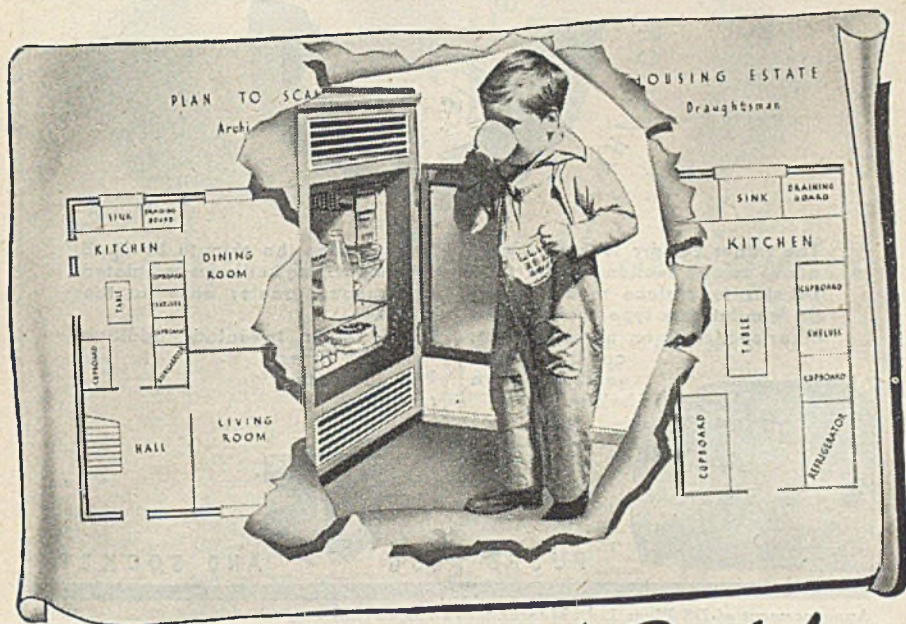
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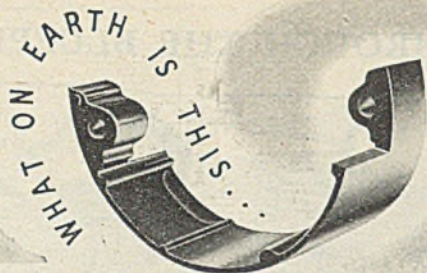
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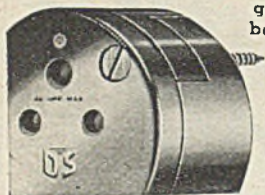
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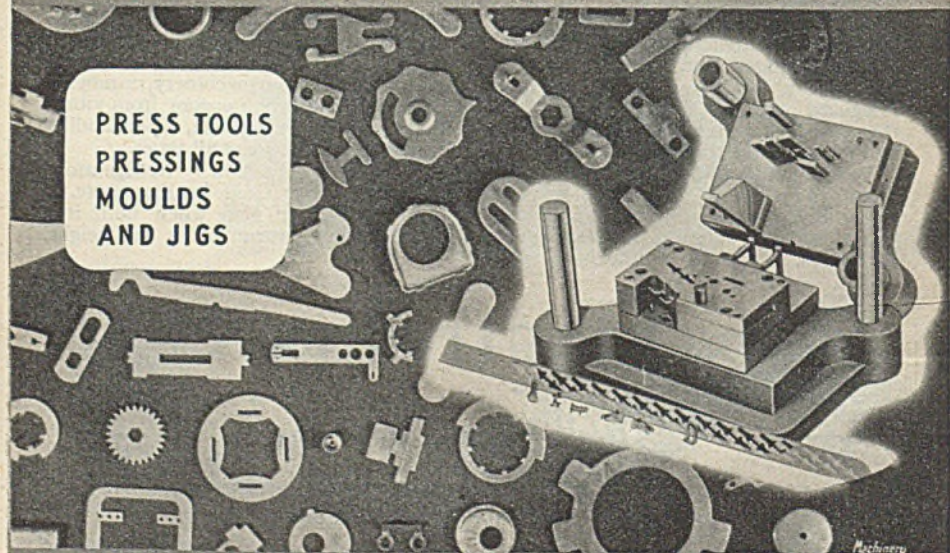
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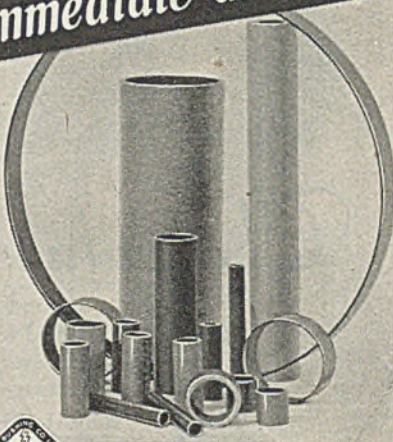
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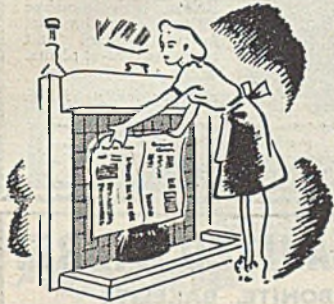


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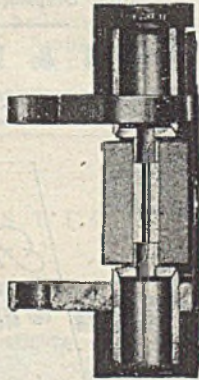
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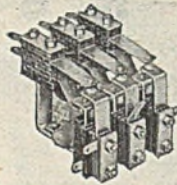


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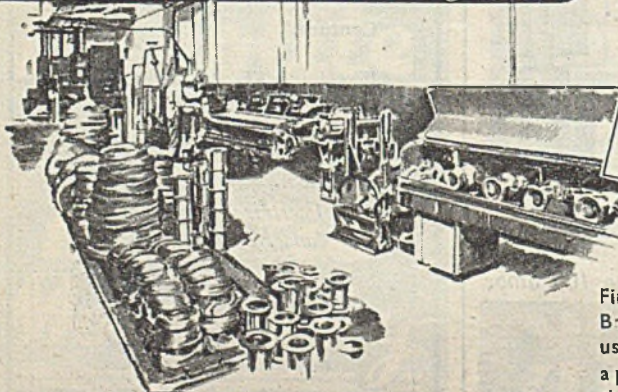
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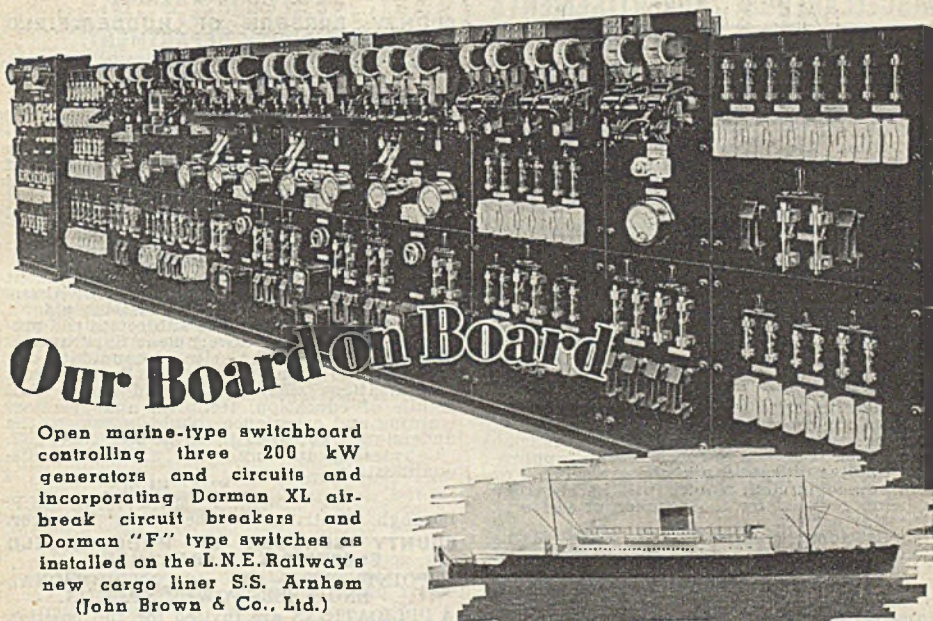
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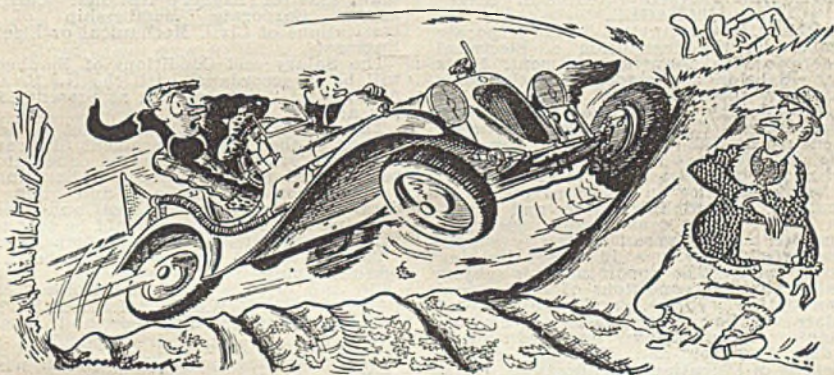
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MISCELLANEOUS ADVERTISEMENTS**SITUATIONS VACANT****COUNTY BOROUGH OF OLDHAM.
ELECTRICITY DEPARTMENT.****Appointment of Assistant Mains Engineer.**

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

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

The age limit for new entrants to the Local Government Service is 45 years unless a transfer value in respect of superannuation is payable. For the purpose of this application, the age of applicants who are serving or have served in H.M. Forces will be regarded as being reduced by the number of years of their war service.

Applications, endorsed "Assistant Mains Engineer," stating age, full details of education, training and experience, with copies of not more than three testimonials, to be forwarded to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, not later than 2nd June, 1947.

THOMAS ALKER,
Town Clerk.

Town Hall
OLDHAM.
14th May, 1947.

CORPORATION OF KIRKCALDY.**BURGH ELECTRICAL ENGINEER AND
MANAGER.**

A PPLICATIONS are invited from Corporate Members of the Institution of Electrical Engineers for the above appointment. Basic salary will be in accordance with the scale set down in the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers commencing at £792 per annum in terms of Clause 10 of the Agreement. Applicants should not be over 45 years of age and should have had experience in positions of senior responsibility in administration and distribution development, construction, operation and maintenance in urban electricity supply undertakings. Experience in street lighting is also desirable. The appointment is subject to the Corporation conditions of service and superannuation scheme, and the selected candidate will be required to pass a medical examination. Applications, endorsed Burgh Electrical Engineer and Manager, stating age, details of education, qualifications, training and experience, along with copies of three recent testimonials, should be in the hands of the Undersigned not later than 4th June, 1947.

JOHN H. McLUSKY,
Town Clerk.

Stanley Park.
KIRKCALDY.

YOUNG man required for Lancashire as outside representative of well known Company of Manufacturers in the electrical industry. Experience of the industry, or selling experience, essential. Applicants must live in area. Apply by letter stating age, experience, to Box PK. 622, Deacons Advertising, 36, Leadenhall Street, E.C.3

SITUATIONS VACANT**COUNTY BOROUGH OF HUDDERSFIELD
ELECTRICITY DEPARTMENT.****APPOINTMENT OF ENGINEERING
DRAUGHTSMAN.**

A PPLICATIONS are invited for the position of Engineering Draughtsman at the St. Andrew's Road Generating Station. Applicants should be experienced Draughtsmen with first class knowledge of the design and layout of modern Electrical and Mechanical Power Station Plant, including cable and wiring installations, together with Civil Engineering Works.

Applicants should have obtained at least the Higher National Certificate.

The Salary and Conditions of Employment will be in accordance with the N.J.B. Agreement, Class "H," Grade 9, £402/4/7 p.a.

The Appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a Medical Examination.

Applications stating age and giving full details of education, technical and practical training and experience should be sent to the undersigned not later than the 28th May, 1947.

Canvassing in any way will be a disqualification.

F. A. ELLIS,

M.I.E.E., M.I.Mech.E., M.I.F.
Borough Electrical Engineer and Manager.

**COUNTY BOROUGH OF HUDDERSFIELD
ELECTRICITY DEPARTMENT.****APPOINTMENT OF CONSTRUCTIONAL
ENGINEER—POWER STATION.**

A PPLICATIONS are invited for the position of Power Station Constructional Engineer.

Applicants should be experienced in the design, construction and layout of modern Electrical and Mechanical Power Station Plant. They should have had extended experience in Civil Engineering and Building Construction Works, including Switch Houses and cable layouts.

The qualifications required will be not less than that of Higher National Certificate and/or Corporate Membership of the Institutions of Civil, Mechanical or Electrical Engineers.

The Salary and Conditions of Employment will be in accordance with the N.J.B. Agreement, Class "H," Grade 6, at present £571/6/0 per annum.

The Appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a Medical Examination.

Applications stating age and giving full details of education, technical and practical training and experience should be sent to the undersigned not later than the 28th May, 1947.

Canvassing in any way will be a disqualification.

F. A. ELLIS,

M.I.E.E., M.I.Mech.E., M.I.F.
Borough Electrical Engineer and Manager.

THE British Electrical Development Association invites applications for the position of Manager of a new department for testing domestic electrical appliances for safety and reliability.

Applicants should be engineers with testing experience on Electricity Supply Undertakings or in Manufacturers' Works, be familiar with British Standards Specifications for electrical appliances, and be able to organise and control a testing department.

The commencing salary will be not less than £255 rising to £1,000 per annum.

Applications, giving full particulars of training, experience and qualifications, should be sent not later than 31st July, 1947, to The General Manager and Secretary, British Electrical Development Association, 2, Savoy Hill, W.C.2.

SITUATIONS VACANT

THE LONDON COUNTY COUNCIL invites applications from qualified electricians and charge hands for positions of INSPECTORS FOR ELECTRICAL WORK in the Chief Engineer's Department.

Applicants must have had practical experience in good class wiring in houses, blocks of flats and other buildings, and should be conversant with methods of carrying out this work by contract on a large scale, and capable of supervising, inspecting and testing work on site. Ability to write clear and concise reports is essential.

Rate of pay according to qualifications and experience up to £7 17s. 6d. a week including variable allowances.

Selected candidates will be subject to the provisions of the Local Government (Superannuation) Act, 1937.

Application forms, obtainable by sending stamped addressed foolscap envelope to the Chief Engineer ("47/2"), The County Hall, Westminster Bridge, London, S.E.1, must be returned not later than fourteen days after the appearance of this advertisement.

Canvassing disqualifieds. (1607)

UNIVERSITY COLLEGE, NOTTINGHAM.

THE Council invites applications for the post of Assistant Lecturer in Engineering. The salary scale is £400-£450 per annum, but a higher initial salary may be offered to a candidate with good industrial and/or teaching experience.

Applications should be made as soon as possible. Conditions of appointment and form of application can be obtained from the undersigned.

H. PICKBOURNE,
Registrar.

FIRST GARDEN CITY LIMITED.

THE following vacancies are open:—

- SHIFT CHARGE ENGINEER, for generating station, N.J.B. conditions, Grade 8, Class F, commencing salary £442 p.a.
- RELIEF SHIFT CHARGE ENGINEER, as above, Grade 8a, Class F, commencing salary £413 p.a.
- ENGINEERING TRAINEES with H.N.C. in electrical and/or mechanical engineering to receive two years' intensive practical training in generation. Details upon request.

Applications in writing to the undersigned not later than June 3, 1947.

W. A. BROWN,

Electrical Engineer and Manager.
Works Road, Letchworth,
HERTFORDSHIRE.

AMATEUR Winding Charge-hand required for Repair shop, to control female labour on small Armature and Stator winding. Applicant must have experience of A.C. and D.C. winding.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton.

EXPERIENCED Drawing Office Personnel for automobile and aircraft electrical wiring systems, cable assemblies, junction boxes, terminations.—Ward & Goldstone Ltd., Sampson Works, Frederick Road, Manchester 6.

ENGINEER required, West Middlesex Area, to take charge of Steam and Diesel Electric Generating Plant, knowledge of Boilers, Electrical Equipment, and Steam Heating Plant essential.—Apply Box 1, E.U., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

PATENT AGENTS

KINGS PATENT AGENCY, LTD., B. T. King, A.I. Mech. E. (Patent Agent), 146A, Queen Victoria Street, London, E.C.4. ADVISOR, Handbook, and Consultations free. Phone: City 616L.

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A.C. Motors. One 50 h.p., Laurence Scott, 400/440/3/50, S.C., 960 r.p.m.; one 36 h.p., G.E.C., 400/440/3/50, S.C., 1,450 r.p.m., with O.I.S.; one 30 h.p. Verity, 415/3/50, S.C., 720 r.p.m., with starter, one 30 h.p., Newton 415/3/50, S.C., 970 r.p.m., with O.I.S.; one 25 h.p. Verity, 415/3/50, S.C., 720 r.p.m., with starter; one 7.5 h.p., Crompton, 400/440/3/50, S.C., 340 r.p.m., with O.I. starter and side rails; one 300-amp, 400-volt Ellison O.I. Circuit Breaker; one 25-h.p. Star/Delta Starter, E.A.C.—A. W. Barker and Co. Ltd., Colnbrook, Slough. Phone: Colnbrook 140.

RESISTANCE Wire.—Alloy Wire Co. Ltd., Lawrence Lane, Old Hill, Staffordshire, manufacturers of high-grade Resistance Wires for all electrical applications.

ROTARY Converter by Crompton, output 50 kW, 440 v. D.C., complete with incoming high tension switch cubicle, transformer and switchboard. First-class condition. Can be seen running. Hunt, Barnard and Co., Printers, Aylesbury, Bucks.

TWO 3 h.p. Metrovick motors, 110v., 3p. 50c., 1,425 r.p.m., perfect, reasonable offer.—Mr. Lowe, Maylane, Hollywood, Birmingham.

PUSH-BAR torpedo switches. Lovely pastel colours for home trade and export. Manufactured by Chorlmet Ltd., 64/66, Shudehill, Manchester, 4. London agents, H.A. (Sales) Ltd., 66, Victoria Street, S.W.1. Tel.: VICTORIA 0161.

SLIP METERS (Prepayment Meters).—We can supply all kinds and sizes. Ideal for hotels, etc. All meters guaranteed. Quick delivery.—Brent Electrical Co., 6, Holmdale Gardens, N.W.4. HENdon 7235.

AIR Compressors, electrically driven, vertical or horizontal type, capacity 3 to 58 cu. ft. Enquiries invited, home or export.—A. M. Craig and Son, Boscombe Road, Walsall.

AVAILABLE from stock, Bakelite Electrical Accessories against W.B.A., competitive prices. Lampholders, Switches, Plugs, Roses, Junction Boxes. Also some non-W.B.A. stock available. Write—BCM/ELEC, London, W.C.1.

PREFOCUS Projector Lamps, 10 to 110 volts, 100 to 1,500 watts, brand new, ex-Govt., ring makes at less than half list prices. Also one million ditto Lamps, various types, 2 to 230 volts, various wattages and caps. Send for list or state your requirements; we probably have it. Example, 80-v., 1,500-w. Prefocus, 10s., post free (20,000 in stock). Large enquiries invited, special prices.—Auto Collections Ltd., 126, St. Albans Avenue, Bedford Park, W.4. Tel. Chiswick 1601.

WELL Meggers, brand new, ex-Govt., 250 v., complete in leather case. List price £12; our price £8 post free.—Auto Collections Ltd., 126, St. Albans Avenue, Bedford Park, W.4. Tel. Chiswick 1601.

FLUORESCENT fittings with tubes, new surplus stock for sale at trade price.—Barker and Son, Oxford Road, Worthing.

"DELLABLE" Thermostats for Rooms, Greenhouse, etc. A.C., D.C., wire, plugs and warning lampholder fitted. 45s., post paid (registered).—Reliable Thermostat Co., 167, Wickersley Road, Rotherham, Yorks.

FLUORESCENT REFLECTORS good quality commercial type in several designs, any quantity supplied.—Dept. 6, JOHN PHILLIPS AND CO. ELECTRICS, 31, Fortune Green Road, N.W.6. Hampstead 8132.

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.

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SPECIAL OFFER of Government surplus new timber window sashes: Size 4 ft. by 4 ft., 2ls. each; 4 ft. 6 in. by 4 ft., 2s. 6d. each. Less 5 per cent. for fifty or more, 10 per cent. for one hundred or more. Carriage paid; cash with order. These are made of 2 in. by 2 in. deal, in three sections with centre window opening with casement. Not glazed.—D. McMaster and Co., 21c, Mount Bures Works, near Colchester.

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. Vacuum Cleaners, various makes, Fluorescent fittings good variety with fluorescent tubes, wash boilers, actually in stock. Please write for full list.—Brooks & Rohm, Ltd., 90, Victoria Street, London, S.W.1. Tele.: Vic. 9550/1441.

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, 41 7s. 6d. Post Free. Send for sample.—F. H. Brown Ltd., P.O. Box 26, Burnley, Lancs.

TINNED STEEL ARMATURE BINDING WIRE.—All even numbered sizes from 16 s.w.g. to 29 s.w.g. supplied from stock on 7 lb., 14 lb. or 29 lb. reels.
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ELECTRIC MOTORS, A.C. and D.C. We supply all types and sizes of Electrical Machinery—Slow Speed Reduction Gears can be supplied to customers' requirements with short deliveries. Send your enquiries to The Electro Power Co. Ltd. (formerly Be-be, Eng.), 3, Retreat Close, Kenton, Middlesex Tel.: WORDSWORTH 4928.

ENGRAVING.—Labels, Nameplates, Diagrams, Panels, English and Foreign characters. Immediate Attention, quick delivery. Enquiries welcomed.—Spriggs, 15, Whitley Park Lane, Reading.

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Telephone: Wembley 3121 (4 lines).

Also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.

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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 1000 RATINGS ACTUALLY IN STOCK HERE.

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WHY not assemble your own Fluorescent Fittings? We can supply 5 ft. Troughs, Chokes, Power-Factors, Suppressors, Starters, Lamp Holders, etc., at a special all-in price, or separately, 5 ft. and 4 ft. Fittings complete with tubes at a keen price.—Write, call or 'phone L. Goodman (Radio) Ltd., 9 Percy Street, Tottenham Court Road, W.1. MUSEUM 0216.

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LADDERS, Trestles, Steps and Hand Saws, Carts from Ramsay and Sons (Forfar) Ltd., Forfar.

SACKS and Bags in excellent condition for all commodities, as low as 4d. each. Write: John Braydon Ltd., 230, Tottenham Court Road, W.1. Tel. No.: Museum 6972.

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BRITISH Electric Co. (Beco) Ltd., can supply most types of A.C. and D.C. Motors from stock.—British Electric Co. (Beco) Ltd., Electra House, 25/29, Lower Road, Rotherhithe, S.E.16. Bernonddsey 3449.

ELECTRIC MOTORS.—1/3 h.p. 3,000 r.p.m. D.C. 110 V. Also 220 V Stock Delivery. 26 15s. each.—John E. Steel, Clyde Mills, Bingley, Yorks.

FLUORESCENT LIGHTING.—We guarantee our Control Gear. All types including "Constead," Hi-Craft Ballast, Transtar, etc. Immediate replacement free of charge if defective in any way. Apply: Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel.: GER. 1461/2/3.

FLUORESCENT LIGHTING—CHOKES, extra quality, elongated, 4 ft., 40 W, tapped 200/250 V, silent working, each unit guaranteed, measurements 1 1/2 in. by 1 1/2 in. by 8 1/2 in. Price 21 5s. each net. Carriage extra.—Write Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel.: GER. 1461/2/3.

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

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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.

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Important auction sale of GOVERNMENT SURPLUS STORES, INDUSTRIAL AND OTHER EQUIPMENT at

ROSSLEIGH'S GARAGE, NORTHUMBERLAND ROAD, NEWCASTLE-ON-TYNE, 1, on

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T. PATTONSON AND SONS

have been instructed to offer by public auction (without reserve) the above stores, which include Electric Motor Hoists up to 30 H.P., Electric Pumps, Condenser Winding Tables, Electric Hand Drills, 300 Steel Chests 2 ft. square, Electric Pulveriser 80 H.P. 400/40 Volt, 200 Various Electric Fans from 12 volt D.C. to 240 volt A.C., Electric Cable, Sundry Electrical Equipment, 30,000 Spanners Various, Assortment of Wrenches, Fitters' and Electricians' Hand Tools, 2,000 Factory Storage Trays, Hand Shear Cutting Machines, 3 Automatic Bag Fillers, Furnace Blowers, Cambridge Electric Recorders, together with a large assortment of lots far too numerous to mention.

The whole of these stores can be viewed at the following Ministry Depots: THE OLD GRANARY, WAGGONWAY ROAD, HEBBURN-ON-TYNE, and ROSSLEIGH'S GARAGE, NORTHUMBERLAND ROAD, NEWCASTLE-ON-TYNE, on June 9th, 1947, and the four days following.

Catalogue price 1s., will admit two persons to the depots on view days and one person to the auction sale. When ready, these may be obtained on application together with remittance to the auctioneers:

33, Westgate Road, Newcastle-on-Tyne, also at Tyndale Estate Offices, Ryton-on-Tyne.

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MINISTRY OF SUPPLY DEPOT,
FEATHERSTONE.

Six miles from Wolverhampton, Staffordshire.
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are instructed to sell by Auction without reserve, at the above Depot, on
MONDAY, TUESDAY, WEDNESDAY, THURSDAY and FRIDAY.

9th, 10th, 11th, 12th and 13th June, 1947,
at 11 a.m. each day,

a large quantity of Valuable

INDUSTRIAL ELECTRICAL EQUIPMENT
and PORTABLE POWER TOOLS,

including Motors, Generators, Rectifiers, Transformers, Switchboards, Condensers, Circuit Breakers, Welders, Rivetters and Miscellaneous items.

ON VIEW Tuesday, Wednesday, Thursday and Friday; 3rd, 4th, 5th and 6th June, 1947, between the hours of 10 a.m. and 4 p.m., and Saturday, 7th June, between 10 a.m. and 12 noon.

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A.C. MOTORS, all sizes and voltages, best prices offered.—JOHN PHILLIPS AND CO. ELECTRICS, 31, Fortune Green Road, Hampstead, N.W.6. Hampstead 4132.

COMPLETE A.C./D.C. 35-kW Rectifier, 400 v., 3-phase, 50 cyc. input, 240 v. output.—Oates Ltd., Gateford Road, Workop, Notts. Tel. 2228.

URGENTLY wanted, A.C., 3-phase, 50-period, 2-speed Induction Motors, 5/5 h.p., 1430/730 r.p.m. and 10/10 h.p., 1430/730 r.p.m., for 415, 380 and 220-volt circuits. Protected enclosure preferred, but other enclosures considered.—W. E. Sykes Ltd., Staines. Tel. Staines 978.

URGENTLY wanted, A.C., 3-phase, 50-period Induction Motors, 1/2 h.p., at 935 r.p.m., and 2 h.p. at 1430 r.p.m., for 415, 380 and 220-volt circuits.—W. E. Sykes Ltd., Staines. Tel. Staines 978.

CAPACITY available in perspex department for further orders of a mass production type.—T. W. Cawood and Son, Shopfitters, Doncaster.

A.C. MOTORS, 1-100 h.p., 500-1500 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, 1/4 in. to .020 in. thick will be purchased for cash in any quantity by Davenset Electrical Works, Leicester.

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.

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VACUUM CLEANER REWINDING SERVICE, commutators and Bearings. Prompt delivery and full guarantee.—Thomas Anderson, 17, Bowes Street, Blyth, Northumberland. Phone: Blyth 405.

PRESSED METAL PRODUCTS (LEICESTER), Middleton Street, Aylestone, Leicester, have capacity for light press work and would be pleased to receive your enquiries, for which a quoted price will be given to your drawing and specification.

ARMATURE Rotor, Stator and Coil Rewinding, any size.—J. E. Fowler, 241, Kirkgate, Wakefield. Tel. 3948.

COIL winding capacity available.—Modern Armature and Coil Winding Co. Ltd., Liphook, Hants.

METAL Polishing Capacity available.—Price's, 95, Lower Richmond Road, Putney, London, S.W.15. Phone: Putney 0179.

V.A.C. armatures rewound, 27s. 6d., 12 days' delivery.—Home Electric Services, 12, Cromer Grove, Keighley, Yorks.

ARMATURES rewound.—Speciality, vacuum cleaners, r-grams, small motors, dryers, electric tools; fields; keen prices; prompt service; guaranteed work.—Send s.a.e. for list to A.D.S. Co., 261-315, Lichfield Road, Ashton, Birmingham, 6.

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

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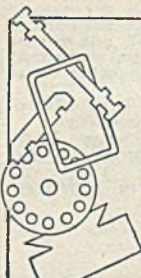
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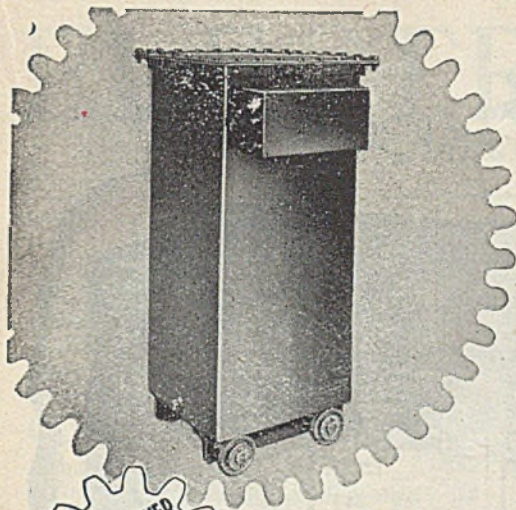
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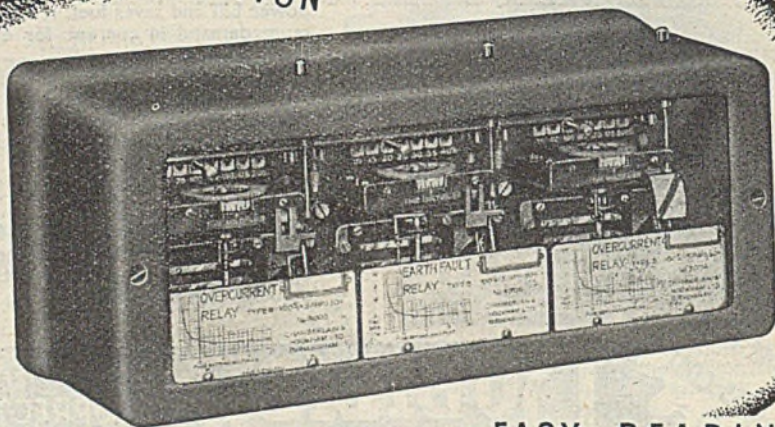


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Next Winter's Load

THE warnings given in THE ELECTRICIAN that the fuel position next winter will be appreciably more difficult than it was last year, are confirmed by an Electricity Sub-Committee of the Joint Consultative Committee of the National Joint Advisory Council, whose report suggests that the gap between generating capacity and maximum demand will be such that from October next, it will be necessary to reduce the industrial load between 8 a.m. and 4.30 p.m. to two-thirds of the peak demand of the past winter. This does not, of course, mean that the total current consumption by industry need be reduced by one-third, but that during the hours named the industrial load must not be allowed to reach a value more than two-thirds of last winter's peak figure. Outside those hours the generating capacity available will permit industry to continue manufacture at maximum production, subject to such other factors as availability of coal, and the risk of occasional load shedding.

As a rough estimate, the gap between generating capacity and estimated demand will next winter still be around 2 000 000 kW, and any arrangement designed to spread the load in such a way as to avoid taxing power station capacity to the full deserves close attention. The summer months provide time enough for a tactical appreciation of the power position to be made, and the Sub-Committee report named in the opening paragraph above will be found a useful contribution when working out details

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for overcoming the main difficulties. The Ministry of Supply has already made arrangements for the allocation of material for the production of Diesel-electric sets—whereby industrial organisations engaged on work of national importance may reduce their load on the grid by local generation—and the adequate use of these, coupled with a suitable staggering of the day-time industrial load on the public supply mains, should ease the position, even though it cannot be expected to exempt industry from the risk of power cuts entirely.

Need for Economy by Industry

IT will be remembered that in the last issue of *THE ELECTRICIAN* before the February fuel crisis caused suspension of publication of periodicals, reference was made to a plan for staggering demand in the Birmingham area, which had about it much which even to-day could be applied nationally. Mr. F. W. LAWTON, chief engineer and manager of the Birmingham undertaking, sent us at the time a copy of an advertisement giving details of the scheme, and though the circumstances have altered since, the fact that the Midland area was then attempting to solve the problem suggests that the industry is not lacking in ideas. Domestic consumers, already inconvenienced beyond measure by the denial of electric space heating during these cold evenings, cannot with reason be expected to contribute further economies, and industry is invited, therefore, to work out details so that certain processes may be continued outside peak load hours, so that rota schemes may be worked out for load shedding on a local or area basis, and so that a proportion of day work may be carried out at night.

Load Staggering Possibilities

THERE are probably still a number of large industrial consumers who might reasonably be called upon to share the sacrifice made by those who have already entered into some load staggering arrangement, but this does not mean that every concern could be expected to reduce its peak demand by precisely the same percentage. Such equality of sacrifice would in any case be hard to arrive at, for though from a national point of view a rise or fall in

total consumption may be an interesting figure, it is no more. Industrial demand as provided by individual firms is governed by many factors, and when comparison between various organisations is made, the volume of the demand must be qualified by the nature of the work carried out by the firms, the importance to the national economy of the products made, the geographical position of the works and its effect upon factory lighting and heating, and so on.

The Bankside Station

THE model of the proposed power station at Bankside and its environs, of which a picture appears on another page, lay in the House of Lords during Monday's debate on the scheme, and is now available for inspection by members of the House of Commons. Had it been completed earlier, it is possible that much of the criticism offered in recent weeks would have been less coloured, while those seeking to defend the proposal would have felt better equipped to answer objections raised by the opposition. Throughout the controversy, the issue has been obscured by the fact that there have been two unrelated objections to the new station. One school of thought contends that the building would impair the dominance of St. Paul's Cathedral over the river and obstruct the view of the cathedral from the South Bank; the other holds that the erection of a power station on Bankside would prevent the County of London plan for turning the area into an artistic and cultural centre from being carried out.

An Impressive Model

IN the model of the Bankside site the difference in the heights of the proposed station and of St. Paul's is such that the latter appears to lose nothing in comparison, while from the gardens in front of the station would be gained a finer view of the cathedral than has been possible before. The second objection remains to the extent that if the project is proceeded with, some modification of the original South Bank scheme will be essential. In the station layout proposed, the building with its single chimney would form the centre-piece of a well-spaced group of public and commercial build-

ings, and the gardens which would be built over the oil-storage tanks behind the station would provide ample recreational space in the area. From the short-term point of view of national necessity, the arguments in favour of an immediate commencement of the new station at Bankside are almost overwhelming. From the viewpoint of town-planning, the local authorities concerned have already won a major victory in that the station will use oil and not coal. Whether this is a fair enough compromise between utility and aesthetics, remains to be seen.

Companies and Nationalisation

CRITICISM of the Government's doctrinaire attitude towards the supply industry, at a time when the national need demands that every effort be applied by Government and industry alike to increasing generating capacity, was voiced by Mr. SELWYN S. GRANT, chairman of the Provincial Electric Supply Association, at that organisation's twenty-sixth annual meeting last week. Recalling their opposition to nationalisation, Mr. Grant emphasised that "first things" had been forced out of the picture "to the grave disappointment of all of us and to our increasing sense of frustration. Many of the practical steps which the industry would have tackled previously but for the war, and which we should have liked to tackle right away when the war ended," he went on, "have been shelved because both the Civil Servants and the industry have been compelled by politicians to concentrate on nationalisation."

Technicalities and Politics

AS instance of this political interference, Mr. GRANT quoted the decision of 14 months ago to standardise voltage at 240 V single- and 415 V three-phase, a decision which many of them regretted in view of the Commissioners' decision to make the supply 230/400 V, but nevertheless a decision which, due, he suggested, to nationalisation work, had prevented an Order being issued to implement it. The chronic plant shortage was not something the Government should have been unaware of, because for years past the C.E.B., on behalf of the industry, had been pressing it.

"But we who are responsible for management of components of this industry—whether company or municipal men—feel that much of the work we have put in in the past is being undone because the Government of the day, intent on a political party programme, have persistently overlooked the necessity of assisting our industry by granting priorities," declared Mr. Grant. "It is now May, 1947, and I predict, as indeed the industry predicted this time last year, that we shall face inevitably another fuel crisis in the winter of this year if the present *laissez-faire* attitude of the Government continues in respect of fuel."

B.I.F. Reactions

THE doors to the British Industries Fair have now been closed for a week and most of the 16 000 foreign buyers who passed through them have gone their various ways. During their visit all were appreciative of the range of products and technical skill which the industry has to offer, but not all were prepared to commit themselves to orders where delivery dates were long. Several exhibitors made a point of encouraging buyers to visit their works, and one firm at Castle Bromwich as a result of the Fair and their renewal of contacts with visitors from abroad, was able to appoint agents in twenty different countries where they had not previously been represented. Few will doubt that the Fair has been worth all the effort, for, if nothing else, many exhibitors have learnt a good deal about foreign markets in terms of price and tastes, many realise better than they did before the wisdom of our recommendations for further and more direct contacts overseas, and many appreciate more the high standard which foreign buyers expect to find when inquiring about British-made goods. This standard is to-day of special importance, for cases have been brought to our notice where goods shipped to overseas countries have on occasion resulted in disappointment, with a consequent withholding of further orders. The number of such instances is, fortunately, small, but the fact that any is possible at all is a regrettable result of the seller's market, the dimensions of which latter are noticeably contracting.

SOME MATHEMATICAL DIFFICULTIES EXPLAINED

by C. TURNBULL, M.I.E.E.

TIME and money are spent in inventing methods for solving engineering problems, but few mathematicians appear to admit the desirability of the simplification of mathematics.

Incommensurable Numbers.—Mathematics are full of these and many students wonder why they should be so. Whitehead states that the problem worried the early Greeks and that it has only recently been cleared up, but he does not tell us how. An explanation on engineers' lines is attempted, as follows. Try to measure a straight line $\sqrt{2}$ metres long with a rod one metre long without subdivisions; we find it to be 1 m. plus a bit. Magnify the "bit" 10 times and we find it to be 4 m. plus a bit, and similarly that "bit" when magnified is 1 m. plus a bit. We may go on as long as we can and never find a "bit" that is exactly a metre long. Looked at in this way the problem does not seem unreasonable, in that all that we have done is to magnify the "bits" instead of subdividing the scale. We always advance by a "bit" which in itself may be magnified infinitely. The method may be used generally and though the mathematician may object that this does not prove anything rigorously, it makes the matter clear to the man who thinks in engineering terms, and that is what is wanted.

Negative Areas.—The American "Introduction to Mathematics" (Harraps) shows positive and negative areas as in Fig. 1a. Fig. 1b shows a more satisfactory method where the positive area is a hump and the negative a hollow. In integration the area is positive if ydx is positive and vice versa. The method appears to be obvious and though the writer has often put it forward, mathematicians have refused to accept it. By this method three-phase volts or amperes may be shown with one sine wave and three conductors on the curve. The distances between the axis and the curve show the instantaneous volts or amperes. The method is, it is submitted, useful for teaching as the student can see by measurement that the feed equals the return at each position, a more descriptive phrase than that the sum of the currents is zero.

Product of Two Negative Numbers.—The "Introduction to Mathematics" (page 33) states that we would like $(-a)(-b)$ to be opposite in sign to

$(-a)(+b)$ and also that it fits in practice. Many years ago the author introduced in *THE ELECTRICIAN* the idea that advance was made from $+1$ to -1 by rotating a vector of unit length through half a revolution and that $1^{\circ} = +1$ and $1\frac{1}{2} = -1$, and hence $(-1)^2 = (1\frac{1}{2})^2 = 1^2 = +1$ and $j = 1\frac{1}{2}$. This method is gradually coming into use, but the authors of the "Introduction to Mathematics" do not use it. They state that a revolution is a good unit for angles. The writer dealt with it years ago, calling it a Rev, divided into 1 000 milli-Revs, or Jots. The benefit

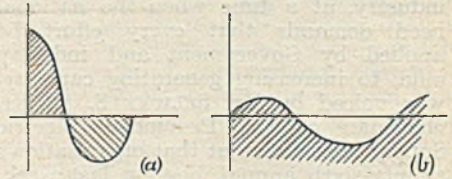


Fig. 1

of this method applies to a large territory when circular measure is inconvenient and degrees absurd. Jots may be changed into degrees by multiplying by .35 so that tables are available. Airmen could use the method to get rid of degrees and minutes. The workshop wants it as with a radius of approximately 6 in. the circumference is a metre and the jots are at millimetre spacing; an ideal size where degrees are too big. A few years ago people were afraid of 250 Jots to the right angle, but to-day we are accustomed to long numbers in a simple form; i.e., we do not say that a plane is at a height of 3 miles, 2 furlongs, 4 poles, 2 yards; we no longer object to such figures as 30 000 ft., or 20 000 lbs. weight. When the Revs and Jots eventually come into use it may be wondered why such a simple and obvious method was not adopted long ago. The writer has an arithmetic book issued by a famous publishing firm, which converts cubic inches to centimetres to eight places of decimals, with many other decimal conversions of an equally complex nature. The book attempts to persuade pupils that the decimal system is too difficult for practical use. May one trust that a like book may not appear to instruct students on Revs. by converting Jots to degrees, minutes, seconds and fractions of seconds.

I.E.E. Servo Convention

AUTOMATIC REGULATORS, CONTROLLERS AND AMPLIFIERS

ARRANGED by the Committee of the Measurements Section, acting in collaboration with representatives of the Service departments and industry, the I.E.E. Convention on Automatic Regulators and Servo Mechanisms opened on Monday evening.

Many of the papers delivered presented, for the first time, details of war-time applications of servo mechanisms to armaments design, such as gun-laying, automatic pilots and data transmission. Pressure of space, however, makes it impossible to deal with these important but specialised developments, and we have therefore selected for review, on this and the following pages, those papers considered to be of the maximum interest to industry in general.

Opening the convention, Mr. John Wilmot, Minister of Supply, recalled that during the war the Ministry had formed a "servo panel" which was responsible for the co-ordination of various applications of servo mechanism. The happy collaboration of the Services, industry and the universities on the panel had contributed in no small measure to the great progress achieved.

Instancing the part placed by servo mechanisms in the war, Mr. Wilmot said that in the Army the efficiency of anti-aircraft artillery was increased by the adoption of a complete chain of automatic control from the initial location and tracking of aircraft by means of automatic-following, the automatic computation of the ballistic equation, and the automatic-remote control of the movements of the guns themselves. The success of these methods was shown in the defeat of the flying bombs, whose final downfall, amounting to 98 per cent. of those that crossed the coast was not achieved until the fully automatic chain of control was developed.

The same development, Mr. Wilmot went on, was no less necessary in peace. Processes in chemical engineering and in the engineering field in general, required a fineness of control difficult if not impossible to achieve by human operation. The White Paper on Production had emphasised that the only way to expand our production and raise our standard of living was by increased output-per-man-year. This was a direct call for the increasing employment of automatic methods in these

processes, which would not only enable more plant to be worked, but also make each plant more efficient. It was difficult to list examples of processes in modern industry in which automatic regulators and servo mechanism could not be employed.

The first technical paper, "Fundamental Principles of Automatic Regulators and Servo Mechanisms," was read by Dr. A. L. Whiteley. Dealing with the elementary theory of servo systems, Dr. Whiteley said

TABLE 1.

| A. Service uses (chiefly remote position control) | B. Industrial automatic regulators | C. Process controllers |
|---|--|---|
| Gun and searchlight r.p.c. | Voltage regulators for generators | Temperature control |
| R.P.C. for radar scanners | Speed regulators for electric-motor drives etc. | pH control |
| Radar auto-alignment and auto-range | Tension control in strip mills, wire drawing, etc. | Liquid level control and flow controllers generally |
| Rate control for gun turrets | Self-balancing potentiometers | |
| Small power servos as adjuncts to or inherently part of automatic computers | | |

that the primary function of the class of apparatus to be considered, variously called automatic regulator, servo mechanism, or process controller, according to its particular sphere of application, was the accurate control of a quantity generally associated with the output function of a process or assemblage of machines.

Some examples (Table 1) were then given of the various classes of servo control, and Dr. Whiteley summarised the three elements of a closed-loop system as being:—

(i) The measuring units which converted input and output information into an error or a deviation signal, a physical quantity suitable for operating the control unit;

(ii) the control unit, usually some form of power-amplifier for raising the power level of the error or deviation signal; and

(iii) The final control unit, or output element; the device which acted directly upon the controlled member or controlled variable.

In comparing remote-position control (r.p.c.) servos, industrial automatic regulators and process controllers, a marked difference would be noted between the last and the other two as regards time-scale. The response times of process controllers were often relatively slow, measurable in minutes or hours. On the other hand, r.p.c. servos had to settle down in

a fraction of a second after a small disturbance and while industrial automatic regulators seldom achieved the speed of response of the fastest r.p.c. systems, the settling-down time was of the same order.

The stability problem existed, in general, in any kind of automatic regulator or controller, and the overcoming of "hunting"—or over-shooting of the system with an oscillatory recovery—represented one of the outstanding design features in this class of control.

The paper then examined in some detail examples of the three main classes of control, and described some elementary methods of stabilisation. The transient response obtained by operational methods was considered, and also harmonic response, which, it was stated, lent itself to graphical methods of studying system performance.

Tuesday's session, which opened with a paper on "Elements of Position Control," by Prof. K. A. Hayes, dealt mainly with the use of servo systems in the three fighting Services.

On Wednesday evening, the first paper was "Automatic Voltage Control of Generators," by Mr. C. Stewart.

CLASSES OF REGULATORS

Beginning with a classification of regulators, the author explained that there were three classes. Class I, direct-acting regulators, included carbon-pile and rheostatic types, which performed their function by the direct variation of resistance in an exciting field winding circuit. In Class II were the pulse types, such as vibrating contact and the more recent electronic regulators.

Class III consisted of the quiescent regulators, which were in effect combinations of Class I and Class II. Immediately following a load change, a quiescent regulator brought Class II field-forcing into action to give maximum corrective effect, at the same time adjusting the motor-operated field rheostat to its correct position for the new load condition.

The advantages of the three classes were considered, and the body of the paper dealt with voltage control characteristics, hunting and its prevention, the excitation range and its effect on the regulator and methods of combating some effects of wide excitation range. Machine design and the parallel operation of regulators were also discussed.

The author summed up by saying that the voltage regulator was not only a useful but an important, accessory to generating equipment. On systems such as the grid, where voltage variations were of a minor character, quiescent automatic control was suitable and the presence of automatic control was invaluable in system

faults, when field-forcing maintained stability and saved major tripping of generator equipment in the area. The Class II electronic regulator virtually converted a self-excited exciter into a separately excited one with all the advantages of increased response. For regulation of small machines up to about 500 kW for industrial supplies, Class I carbon-pile regulators would hold their own on the score of simplicity and low cost.

"Amplidyne Regulating Systems," was the title of the second paper on Wednesday evening, delivered by Mr. B. Adkins. The amplidyne, the author began, was a special d.c. generator in which, by the use of the method of cross-field excitation, the power required by the controlling field-winding was reduced to a very small value. Its use as an automatic regulator depended on its ability to provide the excitation of a larger generator or motor while requiring a very small amount of power, often less than a watt, to control it. In addition, the amplidyne responded quickly to control changes.

Describing, by means of diagrams, the evolution of the amplidyne from the d.c. generator, the author said that the amplidyne was normally provided with several field windings, and a typical model of 2.5 kW power would have a power amplification ratio of 20 000:1, if the whole of the field space were used for a single winding.

In a typical regulating equipment, a feedback voltage, derived from the regulated quantity, was matched against a constant reference voltage, and the difference was used to excite the first stage of the amplifying system. Hence, in order to operate the system there must always be a small error in the regulated quantity, that was, the system was error-actuated.

EQUIVALENT CIRCUIT

Turning to design considerations, the author stated that under transient conditions, the behaviour of the equipment was a matter of changes relative to the steady state, and could be investigated by means of an equivalent system diagram from which all steady voltages were omitted. A typical equivalent circuit consisted of a chain of amplifying stages with a feedback circuit connecting the output of the last stage to the input of the first. With the aid of this equivalent diagram, the nature of any oscillations which might occur could be investigated.

Finally, the factors governing the accuracy, stability and speed of response were discussed in relation to the whole system and to each component, as well as the effect of additional apparatus, such as anti-hunt transformers and ballast resistors.

Applications of Servo Control

USES IN THE BOILER HOUSE AND IN INDUSTRY

THE proceedings of the I.E.E. Convention on Automatic Regulators and Servo Mechanisms, which were continued yesterday, Thursday, dealt mainly with industrial applications of servo mechanisms, and during the afternoon session papers were delivered on "Automatic Control Applied to Modern High Pressure Boilers," by Mr. Ll. Young, and "Automatic Control in the Chemical Industry," by Messrs. J. W. Broadhurst, F. C. Broderick, A. W. Foster and G. E. Weldon.

In the course of Mr. Young's paper it was said that the increased unit size, operating pressures and temperatures of modern boilers had made them highly complicated and sensitive pieces of apparatus necessitating close attention being paid to operating conditions in order to maintain safety and efficiency. The developments incidental to the increased boiler capacity had drawn attention not only to the need for accurate and quickly responding methods of control but also to the limitations of manual operation and the advantages to be gained by the use of automatic devices.

To enable the operator to apply those adjustments to fuel and air supply which were necessary for the maintenance of load and efficiency, particularly where his responsibilities covered more than one boiler, automatic devices to relieve him of some of his routine operation of control became essential.

Automatic boiler control, however, could not be claimed to replace the trained operator; the rôles of each were complementary. The essential requirements of the simplest form of automatic boiler control systems were that it should maintain a constant steam pressure at a selected point in the steam circuit, maintain a constant suction in the combustion chamber and maintain the ratio between fuel and air so as to achieve the most efficient combustion conditions at all loads. Finally, it should provide a means of manual distance control of the ancillary equipment from the control panel for starting-up purposes and manual control for emergency operation.

As the variations in steam pressure provided the most convenient means of determining the relationship between the absorption of heat by the heating surfaces of the boiler and the heat consumption of the turbine, the steam pressure, measured at a selected point, could be used to control the firing rate of the boilers, and thereby

maintain the balance between production and consumption. Occasions frequently arose in which plant arrangements and operational requirements demanded more

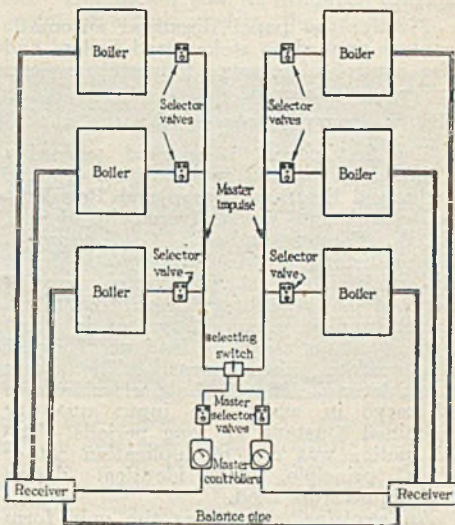


Fig. 1

than one point of pressure control. A typical example (Fig. 1) was given, in which steam from each bank of boilers flowed into a receiver from which a connection was made to the turbine. The master selecting switch permitted the boiler-house to be operated either as two separate units, with each half operating from its individual master, or as one complete unit operating from either master-controller. The individual selector station at the boiler permitted any boiler to be operated under constant load conditions when necessary.

The author then described a standard system of automatic boiler control using compressed air. Other forms of motive power, such as electricity or oil, could equally well be employed.

One of the most important duties of the designer of automatic boiler control equipment was the co-ordination of the various items of boiler ancillary equipment, but it was important to remember that the duty on the gear was much more severe than when manual control was used, as automatic control caused constant movements of the parts in fulfilling its duty of cor-

recting every deviation from the specified conditions. This point had to be taken in mind when designing the ancillary gear.

Next, the author dealt with automatic control applied to various classes of boiler. Boilers fired by fuels in suspension had little fuel reserve and therefore demanded a close control of fuel supply to the burners. Control systems applied to oil-fired, bin-and-feeder, spreader-stoker-fired and direct fired boilers were then described, and details were given of control systems used on pulverising mills.

Finally, the paper discussed automatic control applied to stoker-fired boilers and the control of steam temperature and boiler feed water.

DEFINITION OF TERMS

The first paper to be read yesterday (Thursday) evening was entitled "Some Industrial Electronic Servo and Regulator Systems," and was delivered by Messrs. E. W. Forster and L. C. Ludbrook. Distinguishing between the two systems, the speaker stated that the term "servo" denoted the general type of error-actuated, power-amplifying, control system, in which both input quantity and load were subject to random disturbances. The term "regulator" denoted the particular form of servo in which the input quantity remained constant for long periods. The distinction was one of application rather than principle, and identical design techniques were used.

An electrical signal was the only form practicable for remote control, and offered many advantages for the low-level amplifier stages of local-control equipments. Some electron valves, such as the photo-cell and the ionisation gauge, responded directly to physical quantities; but in the majority of industrial servos the input and output quantities were measured and compared by devices based on variation of resistance, inductance, or generated voltage.

Experiences of electronic servos in industry since 1932, and under arduous military conditions since 1939, indicated that correctly engineered equipments would give at least ten years' service under heavy industrial conditions, with maintenance confined to occasional valve replacements and routine attention to auxiliary contacts. Failures of the latest high-quality components would be statistically insignificant up to 15 years' life.

Electronic position-control servos, highly developed for military applications, appeared to be essential to future nuclear-power plants and were immediately applicable to mechanical handling problems of heavy industry.

Electronic voltage regulators of the thyatron type had been used since 1935

for controlling the voltage of generators, not only for special testing installations requiring voltage regulation to within ± 0.1 per cent., but also for controlling the voltage of large alternators at power stations.

Electronic speed regulators were used for controlling the speeds of d.c. motors, the method of control being by variation of shunt field current, armature voltage, or a combination of both. Motors of 4 000 H.P. were being controlled by acting on the shunt field of the generator supplying armature power to the motor. With a.c. commutator motors of the Schrage type, speed control could be achieved by the automatic operation of the brush gear-shifting motor.

These points were illustrated, during the course of the paper, by descriptions of typical industrial applications of position control servos and automatic regulators for current, voltage and speed.

The final paper of the convention took as its subject "Electronic Servo Simulators," and was prepared by Prof. F. C. Williams and F. J. V. Ritson.

The paper presented an outline of a method which would allow automatic control systems to be studied experimentally by means of an electronic apparatus called a "simulator," which was constructed so as to have the same characteristic equation as the control system.

This apparatus could be used to predict the response of the control system to the usual standard input signals, such as step-function changes in the value of the input quantity or its derivative, or to the more complex input signals encountered in actual use. The method was considered to be valuable in cases where these responses were difficult to calculate because of the complexity of the control system or because it contained non-linear elements.

SLOW AND FAST SIMULATORS

Simulators might broadly be classified into two categories: first were "slow" simulators in which the time scale was such that any transients occurred slowly enough to be recorded by an operator reading a meter or on a recording instrument; and secondly, "fast" simulators in which transients were recorded with an oscillograph. Often this type was operated at a recurrence frequency of, say, 50 cycles, and was then called a "repetitive" simulator.

A simulator for a remote-position-controlled servo mechanism stabilised by "phase advance" was then discussed in detail to illustrate the methods of design, and results obtained with the apparatus were compared with those calculated from the characteristic equation.

Central England Area E.D.A.

Dinner at Birmingham—Nationalisation and the Future

THE Central England Area of the E.D.A. held a dinner in connection with the Birmingham section of the British Industries Fair on May 13, Mr. G. F. Pierson (chairman) presiding. It coincided with the announcement by Mr. E. Shinwell, Minister of Fuel, of the Organising Committee for the industry, and the Chairman opened the proceedings with congratulations to the city electrical engineer of Liverpool, Mr. J. Eccles, as one who had been chosen as one of the members.

The Association was given by Mr. V. Z. de Ferranti, president, I.E.E., who said that archaic legislation had been for many years an impediment to the development of electricity, but the industry was now entering a new phase. Electricity knew no municipal or county boundaries, but whether the legislation pending would be helpful depended on the integrity, intelligence, and energy of those who would be placed on the new authorities. No one knew what part the E.D.A. would play under the new regime, but some such organisation would be required to guide the public in the proper use of electricity; to explain and demonstrate to them in their homes and factories how electricity could lighten their work, increase industrial production, and give greater pleasure and a fuller life. There could, in his view, be no doubt that the association would continue in some form, and its past example of public service would be an inspiration.

Mr. H. F. Carpenter (chairman, E.D.A. Council) spoke of the relationship between electricity and industry, symbolised in all that had been seen at the B.I.F. It was vital that exports should be increased to 75 per cent. above the 1938 level, but so far there had only been moderate success; at the beginning of this year the increase was only 11 per cent. No one had liked cutting down electricity consumption but the reason was shortage of plant and coal. Such shortages were typical of world conditions and even in Australia load had to be shed and a scheme worked out for restricting supplies to consumers. The E.D.A. was very proud of its achievements

in the war and since. The future was obscure but intriguing. As soon as restrictions were removed the demand for electricity would increase to such a figure that he could not conceive the coal industry being able to meet the calls made upon it. The answer seemed to be the development of atomic energy, the only obstacle



MR. J. ECCLES, *vice-chairman, E.D.A. Council, being congratulated on his appointment to the Electricity Organising Committee by MR. H. F. CARPENTER, chairman, E.D.A. Council. In the photograph are (left to right) MR. G. F. PIERSON, chairman, Central England Area Committee, E.D.A. MR. V. W. DALE, general manager and secretary, E.D.A., and COUNCILLOR J. SELWYN JONES, member of Council*

to which appeared to be the disposal of the radioactive waste material.

The toast of "The City of Birmingham" was proposed in humorous vein by Mr. C. Heathcock, managing director of the Midland Electric Corporation for Power Distribution, Ltd., and Ald. W. S. Lewis responded. A lot had been said, he remarked, about nationalisation; whether that was necessary or not he could not say, but if the country had been organised on the lines of the West Midland J.E.A. nationalisation might not have come so soon. Certain reorganisation had to be made, however. In Birmingham they stood to lose under the Government programme assets around £60 000 000, including the electricity undertaking which was worth roughly £24 000 000. Birmingham was proud of its electricity undertaking, which had served not only the city but 30 000 consumers outside it. It was clear that big municipalities should not keep to themselves the benefits of first-class electrical development, and the parochial outlook must be dropped.

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 brief as possible.

MR. P. E. WILSON, who for the last two years has been associated with the electrical industry, has joined the sales division of George Forrest and Son, Ltd.

MR. I. H. SMITH, meter repairer and tester in the Hammersmith electricity department, has been appointed to the position of testing assistant (radio).

MR. J. RUSSELL TAYLOR, who has been with the Igranic Electric Co., Ltd., for 23 years, and has been chief engineer since 1937, has accepted an invitation to join the board of directors.

MR. L. CHARLTON has been elected chairman of the Newcastle-on-Tyne branch of the E.C.A., in succession to Mr. J. Fairbairn. Capt. V. Ferens, of Sunderland, has been elected vice-chairman, and Mr. E. P. Rickard re-elected secretary.

MR. TOM BLACKSHAW has succeeded Mr. John Walsh as chairman of the Blackburn branch of the Electrical Contractors' Association, and Mr. James Heys, who was hon. secretary for 21 years, has been elected vice-chairman. Mr. H. Edgar Dixon is the new hon. secretary.

MR. JAMES D. EWING, employed by Dundee electricity department for the last 19 years, was presented with a leather brief case on leaving to take up the appointment of assistant secretary to the Electrical Power Engineers' Association in Bristol.

MR. J. T. HEADS, traffic superintendent for the last 14 years of Newcastle-on-Tyne City transport and electricity undertaking, has been appointed deputy general manager of the undertaking. Mr. Heads is 44 years of age and was with the United Automobile Services, Ltd.,

for ten years before joining the Newcastle undertaking in 1933.

THE EARL OF ROTHES, whose appointments include the chairmanship of Brocklehurst-Whiston Amalgamated, Ltd., and Mr. Allan Miller, a director of Provincial Newspapers, Ltd., and of other companies, have been appointed to the board of the British Electric Traction Co., Ltd.

SIR CHARLES McLAREN, Director-General of Ordnance Factories, has been appointed by the Ministry of Supply as the official chairman of the Gauge and Tool Advisory Council in succession to Mr. S. F. Steward, who has resigned in order to be free to devote full time to his business interests.

MR. ALLAN MILLER and Mr. D. J. Robarts have retired from the board of Broadcast Relay Service, Ltd. Mr. J. S. Wills, managing director of the British Electric Traction Co., Ltd., and Mr. R. P. Beddow, chairman and managing director of the Antrim Electricity Supply Co., Ltd., have joined the board and Mr. Wills has been appointed chairman and managing director of Broadcast Relay Service, Ltd.

PROF. WILLIS JACKSON, Professor of Electrical Engineering at the Imperial College of Science and Technology, London, has been appointed to the Minister of Supply's Advisory Council on Scientific Research and Technical Development. Other members of the Council are Prof. Wesley Austin, Goldsmiths' Professor of Metallurgy in the University of London; Prof. W. E. Curtis, F.R.S., Professor of Physics at King's College, Newcastle; Lord

Hankey, F.R.S.;

Prof. E. K.

Rideal, F.R.S.,

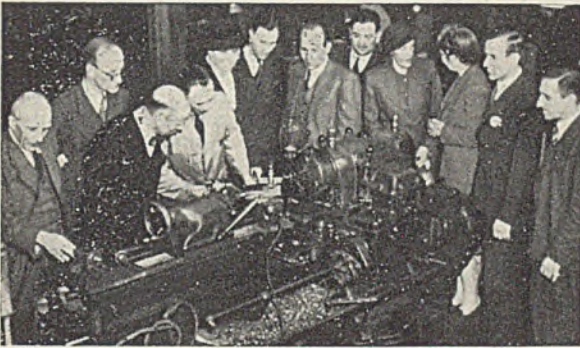
Fullerian Profes-



A group taken at the entrance to the I.E.E. building, Victoria Embankment, of those attending the 48th Illumination Design Course at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London

sor of Chemistry at the Royal Institution; and Mr. S. Robson, of the Imperial smelting Corporation, Bristol.

MRS. EMMETT, representing the Blackburn branch of the E.A.W., handed a cheque for £24 for the Y.M.C.A. to the



Finnish newspaper editors in the tool room of the Strowger Works of the Automatic Telephone and Electric Co, Ltd, at Liverpool

Princess Royal when she visited Blackburn on May 8.

PROF. J. D. COCKROFT, F.R.S., Director of the Atomic Energy Research Establishment at Didcot, has accepted the invitation of the I.M.E.A. Council to be the principal guest at the banquet in connection with the annual convention at Bournemouth on Thursday, June 26.

MR. H. P. BAYNHAM, deputy city electrical engineer for Carlisle, wished to retire next month, but the appointment of a successor is to be left over for a short period, in view of the nationalisation Bill, and in the meantime Mr. Baynham is to continue his work.

MR. JOHN DUXBURY, of Fairhaven Golf Club, was the winner in the competition, held by the Lancashire and Cheshire Radio and Electrical Golfing Society at Reddish Vale Golf Club, on May 14, for the B.V.A. Cup, over 18 holes, medal play, his score being 84, less handicap of 5—79 net. Mr. H. Nightingale, of Manchester, tied with a gross score of 94, less 15 handicap, but Mr. Duxbury was awarded the cup on the best score for the first nine holes. Mr. Nightingale was presented with a prize given by the president, Mr. Harrison, who has decided that in all future competitions a special prize shall be given for the best net score by members with handicaps of 14 and over. A subsidiary competition, in the form of a 9-hole greensome, was won by the captain, Mr. G. G. Cooper, and Mr. G. Smallman, with a score of 2 down. The prizes were provided by Mr. J. Foster Veivers.

MR. A. WESLEY BLAKE, commercial

assistant to the engineer and manager of Peterborough electricity undertaking, has been elected an alderman of Huntingdonshire County Council at the age of 43.

MR. D. R. ROPER, information officer, British Legation, Helsinki, accompanied seven Finnish newspaper editors who saw automatic telephone equipment being manufactured at the Strowger Works of the Automatic Telephone and Electric Co., Ltd., on Thursday, May 15. The visit was arranged by the Central Office of Information. Mr. J. Mason, manager, told the visitors that 60 per cent. of the factory's output was to fill export orders and that at the present time shortages of raw materials, notably rolled brass and sheet nickel silver, were presenting difficulties.

MR. CHARLES FORSYTH, resident engineer at Keswick to the Keswick Electric Light Co., retires at the end of this month after 47 years' service with the inter-linked Windermere and Keswick Electric Light Companies, and 31 years at Keswick. The directors have presented him with an inscribed gold watch and chain, and the staffs have given him a silver tea service and salver.

MR. ANDREW REID has been engaged by the Radio Industry Council to handle the Press information in connection with Radiolympia. Mr. Reid will work at 11, Garrick Street, W.C.2.

MR. LEWIS W. DOUGLAS, the recently-appointed American Ambassador to Great Britain, will be the guest speaker at the quarterly luncheon of the Gauge and Tool Makers' Association at the Savoy Hotel, London, on June 17.

MR. J. OWEN, assistant maintenance engineer (electrical), at Clarence Dock power station, Liverpool, has been appointed assistant electrical engineer; Mr. G. Gorst, junior assistant maintenance engineer, at Clarence Dock power station, becomes assistant maintenance engineer (electrical); Mr. N. D. B. Hyde, senior inspector of installations, is promoted assistant meter and test superintendent.

MR. V. PICKLES, chief engineer of the Victoria Falls and Transvaal Power Co., Ltd., Johannesburg, will retire from his full-time duties on July 1, and the following appointments have been made with effect from April 1: Mr. D. B. Roay, a member of the I.E.E. and I.E.(S.A.), chief engineer (mechanical) to the company in South Africa; and Mr. J. S. Trelease, a member of the I.E.E., to be chief engineer (electrical) in South Africa.

MR. N. C. ROBERTSON, deputy managing director, E. K. Cole, Ltd., on behalf of the Horners' Company, at a banquet in Chicago, handed over a presentation copy of "A Short History of the Worshipful Company of Horners" to the U.S. Plastic Industry. Plastics are considered to be the modern counterpart of the ancient art of the horner, who fashioned articles from natural animal horn. This gesture from one of the oldest of the City of London guilds was very warmly received as a token of the goodwill existing between the people of the plastic industries on both sides of the Atlantic.

Obituary

MR. RALPH CONSOLUS BROWN, managing director of British Acheson Electrodes, Ltd., and British Electro Metallurgical Co., Ltd., Sheffield, on May 15, aged 60 years.

MR. JAMES DALZIEL, mechanical and electrical engineer, at Enfield, on May 16. Born at Sanquhar, in 1876, he received his technical training with Bertrams, Ltd., and at the Heriot-Watt College, Edinburgh. He was for some time chief electrical assistant in the C.M.E. department of the Mid-

land Railway at Derby. Mr. Dalziel had been a member of the I.E.E. since 1919.

MR. A. ALBRECHT, director and secretary of the Electrical Wholesalers' Federation, a brief announcement of whose death appeared in our last issue, was educated in Sheffield, and articulated an architect. In 1905 he joined the St. Marylebone electricity department, and took part in the changeover. Later he went to the Santoni Co., Ltd., as sales manager. He became an electrical wholesaler in Newcastle in 1906. In 1918 his firm, the North British Engineering and Equipment Co., was admitted to membership of the E.W.F., and shortly afterwards Mr. Albrecht was elected to the council. He was president in 1920-21 and in 1930-31, having served on the Council for eleven consecutive years. In 1931 he accepted the office of secretary, and later became director. He was due to retire on a pension in September. When the Fair Trading Council was formed in 1933, Mr. Albrecht was one of the federation's representatives, and played a great part in the devising of its policy. Earlier he was associated with the radio industry, and was chairman of the N.A.R.M.A.T. in 1926.

Equipment and Appliances

Coal-Electric Water Heater

The type C.E.L. "Sadia" coal-electric water heater, one of the recent products of Aidas Electric Ltd., of Sadia Works, Northolt, Middlesex, has attracted attention at recent exhibitions. It is a storage type heater of 30 gallons capacity designed for either wall mounting or floor mounting, and is fitted with flow and return connections for use with a solid fuel boiler. The physical dimensions are 20 in. diameter by 47 in. high, and it is fitted with two banks of elements. One near the top is loaded to 500 W, is fitted with a thermostat, and is sufficiently powerful to heat and maintain 7 gallons of water at 160° F. A larger bank of elements, near the bottom, is loaded to 2500 W, and is controlled by both a 15 A thermostat and a 15 A foot-press single-pole switch. All the elements are in units of 500 W. For use with hard water a drum calorifier is mounted inside. Flow and return pipes are internal. A drain cock with hose attachment is fitted to the inlet. The makers state that the "C.E.L." works best with saddle or back boilers where the heat input can be regulated with a damper. For use in conjunction with the "C.E.L." or other forms of water heaters, a waste heat utiliser, known as the "Circoil," has been designed to make use of the hot gases in the chimney of a solid-fuel fire. It consists of a flue divided into two compart-

ments. One side is free, while the other has a water container in the path of the hot gases, the container being fitted with flow and return unions, which are in turn connected with the electric heater. A flap fitted below the water container is actuated by a thermostat and controls the heat output. The element of the thermostat is in the return pipe and the hot gases are diverted into the free compartment of the "Circoil" when the water reaches 180° F.

Ornamental Lamps

A variety of ornamental table and standard lamps was shown recently on the stand of Charles Selz, Ltd., at the Olympia section of the B.I.F. These range from modern patterns, employing plastics materials, to "period" lamps, of which that illustrated is typical, hand-worked in wrought-iron. The two-light model shown is based on Crom-

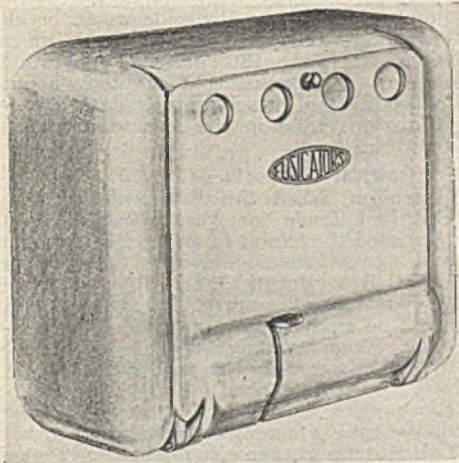


Wrought-iron table lamp, made by Charles Selz, Ltd.

wellian ironwork, and has a rust-proof finish which makes it suitable for export to tropical climates.

Lamp Indicator Fuse Box

A domestic switch fuse-box of interesting design is being made by Fusicators, Ltd., of 114, Anerley Road, Upper Norwood, London, S.E.19. Special features are red lights which automatically indicate the position of a blown fuse, and sockets on the side of the box to enable an ordinary domestic bell to be operated without the



New fuse-box, made by Fusicators, Ltd.

aid of a bell transformer or battery. This circuit is protected by a cartridge fuse. Repair of faulty fuses in the dark is facilitated by an inspection light beneath the box. The case is pressure die-cast and finished in colours with a ripple effect. Moulded in a high-grade plastic, the fuse carriers themselves are protected at the flash points with special inserts. The switch arm operates on the front of the box, thus breaking away from the usual method of switching, and this arm also holds the door closed when in the "on" position. The shell of the box and door comes away by removing four screws, leaving a back plate fixed to the wall and giving easy access to all parts. There are three differently positioned feed-out points, allowing for variations in wiring layout. The model described, the P.L. 515, is for 5-15 A circuits, 250 V a.c., and is a two-way double-pole box.

Small Radius₂ Tube Bender

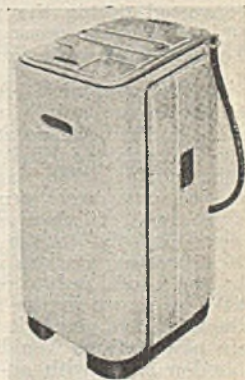
The "Staffa" hand bending machine, made by Commercial Structures, Ltd., of

Staffa Works, Leyton, E.10, will be of interest to contractors and others who work with tubes up to 1 in. outside diameter. Designed to tackle small radius bending, it will provide precision bends with throat radii equal to twice the tube diameter, and on certain classes of tube equal to one-and-a-half times the tube diameter. The machine is of the mandrel type, and is well suited for mass-production bending. Operation, the makers claim, is simple, the tube being inserted in the mandrel, a pre-set stop on the mandrel rod locating the bending position. The angle of bend is fixed by an adjustable stop ring. The whole operation of inserting, clamping and bending each tube takes only a few minutes. All formers and back formers are interchangeable, and special formers can be supplied for bending rectangular tube. Former sizes available range from 1 in. to $\frac{1}{2}$ in., giving throat radii of 2 in. and 1 in. respectively.

New Clothes Washer

At the recent annual general meeting of Hoover, Ltd., of Greenford, Middlesex, the Chairman reported that the company

was soon to commence production of a new washing machine of unusual design. The general appearance of the prototype washer may be seen from the accompanying photograph, although it is understood that the production model may vary in minor details. The overall dimensions of the new washer are sufficiently small for it to be stored under the



Prototype of the new Hoover washing machine

average draining board. It will, it is understood, require only 7 gallons of water, but will be capable of handling all but the largest pieces of washing. Laundry weighing between 3-4 lb. dry will be washed in from one to five minutes, depending upon the type of material. With very few moving parts and a simple design, the washer has been especially designed for use in small houses or flats. It will be, the makers believe, the lowest price good-quality electric washer on the market and will be available by the end of this year.

In Parliament

Replies to Some Electrical Questions in the House

New Generators.—Twenty-four turbo-generators, totalling 709 000 kW. of installed capacity, Mr. Shinwell said, were now in course of erection in selected and non-selected stations in England and Wales.

Berkshire Downs Television Station.—In the course of a reply to Sir Ralph Glyn, the Postmaster-General (Mr. Wilfred Paling) said that he had visited the proposed site for the television station on White Horse Hill on the Berkshire Downs and now agreed that the station should be located elsewhere. He had given instructions accordingly.

Neasden Conversion.—Mr. Hobson asked the Minister of Transport the number of boilers converted to oil fuel at Neasden L.P.T.B. power station; and the time taken for conversion and cost. Mr. Barnes replied that the scheme covered six boilers, one of which was brought into operation in January last. The remaining five would be converted during the next 12 months as supply of the necessary materials allowed. The total cost was estimated to be £45 000.

London Supplies.—Answering questions on electricity supply in the London area, Mr. Gaitskell, Parliamentary Secretary to the Ministry of Fuel and Power, stated that during 1946, approximately 8 500 million units were produced in the London area, of which 1 200 million units were exported to the grid. There were 29 generating stations in the London area, having a total output capacity of 2 644 000 kW, as shown in the following table. In the next five years, it was estimated that six new stations would be required in the London area, with an aggregate installed capacity of about 1 400 000 kW. The requirements beyond that period could

not, at present, be forecasted with reliability.

The capacity of the new station at Poplar, Mr. Gaitskell went on, would ultimately be 300 000 kW. The first part, which had now been authorised, would have a capacity of 157 500 kW. To extend the station beyond 300 000 kW in order to do away with the need for the proposed station at Bankside would be an extremely difficult business. At times of peak load, the present generating station at Bankside generated about 75 000 kW, of which approximately two-thirds was used in the local distribution network.

Electrical Exports.—Col. J. R. H. Hutchison asked the President of the Board of Trade for what reason he had permitted the export of 19 big transformers and two electric power houses to U.N.R.R.A. during 1947. Replying, the Parliamentary Secretary (Mr. Belcher) said that the equipment was supplied in fulfilment of long-standing orders placed as part of the U.K. contribution to U.N.R.R.A. It was specially designed for use as an emergency plant to provide a temporary and limited power supply in devastated areas. Col. Hutchison then asked whether in view of the demand in this country for electrical equipment, it had been wise to send this plant to Poland at the time, and Mr. Belcher replied that the Central Electricity Board had been consulted on the matter, and had advised that the equipment was not suitable for home use.

Employment Statistics.—Replying to a question by Sir Waldron Smithers, Mr. Ness Edwards stated that, of the total employees in manufacturing industries, 84 per cent. were employed as operatives and 16 per cent. as administrative, clerical and technical workers.

OUTPUT CAPACITY OF GENERATING STATIONS IN THE LONDON AREA. (MW.)

| | | | |
|-----------------------|-------|-----------------------|-----|
| Bankside | 76 | Shoreditch | 18 |
| Barking | 509 | Stepney | 65 |
| Battersea B.C. | 43 | Walthamstow | 13 |
| Battersea I.P. | 299 | Wandsworth | 15 |
| Bow L.P. | 48 | West Ham | 61 |
| Brimsdown | 196 | Willesden I.P. | 154 |
| Croydon | 72 | Willesden N.M. | 71 |
| Deptford West | 208 | Woolwich | 69 |
| Deptford East | 139 | Barnes | 6 |
| Fulham | 282 | Finchley | 3 |
| Grove Road | 57 | Hammersmith | 18 |
| Hackney | 83 | Islington | 20 |
| Poplar | 24 | Kingston | 5 |
| St. Marylebone | 40 | Wimbledon | 19 |
| St. Pancras | 26 | | |
| Total | 2 644 | | |

Answers to Technical Questions

We produce below the answers to a selection of questions which have been sent to us by readers. The co-operation of students and others in making this feature one of general interest is invited

A correspondent has asked for details and wave forms of a typical electric discharge lamp.

The most commonly used discharge lamp is the a.c. 80 W, 230 V fluorescent unit, a

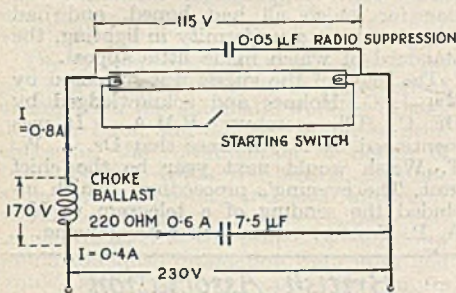


Fig. 1.—80W fluorescent lamp with typical values of current and voltage

connection diagram of which is given in Fig. 1. The actual lamp is 5 ft. long and 1½ ins. in diameter, and contains mercury vapour at low pressure, together with a trace of argon to assist starting. Passage of current through the vapour causes excitation of the mercury atoms and produces radiation, about 60 per cent. of which is at a wave length of 2 537 Angstrom units (1 A.U. = 10^{-8} cm.), i.e., it is ultra-violet and outside the visible spectrum. The tube is coated on the inside with a mixture of fluorescent powders, e.g., zinc and zinc beryllium silicates. The above radiation, on striking these powders, excites them and causes them to emit radiation between 4 000 and 7 000 AU, i.e., within the visible spectrum, and in amounts which are approximately similar in proportion to the radiation of ordinary sunlight. The r.m.s. voltage necessary to maintain the discharge in the tube is about 115 V and the current is about 0.4 A.

Lamp Circuit.—A feature of any electric discharge is its negative resistance characteristic, i.e., the resistance decreases with an increase of current, so that a ballast impedance is necessary. For various reasons, a choke and not a resistor or a condenser is used, the choke having a reactance at 50 c/s of about 220 ohm. The power factor of the lamp and choke is about 0.5 lagging and a condenser of about 7.5 μ F is connected as shown to improve the power factor to about unity. A further

condenser of 0.05 μ F is connected across the lamp to suppress radio interference.

Starting.—In order to start the lamp a current of about 1.2 A is passed through the two filaments in series by closing the starting switch. As soon as the filaments are heated sufficiently to emit electrons, the starting switch is opened, thus putting the full circuit voltage across the tube. This, however, is not sufficient to start the discharge, but the sudden breaking of the 1.2 A starting current causes a voltage surge, due to the choke, of about 800 V,

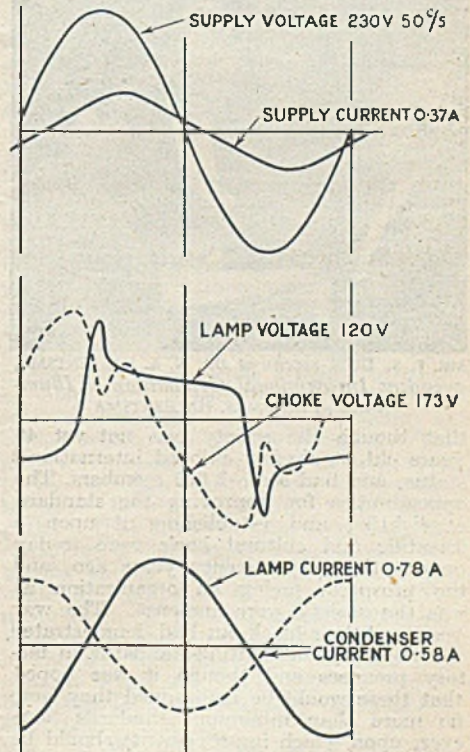


Fig. 2.—Wave forms of standard 80W fluorescent lamp

which initiates the discharge, which can then be maintained by the normal voltage.

The starting switch is entirely automatic in operation and is closed when the lamp is not in circuit. The initial starting current causes it to open after a fraction of a second and initiate the discharge as

described above, after which the normal lamp current holds it open.

Wave Form.—Wave forms for a typical lamp are shown in Fig. 2, the waves being arranged in their correct phase positions. It can be seen that the lamp voltage is approximately constant during the dis-

charge, due to the negative resistance characteristics, and that the choke absorbs the difference between this and the supply voltage. The current wave form normally contains about 10 per cent. of harmonics.

E. O. T.

illuminating Engineering Society

THE annual dinner of the Illuminating Engineering Society, the first since the war, was held in London on May 14, with the president, Mr. J. S. Dow, in the chair.

The chief speaker was Lord Marley, chairman of the Colour and Lighting in Industry Council, who after pointing out

essential to every industry, without which the whole programme of production would be brought to naught. Restrictions had for the time being replaced the reconstruction for which all had hoped, and had brought about a uniformity in lighting, the standard of which made little appeal.

The toast of the guests was proposed by Mr. J. G. Holmes and acknowledged by Dr. C. Hill, secretary, B.M.A. It was mentioned by Mr. Holmes that Dr. J. W. T. Walsh would next year be the chief host. The evening's proceedings, which included the sending of a telegram to Mr. A. P. Trotter, terminated with dancing.



MR. J. S. DOW receiving DR. N. A. HALBERTSMA, president *International Commission on Illumination*, and MRS. HALBERTSMA

that though the society was not yet 40 years old, it already enjoyed international status, and had some 2 000 members. The opportunities for improving the standard of lighting and establishing it upon a scientific and cultural basis were to-day greater than say, twenty years ago, and the prospects facing an organisation as was the society were immense. The war years and their black-out had demonstrated the necessity for lighting-standards in factory premises and though it was hoped that these would be maintained they were no more than minimum standards however, upon which improvements should be made. Speaking of colour and references to it in the report of the Working Party of the Wool Industry, Lord Marley said that just as colour depended on light to reveal its beauty, it required colour to give full appreciation to lighting effects.

Mr. J. S. Dow, president, who has been a member of the society for 40 years, and has not missed a council meeting during 27 of them, said that light was a tool

British Association

INTERRUPTED by the war, which cut short the 1939 meeting in Dundee in its early stages, the annual meetings of the British Association will be resumed this year, from August 27 to September 3. The meeting will again be held in Dundee, and it is expected that some 3 000 members will attend, including representatives from overseas.

Sir Henry Dale, F.R.S., president of the association, will set the keynote of the meeting, "swords into ploughshares," in his presidential address on science in war and peace, and many of the papers delivered in the 13 sections will follow the same theme.

A paper on "Earth, Stars and Radio" will be delivered by Sir Edward Appleton, F.R.S., president of the physics and mathematics section, and Sir William Halcrow, in his presidential address to the engineering section, will speak on "Progress in Modern Engineering." Among subjects which will form the basis of discussion are: "Peace-time applications of nuclear fission," "men and machines," "radio applications in astronomy and meteorology," "modern methods of computation," "the future of coal supplies," "Scottish water power developments," and "coal as a source of heat and power."

Announcing details of the meeting, recently, Sir Henry Dale stressed that the instruction of the general public in the nature of scientific activities and the meaning of science was a matter of high importance.

Long-Line Telephone Signalling

PROBLEMS OF AUTOMATIC SWITCHING DISCUSSED BY I.E.E.

THAT the introduction of automatic switching on long lines had confronted telephone engineers with a more difficult and exacting problem probably, than had ever before faced the industry, was stated by Mr. T. S. Skillman in his paper entitled "An Analysis of the Problems of Long-line Telephone Signalling," which was read at the meeting of the I.E.E. on May 15.

The author attempted to analyse the probable requirements and interactions arising from the automatic working of long distance lines, and deduced tentative principles for the co-ordination of design of trunk boards, trunk test-boards, long-line signalling equipment, and local automatic switch equipment. It was claimed that standardisation of the principles laid down would minimise interaction difficulties and would leave the way open for future growth and for new developments.

MR. G. J. S. LITTLE (Post Office) said that many of those best qualified to discuss the paper were at present attending a meeting of the C.C.I.F. in Paris on the same subject. At that meeting such systems as the author advocated were not, however, under discussion, the C.C.I.F. having previously decided to recommend for use on international circuits systems in which all the signals were transmitted over the voice path, in conformity with the adage "Where you can speak you can dial." It had not been possible, apparently, to come to an agreement in Paris on whether one frequency or two frequencies should be used, and the recommendation would probably be to use either one or two, in agreement with the two administrations concerned. It also seemed as if the conference would be unable to come to an agreement to use a given set of signals which would be suitable for transmission between the *têtes de ligne* of the international circuits into national systems, and accordingly the understanding would probably be that there would be a prefix signal which would, in effect, separate the circuits between the *têtes de ligne* from the national networks. Even if those recommendations were confirmed by the present meeting, however, they would require the approval of a plenary session of the C.C.I.F. He believed that where a call was into an automatic network of which the far *tête de ligne* was the centre, the signals transmitted over the international line would probably be used to actuate the automatic equipment there.

and so connect right through to the subscriber. Dealing with the author's proposals, Mr. Little said that a most important consideration in designing a system of signalling was its reaction on the coaxial system. In that system, and also in the 12-channel carrier on cable system which preceded it, and of which many thousands of miles were still working, it would be difficult to adopt the principle of carrier signalling, which would tend to overloading of the repeaters. He thought that a compromise might be reached whereby a simplified system of pulse transmission could be used without involving the large number of relays which piled up when it was necessary to guard against speech operation of the equipment.

MR. J. MCGAVIN (Automatic Telephone and Electric Co., Ltd.) suggested that the most interesting aspect of the paper was the remoteness of some of its ideas from those being discussed by the C.C.I.F. He thought that the C.C.I.F. approach to the problem of international signalling was the more realistic; they envisaged a sort of international ring-main circuit, and at each point of entry either converting or regenerating equipment, and they proposed to allow complete liberty to each national area to do exactly as it pleased. That might seem a somewhat defeatist attitude to adopt; but it had the merit of taking into account the enormous amount of capital which was already involved. The author's proposed new system was open to the objection which existed to any dissociation between signalling and talking paths. That involved the risk that the signalling circuit might be good and the talking circuit faulty. No mention was made in the paper of either frequency-modulation, or pulse-modulation schemes. Some work had been done on both, and he thought that they must be taken into account before any big step forward could be taken in standardisation for long-line signalling.

MR. J. E. COLLYER (G.E.C.), commenting on the suggestion in the paper that for large trunk routes a small number of both-way circuits co-operating with their groups of one-way circuits in each direction should be used, said that both-way circuits were very difficult to design for effective guarding on seizure and release. Some engineers favoured a new method whereby, instead of the both-way circuits, a small group of unidirectional circuits were employed, the direction

being determined automatically by the traffic overflow conditions prevailing. He agreed with the author that a distinction should be drawn between the basic line signals and other signals, and that the equipment sending and receiving the latter could often with advantage be located in the cord circuit and the automatic equipment. It might be said that the loss in articulation produced by the extraction of the v.f. signalling path was almost negligible, but he doubted whether that would be accepted by those engineers who were for ever striving to improve articulation. It seemed to be a step in the wrong direction, and it was difficult to foresee the ultimate effect of it. He had the impression that, with high-grade filters, a very special design of v.f. receiver, the modifications required to accommodate the system in existing telephone equipment, and so on, the author's proposed system would be costly, and would have many new technical and engineering difficulties. On the other hand, it did solve many of the sticky problems of existing systems, so that it was worthy of very serious consideration.

MR. G. C. HARTLEY (Standard Telephones and Cables, Ltd.) emphasised the overwhelming importance of standardisation, and supported what he took to be the main theme of the paper, a plea for a form of standardisation which would allow adequate scope for the individual administration and the individual designer to make further progress. The problem of long-distance signaling, he said, was undoubtedly a very thorny one in that respect, because of the world-wide repercussions of any particular administration's activities. That emphasised the need for the right type of standardisation, but did not necessarily rule out the v.f. system. It did imply, however, a greater sectionalising of the working of such systems. By the use of prefix-splitting techniques it was possible to have v.f. systems constructed in such a way as not to interfere with any similar system, whether in the next country or the next county. In that respect, too, much emphasis had been placed on the division between the international and national systems; freedom from interference was just as important inside a country as between countries. With regard to the proposed filtered channel system, he suggested that a continuous tone system working on modern multi-channel circuits would have to work at a very low level, and with that low level the filter design problems would be such as to make the economics of the system a matter needing close scrutiny.

MR. D. WRIGHT (Automatic Telephone and Electric Co.) suggested that the

author had painted a gloomy picture of the length of pulses necessary to effect a simple seize and clear; circuit designers would feel that they could clip an appreciable amount off the 1 400 milliseconds which the author thought necessary. None of the signal codes suggested by the C.C.I.F. in 1939 exceeded 400 milliseconds, and of this the first 300 was a compound prefix, which was followed by a 30 millisecond space, these being intended to give the circuit a high degree of voice immunity; the actual function of switching was in point of fact controlled by 70 milliseconds of a simple frequency.

MR. SKILLMAN, in a brief reply, said he knew when giving the figure of 1 400 milliseconds that someone would say that it was possible to do better than that, but it was dangerous to nibble away at this tolerance, or one day may be reached when everything would be cut so fine that the whole system would tend to "pack up."

Canadian Water Power

THE Canadian Water and Power Bureau, Surveys and Engineering Branch, has issued a review of the potentially available and of the presently developed water powers of Canada, up to March 15 last. The review summarises the latest available information regarding water power in each province and briefly discusses the resources of the Dominion with regard to provincial distribution of water power, current progress in development, growth of development, coal equivalent of developed water power, general utilisation and relation of developed power to population. The presently recorded water-power resources of the Dominion are shown as totalling 25 722 900 h.p. under conditions of ordinary minimum flow and 40 124 300 h.p. at ordinary six months flow, the latter figure representing maximum dependable power and corresponding to a potential turbine installation of more than 52 000 000 h.p. The total turbine installation as at January 1, 1947, was 10 312 123 h.p., indicating that only 20 per cent. of available resources has been developed. During 1946, the production of hydro-electricity reached new high levels with the transition to peace-time uses proceeding with relatively few severe dislocations.

Partly reflecting post-war construction difficulties, new installations completed during the year totalled only 27 760 h.p. although a number of important projects are under active construction and installation.

The Bankside Project

Architect's Views on Power Stations and Town Planning

BEFORE being taken to the House of Lords, where it was displayed during the debate on the proposed power station at Bankside, a 44 ft. to the inch scale model of the area affected by the scheme, prepared by the City of London Electric Lighting Co., Ltd., was shown to the Press on Monday. Sir Giles Gilbert Scott, architect of the new station, was present to explain features of the design.

Made on the suggestion of Mr. Anthony Eden in the House of Commons, the model covers an area bounded by Blackfriars and Southwark Bridges on the East and West, and by Cheapside and the area immediately behind the Bankside station on the North and South.

In his proposed layout, Sir Giles Gilbert Scott has made the new station a centre-piece of the South Bank scheme. The single chimney will be between 275 and 300 ft. high and the main block, which will reach a height of 90 ft., will be 450 ft. long. The building will be grey- and silver-brick in colour. Buttresses on the chimney and large windows will break the severity of the outline.

Describing the model, Sir Giles pointed out that the gardens in front of the station would be larger than those allowed for in the County of London plan. Behind the station, grass would be laid over the tops of the oil-storage tanks, which would thus

be quite invisible. A jetty would be built in the river for use of oil-barges. With a height of only 90 ft., made possible by the use of oil-fired boilers, the main block of the station might well, in fact, be lower than the surrounding buildings.

Much of the public criticism which had been expressed, Sir Giles said, had been due to inaccurate knowledge of what was proposed, but, personally, he welcomed the scheme as a fine architectural opportunity. There would be no noise, smoke or dirt from the station, which would suit the location very well.

In reply to questions, Mr. H. J. Randall (managing director of the company) said it would be at least two years before work could be started on the suggested alternative site at Rotherhithe, whereas work could be begun at Bankside within a few weeks of approval being given. The station would be erected in two sections, the existing building being demolished as soon as the first section was complete. If started now, and given the present high priority, the whole scheme would be completed in three years.

During the House of Lords debate on Monday, the Lord Chancellor gave an assurance that he would bring to the attention of the Cabinet the objections raised, and ask whether, in the light of the debate, the scheme should go on.

SIR GILES GILBERT SCOTT (left) and MR. H. J. RANDALL, managing director of the City of London Electric Lighting Co., Ltd., (right) explain details of the scheme. In the scale model, on which the gardens in front of the proposed station are seen, the shaded blocks represent existing buildings. New buildings envisaged in the London plans are left white



PROVINCIAL SUPPLY ASSOCIATION

ANNUAL MEETING—NATIONALISATION PROBLEMS

THE annual meeting of the Provincial Electric Supply Association was held in London on May 15, preceded by a luncheon at which Mr. Selwyn S. Grant presided. Ninety-nine companies were represented and, speaking at the meeting, the Chairman said that, last year, most of his speech was divided into two parts. First, the action taken or envisaged on behalf of the association, either by itself or through the Joint Committee, in respect of such practical problems as standardisation of voltage and forms of tariff, settlement of war damage, extension of rural supplies and shortage of material. Secondly, in reference to nationalisation, it was stated that to expect to convert successfully at one hit all the supply undertakings in the country into a few regional bodies was a dangerous dream. At the meeting a resolution was passed opposing State-ownership. In that connection thanks were due to those who undertook the work of opposing the Bill, and particularly to Sir Robert Renwick, chairman of the Public Relations Committee. The latter Committee, in conjunction with the company associations, had engaged technical experts to advise on the Bill, and representatives of the association's Executive Committee had sat on the Parliamentary Committee set up by the three company associations and on its Bill Sub-Committee. The fight was not yet over, though the Government seemed resolved to press forward with their plans. During the Committee stage of the Bill no appreciable concessions had been made by the Government for the benefit of holders of securities and the Chairman expressed strong resentment of the way in which stockholders had been treated. The supply companies had attracted not the speculative type of investor, but the private or professional investor anxious to obtain a steady income, sound security and preferably a long term capital appreciation. He was now to be expropriated on a basis, namely, Stock Exchange prices, which had no direct relation to the intrinsic value of the assets of the company in which he was interested and he was to lose compulsorily, and without regard to his company's statutory rights, some 30 to 40 per cent. of his income. That the new British Electricity Authority should start on the basis of a gross injustice was a poor omen for its future.

Continuing, the Chairman said that they now had an Electricity Organising Committee consisting of a political nominee as

Chairman, the General Secretary of the E.T.U., and four engineers. It was too early to comment on this new move, beyond expressing some reassurance that the names of all the engineers were well known to the association, one indeed being a prominent member. In conclusion he expressed the indebtedness of the Executive Committee to the secretary, Mr. J. M. Graham, who had always given the affairs of the association the full and often urgent attention needed in these present difficult days.

Correspondence

Immigrants to South Africa

[TO THE EDITOR.]

Sir,—We are receiving so many inquiries lately from both your own and kindred trades as to whether they would be allowed to take up similar work in South Africa, that I give here the official statement for all concerned: "The Union Government will welcome and encourage all desirable classes of immigrants. Desirable classes would include the following: Skilled tradesmen and technicians of all classes who intend to pursue their occupations in the Union and who have the physical ability to do so. Also, other types of trained and experienced commercial and industrial employees. Also, persons desirous of establishing new industries or other business activities in the Union and who have the ability and financial resources to do so. Also, persons irrespective of age who have substantial financial resources which they will take to the Union."

So now you know. But, I must point out to all your readers who come in those classes that this club, which, with the assistance of various authorities in other countries, is arranging for its members to travel on special combinations of overland and sea routings in much shorter waiting time than is otherwise necessary, is only interested to hear from people who are in a position to meet the cost, which is in the neighbourhood of first-class ocean passage, and also in a clear position to state their desired date of travel. That being so, they should communicate with me at once at Poleuta Cottage, Veryan, Cornwall.

Yours faithfully,

C. HOWARD THOMAS,

Co-ordinating Secretary.

The Club for Overland Parties to South Africa.

Electricity Bill in Committee

Relations With Employees—New Schedule Of Undertakings

NEGOTIATIONS with employees' organisations and compensation for loss of employment were among points clarified by Government spokesmen during discussions of the Electricity Bill in Standing Committee.

An amendment which had been moved by the Opposition to provide that the Central Electricity Authority or Area Boards did not supply electricity to railway undertakings at a loss was withdrawn after Mr. Shinwell had given an assurance that there was no question of subsidies so far as railway supplies were concerned. If the Electricity Boards supplied electricity to the nationalised railways at anything but the commercial rate, he added, this would be undue preference, about which the Bill already gave assurance.

On the section of the Bill dealing with settlement of terms and conditions of employment, Mr. Shinwell announced that the Government had reconsidered some of its provisions. It was now proposed that negotiations should be on a national, not an area, basis. "We also wish to create," the Minister went on, "having regard to the position of management, something in the nature of a co-partnership. We want a mutual understanding not only in regard to wages but also in regard to the welfare of both parties to consider all matters likely to be beneficial to the industry—in the sense of reorganisation, expansion and research."

WORKERS' ORGANISATIONS

In reply to other questions, Mr. Gaitskell, Parliamentary Secretary to the Ministry, stated that any organisation which represented a reasonable proportion of workers and had hitherto been involved in national agreement would be consulted.

During discussions on Clause 49, which provides for compensation to officers of authorised undertakings in connection with transfers, Mr. R. S. Hudson moved an amendment seeking to write into the Bill the right of directors to compensation for loss of office. He asked Mr. Shinwell for an assurance that the declaration the Minister had made previously that "all those who did a job of work" would be compensated for loss of office would include directors.

To this, Mr. Shinwell replied that the matter was one of great complexity. Where a director functioned as an employee, although not necessarily every day, he would be compensated, as would those who held executive posts, or performed some specific function, or were also officers

of the company. But where he could not admit the right to compensation was where a director sat only occasionally and was on the boards of a number of companies. These he described as the "nomadic" type of director, and instanced from the electricity industry 24 companies in which 21 directors held 59 appointments in other electricity companies, besides holding 247 directorships between them in gas and water undertakings.

POSITION OF PROFESSIONAL MEN

Replying to a point raised regarding the position of the professional man, Mr. Shinwell said that the lack of compensation would be no hardship there, as the person concerned could give his services elsewhere. He then gave an assurance that he would look at the clause again to make certain that directors undertaking regular activities were covered, and Mr. Hudson withdrew the amendment.

Col. Crosthwaite-Eyre pointed out that under the new Finance Bill there would be liability for income tax on capital sums received as compensation.

The question of the definition of "authorised undertakings" arose on Clause 59, and Mr. Gaitskell admitted that he was not satisfied with it as it stood and said he had come to the conclusion that it was necessary to make a new schedule setting out the undertakings. They would not be ready for the Committee, but would be moved on the Report stage. The schedule would also include power companies not authorised undertakings as defined by Clause 13.

When the Committee adjourned, a discussion of debenture rights was still in progress. The Opposition had protested against the Government's "dishonouring" of the rights of debenture holders under Clause 59, and moved an amendment to delete debentures and debenture stocks from the defined category of "securities" with a view to assuring that the contracts of the companies to the debenture holders were honoured.

Mr. Gaitskell, rejecting the amendment, said that Stock Exchange prices represented fair compensation for debentures. Mortgages were in a different category, and were treated differently.

After other members had expressed their views, Mr. J. G. Foster argued that the Government action raised the point of whether companies should obtain capital by issue of a debenture or a mortgage.

Industrial Information

Electrical Equipment for France

The French Government has ordered electrical equipment from Britain to power and control four large dredgers to be used in cutting a new canal between Donjere and Mondragon, near Avignon, in the south of France. Each of the dredgers is completely electrified, with all drives provided by electric motors, totalling 1 050 H.P. per dredger. The supply is taken from nearby h.v. land lines on to the dredgers, where it is transformed down to 380 V three-phase. The biggest individual drive is that for the bucket chain, which requires 350 H.P. Several other motors of over 100 H.P. are required for driving hoists or conveyors. For manoeuvring, Ward Leonard controlled winches are employed. Seventeen main motors on each dredger equipment are controlled by means of automatic starters arranged to work in sequence to ensure correct starting and control of the complete equipment. The comprehensive control equipment is being specially designed and constructed by Brookhirst Switchgear, Ltd., Chester.

A.S.E.E. Conference

The annual conference of the A.S.E.E. was held at Nottingham on May 17, when Mr. J. D. Griffiths, of Birmingham, chair-

educational activities undertaken and said that during the year, the Government's decision to provide increased facilities and



Part of the stand of the Metropolitan-Vickers Electrical Co., Ltd., in the Birmingham section of the British Industries Fair

opportunity for improving the technical education of the lower grades was noteworthy.

Board of Trade Film

Shooting of the first of a new series of films, under the title of "Profiles," being made for the Board of Trade to help the export drive, has just been completed in the factories of Electric and Musical Industries, Ltd., at Hayes. Aimed at giving the world an insight into the quality of British products, the life and leisure of the British worker and the thoroughness of our manufacturing methods, with particular emphasis upon television, this new film is being produced by Derrick de Marney, the actor, working in conjunction with the Crown Film Unit.

E.W.F. Support for E.I.B.A.

At the annual meeting of the Electrical Wholesalers' Federation at the Savoy Hotel on May 15, Mr. W. C. Yuille, retiring from the Council after 12 years' service, presented a large rose bowl to the federation, to be awarded each year to the section most successful in collecting funds for the Electrical Industries' Benevolent Association. Mr. Yuille was the inaugurator in 1938, when president of the federation, of a plan for



The stand of Pritchett and Gold and E.P.S. Co., Ltd., at the British Industries Fair

man of the association, welcomed the 65 delegates who attended. In the course of his address he referred to the intensive

ment Association. Mr. Yuille was the inaugurator in 1938, when president of the federation, of a plan for

the collection of contributions from fellow members and their staffs for the E.I.B.A., the proceeds of which last year amounted to £1 358.

Change of Address

The address of the Brighton office of British Insulated Callender's Cables, Ltd., is now 59a, Middle Street. The telephone number has been changed to Brighton 9212/3.

New Premises

Masteradio, Ltd., announce that their head and administration offices are now at Fitzroy Place, London, N.W.1 (Telephone: Euston 2628).

F.B.I. Regional Conference

On Thursday, June 5, a one-day conference on industrial research and its significance to the industries of Sheffield will be held by the Federation of British Industries in the Royal Victoria Hotel, Sheffield.

Methods of Crack Detection

A symposium on "Methods of Crack Detection," arranged by the Industrial Radiology Group of the Institute of Physics, will be held at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London, W.C.2, on Friday and Saturday, July 18 and 19, commencing at 10 a.m.

Kelvinator-G.E.C. Agreement

An agreement has been made between the Nash-Kelvinator Corporation, U.S.A., Kelvinator Ltd., Crewe, and the General Electric Co., Ltd., England, under which the G.E.C. is licensed to make the Kelvinator design of sealed unit for domestic refrigerators in England. Manufacture will be carried out by Coldair Ltd., a subsidiary of the G.E.C., and their factory at Wembley is being extended for this purpose. Coldair, Ltd., will manufacture sealed systems which will be incorporated in cabinets made in the same factory, the complete refrigerators being supplied to the G.E.C. Sealed systems for domestic use will be supplied also to Kelvinator, Ltd., for use in cabinets of their own manufacture. In the new G.E.C. refrigerator the sealed system will be housed in an all-steel one-piece cabinet of new design suitable for export.

Whitsun Holidays: Revised Arrangements

In a circular letter to members of the National Federated Electrical Association, Mr. L. C. Penwill, director and secretary, states that in areas where Whit-Monday is regarded as a bank holiday operatives will be entitled to 8½ hours' wages at bare time rates for that day even though no work is performed thereon. Where work is performed on Whit-Monday, all hours

worked shall be paid at the rate of double time. Operatives called upon to work on that day are not entitled to time off in lieu at a later date.

The Allen Engineering Review

Now that their efforts are fully turned to post-war production, W. H. Allon, Sons and Co., Ltd., Bedford, have resumed the regular quarterly publication of the "Allen Engineering Review," which was suspended, owing to paper restrictions, in 1942. The contents of all issues are intended, as hitherto, to be mainly of a technical nature.

Philips Technical Review

The use of "tracer" atoms in investigation, an account of the development of secret radio sets during the occupation of Holland and the electrical detection of poisonous gases are three of the subjects dealt with in the eleventh issue of Vol. 8 of "Philips Technical Review." The twelfth issue of the same volume contains articles on the application of a magnetron to d.c. voltage amplifying, and non-metallic magnetic material for high frequencies.

Radio Convention

During the convention of the British Institution of Radio Engineers, which concludes at Bournemouth to-day, May 23, Prof. H. M. Barlow read a paper on "The Exploitation of Micro-waves for Trunk Wave-guide Multi-channel Communications"; Cmdr. J. D. M. Robinson, R.N., and Dr. E. V. D. Glazier contributed one on "International Automatic Telegraph Networks," describing developments in technique made by the fighting Services of this country and the U.S.A.; and Mr. G. H. Leversedge spoke on "The Problems of Radio Communications with Moving Trains," giving particulars of the applications at present under discussion by British railways and possible future uses. Visits were arranged to technical establishments of the Admiralty, Ministry of Supply and British Overseas Airways, Ltd.

Radio Relay Cables

B.I. Callender's Cables, Ltd., are showing a selection of radio relay cables at the exhibition organised by the Relay Services Association of Great Britain at the London Exhibition Centre, New Coventry Street, this week. It concludes to-morrow, May 24. Arranged as a background to the stand is a typical installation of radio relay cables in a residential area. Superimposed upon this is a display showing the recommended methods of making off the cables at various types of chimney and wall brackets. Featured among a representative selection of radio relay feeder and down-lead cables are polyethylene—

insulated and sheathed, star quad and figure "8" twin types of cable for two and four programmed services. Other items of interest include displays of coaxial cables, capacitors, solders and soldering fluxes.

Visit to Scottish Factory

Scottish radio dealers are to visit the premises of E. K. Cole, Ltd., at Rutherglen, and see how Ekco radio and fluorescent lighting products are manufactured. The organisation of small parties is in the hands of the company's Scottish sales representatives, Mr. J. A. H. Montgomery and Mr. John Brown.

Electric Vehicle Association

A luncheon will be held by the Electric Vehicle Association of Great Britain, Ltd., at the Connaught Rooms, Great Queen Street, London, on June 4, at 12.30 p.m. Lord Brabazon of Tara has consented to propose the toast of the Association, to which Sir Felix Pole (president) and Mr. A. W. Barham (chairman) will respond.

"Enterprise Scotland 1947" Exhibition

It is announced that more than 500 firms, covering a wide range of industries, have expressed their intention to submit goods for selection for the "Enterprise Scotland 1947" Exhibition to be held in Edinburgh from August 25 to September 30. Electrical equipment and radio receiving sets will be displayed illustrating post-war progress in Scotland.

Atmospheric Pollution at Westminster

Instruments for recording the sulphur dioxide in the air which damages the magnesium limestone structure, have been set up near the top of the Big Ben Tower and on the Speaker's Green, at the Houses of Parliament, by the Fuel Research Station, D.S.I.R. The main object of the measurements being made is to compare the sulphur dioxide concentration at ground level with that at a considerable height above the ground. The vertical distance between the instruments is 238 ft.

Institute of Welding

The annual dinner of the Institute of Welding will take place at Grosvenor House, Park Lane, London, at 7.15 p.m., on June 25. By arrangement with the Tyneside and Tee-side branches of the institute, an extended meeting will be held on the North-East coast from June 3 to 6. The provisional programme is as follows:—

Tuesday, June 3: Evening—Reception at King's College, Newcastle-on-Tyne. Wednesday, June 4: Morning—Visit to Middlesbrough; luncheon and visits to works; evening—Conversazione in Newcastle.

Thursday, June 5: Morning—Technical papers: "Shipwelding as Practised on the Tyne and Wear," by N. M. Hunter and R. C. Thompson; "Welding in Marine Engineering," by J. A. Dorrat. Afternoon—Visits to works on Tyneside. Evening—Dinner at Station Hotel, Newcastle. Friday, June 6: Morning—Further visits, or a social outing, ending by mid-day in Newcastle.

Dimensions of Unscreened Magnetos

The B.S.S. 5027—Dimensions of Unscreened Magnetos—is a revision of the standard for the dimensions of unscreened magnetos, which was last revised in 1924, when it formed one of a series of specifications dealing with automobile materials and parts. The new B.S.S. 1368—Dimensions of Ignition and Lighting Units for Motor Cycles—deals only with the dimensions of combined dynamo and magneto units (double spindle type), combined generator and ignition units (single spindle type), combined dynamo and engine speed contact breaker unit and dynamos for use on motor cycles, having particular reference to those dimensions which affect the interchange of units. It sets out overall dimensions and fixing dimensions, sizes of tapers and keyways, and defines the position of the keyways on armature spindles. Copies are obtainable from the British Standards Institution, 28, Victoria Street, S.W.1, price 3s. 6d. post free.

Help for Warsaw Polytechnic

During the German occupation the Polytechnic School of Warsaw suffered the destruction of its buildings and apparatus and the loss of its library, and the British section of the World Engineering Conference, which has undertaken to assist in the re-establishment of the Polytechnic activities, by supplying technical literature, especially current journals, text books and scientific apparatus, is appealing to readers to help to fill its needs covering electro-technology, electric measurements, large electrical networks, radiotechnology, telecommunications, electrical machinery and so on. Particulars may be obtained from Mr. Robert Lowe, organising secretary, Provisional British Committee, 82, Victoria Street, London, S.W.1.

London Transport War Story

One of the most comprehensive and revealing accounts of the impact of the war on London and its inhabitants is given in the booklet, "London Transport Carried On," by Charles Graves, which the London Passenger Transport Board has distributed to every member of its staff. It is the story of the successful operation of the trains, buses, trams and trolley buses in spite of enemy bomb, fire, fly-bomb and rocket attacks, of measures

taken to prevent London's travel services being disrupted, of confidential tasks carried out by the passenger transport services, and emergency war plans in which they took part. The greatest danger to London's Underground communications was from flooding, and it was overcome by a system of 25 floodgates costing £250 000, to which was added £750 000 spent on other devices to protect the Underground from flooding. All the floodgates could be closed within half a minute, and were electrically operated from a switchboard in a control room between the Piccadilly and Northern lines at Leicester Square.

X-Ray Test for Cleaner Parts

A remotely-controlled X-ray unit has been installed in a special laboratory at the Chapelhall (Scotland) factories of Vactric Ltd., to test components of the vacuum cleaners and other electrical appliances made by the company. The unit is not being used to check positions of metallic inserts in plastic mouldings. The hot tube is cooled not by water, but by air circulated by revolving fans, so there is no need for a safety light.

E.R.A. Technical Reports

Technical reports published by the British Electrical and Allied Industries Research Association this month are as follows:—B/T45, "The Properties of Ebonite: Influence of Ebonite Dust—Second Report," by J. R. Scott (Research Association of British Rubber Manufacturers). (Price 3s. 6d.) This is a sequel to B/T33. It describes the first systematic investigation yet recorded on the use of ebonite dust as an ingredient of high-grade ebonite. L/T165, "Rheological Properties of Dielectric and Other Materials," by G. W. Scott Blair and B. C. Veinoglou, in co-operation with J. E. Caffyn. (13s. 6d.) It describes research along the lines of an extension of the theoretical appreciation of the Nutting treatment, and an extension of the experimental investigations to include conditions under which materials can be strained at constant stress to pre-selected strains and the relaxations at constant strain can be followed. L/T166, "The Control of Humidity by Saturated Salt Solutions—A Compilation of Data," by F. E. M. O'Brien (3s. 6d.). This report comprises a table of data which have been compiled from various sources. L/T167, "Current Conditioning Procedures: American and European," by F. E. M. O'Brien (5s. 6d.). This report is an attempt to show what progress has been made towards the standardisation of conditioning procedure, in relation to materials before test, in the various industrial groups, and in industry in general.

L/T169, "Dielectric Breakdown in Amorphous Substances, II," by H. Frohlich (H. H. Wills Physical Laboratory, University of Bristol) (4s. 3d.). The purpose of this report is to apply the theory of intrinsic dielectric breakdown (see Ref. L/T 153) on chlorinated polythene, and to predict the dependance of its breakdown strength on temperature and on chlorine content. Copies of these reports may be obtained from the association at 15, Savoy Street, London, W.C.2.

Trade Publications Received

The Wearite components catalogue published by Wright and Weaire, Ltd., of Great Peter House, Lord North Street, London, S.W.1, comprising detailed descriptions, illustrated with circuit blueprints, of various components.

Radio Model 209U Service Manual and Radio Model 462A Service Manual published by the service department of Philips Lamps, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

An illustrated brochure published by G. W. B. Furnaces, Ltd., Dibdale Works, Dudley, Wores., gives a full technical description of the Autolec electrode steam raiser, the operation of the boiler and its applications.

New publications by the Expanded Metal Co., Ltd., Burwood House, Caxton Street, London, S.W.1, dealing with their expanded metal resistances, for industrial, marine and traction applications; and also describing an expanded metal air heater unit for use in convectors, duct systems, unit heaters, ovens, and so on.

The latest literature published by W. Christie and Grey, Ltd., of 4, Lloyd's Avenue, London, E.C.3, comprising an illustrated booklet entitled "The Isolation of Vibration and Noise," describing the firm's methods and their application; and leaflets dealing with the isolation of vibration and noise in buildings.

I.E.E. Students' Section

AT the meeting of the I.E.E. London Students' Section held on May 5, Mr. Arthur Duxbury delivered his lecture on "The Presentation of Technical Information," the purpose of which was to assist the young engineer with the preparation and construction of his speeches and reports. The speaker emphasised that knowledge was at a discount unless it could be suitably expressed in words, illustrated and arranged. He added that it was not always realised that apparent spontaneity was generally the result of careful preparation, and that preparation would give the speaker and writer a feeling of confidence, fluency and power to hold the interest of the listener and reader.

Electricity Supply

Accrington.—The purchase of five cottages and 82 acres of land as a start towards the erection of the Huncoat generating station, is planned. For mains extensions for industrial and housing development, the Electricity Committee is seeking power to borrow £28 090.

Stockton-on-Tees.—A suggestion by the Borough Electrical Engineer that houses should be attached to certain sub-stations for employees of the department is under consideration. The Electrical Engineer stated that under this plan a certain amount of local servicing could be carried out.

St. Marylebone.—In order to equip a transformer sub-station at the Langham Hotel, W., the Borough Council has approved the ordering of transformers and switchgear, etc., at a cost of £10 035, and the necessary installation work and alterations to the present h.t. system, making a total expenditure of £14 471.

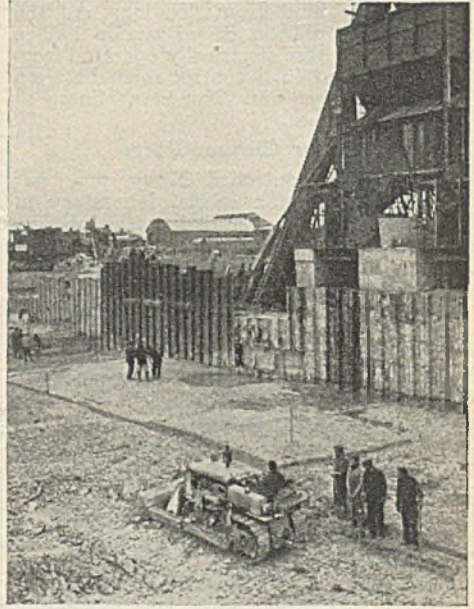
Liverpool.—Electric heaters are being introduced in the foundation works of the Corporation's Stoneley cold store. The system of heating consists of a grid of wires beneath the existing cork insulation of the floor. Rated at 0.086 W per sq. ft., and covering a floor space of 12 200 sq. ft., the entire installation consumes only 1 kW.

Belfast.—As a result of representations by the Corporation, an allocation of steel to proceed with the £1 000 000 extension of the Harbour power station will now be made. The City Electrical Engineer (Mr. W. J. Girvan) had been requested to cancel the authorisation of a 700-ton order of steel because the Northern Ireland steel quota had already been exceeded.

South Shields.—Application has been made to borrow £10 600 for a sub-station in the Quarry Lane area. Other electrical developments planned include £5 600 for a 11 kV supply and increase in capacity at the Chapter Row sub-station at Brigham and Cowans; £1 400 for changing over from single-phase to three-phase at the Ogle Terrace sub-station; £900 for supplying 54 houses; and £13 960 for a sub-station on the Bede Trading Estate.

North Wales.—After considering the proposals for a tidal scheme in the Menai Straits, put forward by Mr. F. O. Harber, the Bangor electrical engineer; the Beaumaris Town Council has passed a resolution claiming that the scheme, if put into effect, would arrest the natural flow of tides and

cause silting which in time would render navigation impossible. Copies of the



As reported in THE ELECTRICIAN of April 18, the work of preparing the 30-acre site for the £7 000 000 power station at Poole Harbour is now nearing completion. This recent photograph shows the rows of piling driven into the clay, and the central concrete batching plant mounted on the girder wall. The Bournemouth and Poole Electricity Supply Co., Ltd., who are erecting the station, will install initially three 50 000 kW sets with provision for a fourth turbo-alternator later

resolution are being submitted to the Ministries of Transport and Fuel and Power.

New Power Stations.—The Central Electricity Board have adopted, without modification, the Mid-East England (Alteration and Extension) Scheme, 1947, which provides for the erection, when they have been authorised, of three new selected generating stations each with an initial installation up to 130 000 kW. It has already been stated that the first of these stations will be located on the Trent in the vicinity of Keadby.

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:—

Walsall, May 24.—Supply of 15 000 yds. cable covers, to be delivered during two years commencing July 1, 1947. Particulars from Engineer and Manager, Electricity Supply Department, Upper Bridge Street, Walsall.

Birkenhead, May 24.—Supply and delivery of one concrete type three-phase indoor reactor, to operate at 6.6 kV. Specification from Borough Electrical Engineer, Craven Street, Birkenhead.

Manchester, May 27.—Supply and delivery of one petrol-electric mobile crane. Specification from Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2.

Wandle Valley, May 28.—Supply and installation of refrigerating plant at the Isolation Hospital, Mitcham Junction, and necessary builder's and incidental works. Specification from Clerk to the Wandle Valley Joint Hospital Board, Isolation Hospital, Mitcham Junction, Surrey.

Kent, May 31.—Applications invited for inclusion in the County Council's approved list of contractors for electrical engineering works. Application forms from Architect to the Council, Springfield, Maidstone.

Brighton, June 2.—Supply and delivery of low voltage p.i. mains cable for one year from July 1, 1947. Particulars from Engineer and Manager, Corporation Electricity Department, Electric House, Castle Square, Brighton, 1; deposit, £1 1s.

Bromley, June 3.—Supply and delivery of l.t. cable, p.i.l.c. and s.t.a., 660 V; e.h.t. cable, p.i.l.c. and s.s.w.a., 3 300 V, 11 00 V; l.t. pilot cable, p.i.l.c. and s.t.a., 660 V; three 750 kVA, 10 000/415/240 V three-phase static transformers. Specification from Borough Electrical Engineer, 1, West Street, Bromley, Kent; deposit, £1 each.

Southport, June 7.—Supply to Gas Department of one new or second-hand five-ton electrically-driven lifting unit to be attached to an existing hand-operated travelling beam (220 V d.c.). Particulars from General Manager, Gas Offices, 91, Eastbank Street, Southport.

Brighouse, June 9.—Supply and delivery of two 11 000 V switchboards. Specification from Borough Electrical Engineer, Huddersfield Road, Brighouse.

West Hartlepool, June 10.—Supply and delivery of eight 500 kVA, single-phase, 50 cycles, 5 760/490/245 V transformers. Specification from Borough Electrical Engineer, Electra House, Church Street, West Hartlepool.

Melbourne, June 4.—Supply of porcelain disc insulators for 220 kV transmission lines, for State Electricity Commission of Victoria. Particulars from Agent-General for Victoria, Victoria House, Melbourne Place, Strand, London, W.C.2; deposit with tenders, £25.

Madras, June 19.—Supply, delivery, erection and commissioning of switchgear, reactors and auxiliary equipment for the Basin Bridge "B" power station. Specifications from Messrs. Merz and McLellan, Milburn, Esher, Surrey; deposit £5 5s. for first copy and £2 2s. for subsequent copies.

Middlesbrough, June 21.—Supply and delivery of street-lighting equipment. Specification from Borough Electrical Engineer, Corporation Electricity Works, Snowdon Road, Middlesbrough; deposit, £1 1s.

Manchester, June 27.—Supply, delivery and supervision of erection at the waterworks hydraulic power station of one electrically-driven submersible borehole pump with starting and control gear, etc. Specification from the Secretary, Waterworks Offices, Town Hall, Manchester, 2; deposit, £1 1s.

Pretoria, July 1.—Supply, delivery and erection of one 180 000-lb. and one 27 000-lb. overhead electric travelling crane. Specifications from City Electrical Engineer in Pretoria or from Messrs. Merz and McLellan, Carloli House, Newcastle-on-Tyne, 1; deposit, £2 2s.

The report and accounts of the Perth (Australia) City Electricity Department for the year ending September 30, 1946, show an increase in units sold over the previous year from 85 981 523 to 93 624 398. The maximum demand, which occurred during June, was 28 000 kW. During the year, extensions were made to the h.t. distribution system, and 720 poles were renewed. New transformers, totalling 140 kVA, were installed and 1 070 kVA was added to existing installations. The undertaking now has 21.4 miles each of h.t. and l.t. underground mains, and 495 miles of pole lines. At the year's end, there were 53 720 meters connected, an increase during twelve months of 1 877. Revenue for the year was £A543 412.

Company News

SWITCHGEAR AND COWANS, LTD.—Prft., 1946, after deprecn. and taxn. £1 584 (£20 376 after £1 000 to pension fund), plus transf. from war contings. £5 000 (nil). To res. nil (£2 000), div. 10% (20%), bonus nil (5%); fwd. £22 252 (£22 268).

HEATRAE, LTD.—After taxn. £3 000 (£5 000), deprecn. and amounts written off £1 199 (£603), etc., net prft. to Feb. 28, £11 656 (£13 959). To reduction of book val. of plant and machy. £2 325 (£4 999), to nom. fig. of £1, reduc. book val. plant and machy. nil (£1 051), gen. res. £1 500 (£4 500), gen. books debts res. nil (£803), div. 12½% (same), fwd. £7 437 (£7 356).

WATFORD ELECTRIC AND MANUFACTURING CO., LTD.—Trdg. prft. 1946, less exes., deprecn., etc., £24 429 (£25 292) plus int. and fees £81 (£306), mkg. £24 510 (£25 598). To dirs.' fees £400 (same), tax £9 384 (£9 170), bldg. res. £1 000 (same), 6% pref. div. £1 980 (£1 800), fin. ord. 10%, mkg. 15% (same) £4 950 (£4 800), fwd. £40 694 (£33 898).

BEDS., CAMBS. AND HUNTS. POWER STATION, LTD.—Amount received for 1946 in respect admin. exes. £1 113 (£1 044), under lease of stn. £197 191 (£195 864), int. on loans £1 046 (£2 372), mkg. £199 350 (£199 280). To fees and exes. £1 113 (£1 044), deb. int. £89 336 (£93 017), debt redmptn. £108 901 (£105 219).

GATESHEAD AND DISTRICT TRAMWAYS CO.—Rev. for 1946 £210 792 (£197 890). To power expend., etc., £88 377 (£79 147), gen. expend. £15 732 (£13 066), reprs., etc., £22 741 (£21 838), defd. reprs. £4 595 (£11 300), renewals £10 000 (same), E.P.T. £20 000 (£27 000), inc.-tax. £24 903 (£20 380), net prft. £20 971 (£11 241), div. 10% (same), fwd. £54 005 (£45 117).

WOKING ELECTRIC SUPPLY CO., LTD.—Net rev., 1946, £108 428 (£94 991), plus int. £3 385 (£3 330). To inc.-tax £18 010 (£30 782), deb. int. £9 432 (same), pref. divs. £11 500 (same), intm. ord. div. at rate of 6% £8 871 (3%, tax free, £4 435), fin. ord. div. £8 3s. 8d. (4½%), being max. permitted by Elec. Bill, deprecn. and renewals £25 552 (£26 563), res. £10 000 (same); fwd. £21 473 (£5 122).

TELEGRAPH CONDENSER CO., LTD.—Trdg. prft. 1946, after E.P.T., £98 708 (£83 476), other income £368 (£30). To deprecn. £12 281 (£13 145), dirs.' fees £2 300 (£1 707), lvg. £84 495 (£68 654). To tax £43 000 (£34 159), gen. res. £25 000 (£18 800), ord. div. 10% (7½%), plus bonus 5% (same); fwd. £40 232 (£40 402). Curr. assets £546 241 (£537 594), curr. liabs. £252 165

(£329 077), res. and surplus £206 363 (£124 561).

WEST LONDON AND PROVINCIAL ELECTRIC AND GENERAL TRUST, LTD.—Income to Mar. 31, £39 770 (£34 336). To tax £17 771 (£16 686), exes. and fees £900 (£918), prfts. tax £43 (£141), deb. int. £4 235 (£3 500), lvg. prft. £16 821 (£13 091). To dirs.' addtl. remun. £900 (£563), div. equalisn. res. nil (£1 000), gen. res. £2 000 (nil), fin. ord. div. 4%, mkg. 6% (same), bonus 1% (nil), fwd. £5 298 (£4 280).

STURTEVANT ENGINEERING CO., LTD.—Trdg. prft. 1946 £58 911 (£50 909), divs. from subsids. £7 700 (£4 500). To dirs.' fees £3 362 (£2 804), tax £27 600 (£17 000), lvg. £35 649 (£35 605), plus net proceeds sale of land at St. Owen £7 369 (nil). To rebdg. res. £10 000 (£15 000), rehabilitation res. £10 000 (nil), fin. div. 11% (9½%), tax free, mkg. 16½% (14½%), tax free, fwd. £15 981 (£13 305). Consd. trdg. prfts. £76 374 (£58 794).

LAURENCE, SCOTT AND ELECTROMOTORS, LTD.—Trdg. prft. inclgd. £28 400 (£31 500) E.P.T. recoverable, £120 551 (£130 306), plus transfer from provn. taxn. not reqd. £10 000 (nil), less deprecn. £28 772 (£24 840), dirs.' fees £1 125 (£1 200), div. 5% red. pref. £4 208 (£3 975), div. 4½% cum. pref. £432 (nil), redemptn. res. £6 600 (same), lvg. £97 465 (£100 719). To "A" and "B" ord. div. 12½% (same) £27 568 (same), tax £42 000 (£47 000), pensions £5 000 (same), staff annuity £2 500 (same), gen. res. nil (£10 600), dirs. have transfdr. addtl. £15 400 to cap. redemptn. res. in order to take advantage of max. powers of 5% red. pref. redemptn., fwd. £4 996 (£8 051). Curr. assets £1 180 334 (£991 431), curr. liabs. £371 506 (£452 450).

JOHNSON AND PHILLIPS, LTD.—Prft. 1946, after charging £52 910 (£51 316) for bldgs., etc., maint., was £373 296 (£313 108). To dirs.' rem. £3 250 (same), audit £630 (same), int. on loan £29 684 (£28 387), deprecn. £42 184 (£41 755), pensions, etc., £16 271 (£16 003), taxn. £120 000 (£58 000), cap. iss. exes. £1 456 (nil), A.R.P. nil (£824), Forces paymts. nil (£1 437), lvg. net rev. £159 820 (£162 821). To research and devpt. £20 000 (same), to contng., £50 000 (same), div. equalisatn. nil (£37 500), intm. 7½% (same), fin. div. 7½% (same), mkg. 15% again, fwd. £128 396 (£112 825). In Nov., 1946, 200 000 ord. shs. were issued to holders at 65s. a sh. Resultant prem. of £450 000 placed to gen. res., now £850 000. Stock and work

Ceratosaurus nasicornis, was one of the carnivorous dinosaurs of pre-historic times. It derived its name from the short, bony horn on its nasal bones. Remains found in Western North America show that it reached a length of 20 feet. Our illustration shows it killing *Camptosaurus nanus* one of its smaller herbivorous contemporaries on which it lived.



Ceratosaurus nasicornis

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£1 062 766 (£925 932) and debtors £568 114 (£718 722). Bank loan £500 000 (£1 000 000), creditors £357 732 (£285 794) and taxn. £432 028 (£505 664).

A. REYROLLE AND CO., LTD.—Speaking at the recent annual general meeting, Mr. George Wansbrough (chairman) said that during the year there had been a substantial increase in stores, manufactured stock and work in progress. In the present situation of material shortages, it was inevitable that the rate of progress of work through the shops should be slower than if all the materials came forward freely and easily, and the problem was having the urgent attention of the management. The output of the company was, in terms of value, about 10% higher than in the previous year, and orders at present stood at a higher level than ever before in the history of the company. In 1944, the chairman recalled, they had issued 11 600 ordinary shares in acquisition of an interest in Morphy-Richards, Ltd. The object of this was to give them an interest in the field of domestic appliances, and to provide manufacturing work for the post-war period. Since then, the two firms had co-operated in the design of a new vacuum cleaner, which would be made by Reyrolle's at the Ashington factory and distributed by Morphy-Richards. Plans were far advanced for converting Morphy-Richards into a public company.

EVER READY COMPANY (GREAT BRITAIN), LTD.—Trdg. profit and investmt. income to March 31, includg. E.P.T. adjustment £596 668 (£744 419). To dirs.' reimmun., etc., £24 700 (£28 400), written off bldgs., plant, etc., £40 000 (£65 000), reserve £79 583 (£213 628), staff fund £14 000 (same), donations £1 262 (£2 509). Pref. div. £20 000 (same), final ord. div. 25%, again mkg. 40% (In addition a 5% Victory bonus not subject to tax paid for 1945-46 out of capital profit on sale of holding in assoc. co.). Fwd. £115 967 (£103 005). In his comments on the accounts, Mr. Magnus Goodfellow (chairman and managing director) stated that the profit shown of £532 000 was after an adjustment or recovery against E.P.T. of £150 000 at the reduced rate of 60%. The trading profit earned during the year was therefore £382 000. The previous year's profit of £651 000 was after an adjustment or recovery against E.P.T. of £100 000 at the full rate of 100%, the trading profit in that year therefore being £551 000. The company, Mr. Goodfellow pointed out, was among the first, if not the first, of manufacturing concerns to publish accounts which reflected the harmful results of the fuel and power breakdown in the early part of the year. "The interruptions and dislocations during this period," he stated, "resulted in heavy losses in production, and we incurred further losses of profit in that we paid salaries and wages to our people throughout the whole period."

Metal Prices

| | Monday, Price | Inc. | May 19 Dec. |
|---|------------------|------|----------------|
| Copper— | | | |
| Best Selected (nom.)...per ton | £135 10 0 | — | — |
| Electro Wire bars ... " | £137 0 0 | — | — |
| H.C. Wires, basis ... " | £155 0 0 | — | — |
| Sheet ... " | £178 10 0 | — | — |
| Bronze Electrical quality | | | |
| 1% Tin— | | | |
| Wire (Telephone) basis per ton | £177 15 0 | — | — |
| Brass (80/40)— | | | |
| Rod basis ... " | 1s. 2½d. | — | — |
| Wire ... " | 1s. 6½d. | — | — |
| Iron and Steel— | | | |
| Pig Iron (B. 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 ... " | £91 10 0 | — | — |
| Foreign and Colonial... " | £90 0 0 | — | — |
| Tin— | | | |
| Ingot (minimum of 99.9% purity) ... " | £410 10 0 | — | — |
| Wire, basis ... " | per lb. 5s. 6¾d. | — | — |
| Aluminium Ingots ...per ton | £80 0 0 | — | — |
| Spelter ... " | £70 0 0 | — | — |
| Mercury (spot) ... per bott. | £17 3 6 | — | — |

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.

Overseas Trade

THE Board of Trade figures published this week showed that the recovery from the setback caused by the fuel crisis in February is gathering momentum, the total value of electrical exports during April being £5 778 187, which exceeded the figure for March by over £340 000 and that for January, which was the previous best monthly aggregate for the year, by over £200 000. The total for April, 1946, was £3 411 203, and the monthly average for 1938 £1 501 081. For the first four months of this year the total value of electrical goods and machinery shipped overseas was £21 141 246, contrasted with £12 814 871 in the corresponding period of 1946. The value of electrical imports in April was £200 757, as against £125 916 in April of last year, and £328 117 in 1938, showing a credit balance of exports over imports for the month of £5 778 187. The value of the imports for the first four months of this year was £658 285, compared with £1 226 972 over the first four months of last year, the balance in the value of exports over imports being £21 141 246.

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Commercial Information

Mortgages and Charges

*NOTE.—The Companies Act of 1908 provides that every mortgage or charge shall be registered within 21 days after its creation, and that every company shall, in its annual summary, specify the total amount of debt due from it in respect of mortgages or charges. The following mortgages and charges have been registered. The total debt prior to the present creation, as shown in the annual summary, is given—marked with an *—followed by the date of the summary, but such total may have been reduced.*

CROWNE ELECTRONIC ENGINEERING LABORATORIES, LTD., Penzance.—April 2, deb., to E. W. C. Howard, Penzance, securing £1 000 and the liability under a certain guarantee to an amount not ex. £1 000; general charge.

PIRELLI-GENERAL CABLE WORKS, LTD., London, N.W.—April 2, £750 000 deb. stock (repayable at a premium of 5% on December 31, 1994, and repayable in certain events at a premium of 7% in lieu thereof) secured by a Trust Deed dated March 27, 1947; general charge.* £501 400. October 1, 1946.

POLAX CO., LTD., Newcastle-on-Tyne, mfrs. of electric washing machines.—March 28, £300 deb.; general charge.

E.R.G. INDUSTRIAL CORPORATION, LTD. (formerly E.R.G. Resistors, Ltd.), London, N.W.—April 8, £4 500 charge, to H. L. Alexander, London, and ano.; charged on 15, Matthew Street, Dunstable, with the coachhouse, workshop and bldgs. *Nil. October 24, 1946.

ELECTRONIC PRODUCTS (GLOS.), LTD. Stroud.—April 8, deb., to Olds Discount Co., Ltd., as trustee for itself and nine other cos. securing all moneys due or which may become due from the co. to the holders; general charge (subject to etc.).

SIMMONS ELECTRICAL AND WINDING CO., LTD., London, W.C.—April 9, £500 deb. part of a series already reg. *Nil. April 9, 1946.

F. FRADLEY, LTD., Stoke-on-Trent.—April 9, deb., to Barclays Bank, Ltd. securing all moneys due or to become due to the Bank; general charge. *Nil. August 31, 1944.

STURDY ELECTRIC CO., LTD., Newcastle-on-Tyne.—April 14, £3 000 deb.; general charge. *Nil. February 21, 1946.

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.

HALL, L. A. S. (male), Castledown, Portland, Dorset, propr. of Castle Electrical

Services, electrical engineer. £13 11s. 4d., February 6.

HOLT, WM. GEO., Hut 11a, Perry Barr Camp, off Walsall Road, Perry Barr, electrician. £13 3s. 8d. March 4.

MORSE RADIO (a firm), 173, Spring Bank, Hull, radio dealers. £20 3s. 11d. March 19.

NORRIS, J. W. B. (male), Hickmot Electrical Service, 16, Hickmot Road, Sheffield, 11, electrical engineer. £32 10s. 10d. March 13.

GRANGE, Keith Sidney, 11, Duncan Road, Southsea, radio and television engineer. £15 14s. 5d. February 25.

MASTERS (a firm), 8, Cuthbert Road, Westgate-on-Sea, electrical dealers. £26 4s. 8d. March 11.

DEMPSEY, J. (male), 76, Breck Road, Liverpool, 6, dealer in radio appliances. £15 1s. 0d. March 17.

DRETH, L. A. (male), 238a, Fulham Road, South Kensington, Middlesex, building and electrical contractor. £17 13s. 10d. March 10.

HUNT, Samuel Harry, 48, Bridlesmith Gate, Nottingham, electrical dealer. £18 15s. 3d. March 12.

DILLON, S., AND SONS (a firm), 15, Grafton Terrace, Malden Road, London, N.W.5, electrical engineers and contractors. £40 12s. 3d. January 29.

PARRY, Mr. R. M. (propr. of RADIO RENOVATION CO.), 20, Albyn Road, St. John's, London, S.E.8, electrical engineer. £35 12s. 3d. February 7.

Coming Events

Friday, May 23 (To-day)

I.E.E., SCOTTISH CENTRE.—Dundee. At the Training College Hall, Park Place. Faraday Lecture. "The Generation and Wholesale Distribution of Electricity," by J. Hacking. 7.30 p.m.

Wednesday, May 28

INSTITUTE OF FUEL, LONDON SECTION.—At Burlington House, Piccadilly. "Combustion and Combustion Equipment for Gas Turbines," by Dr. E. A. Watson and Dr. J. S. Clarke. 2.30 p.m.

I.E.E., LONDON STUDENTS' SECTION.—Annual General Meeting, followed by film. "Can We Be Rich."

Thursday, May 29

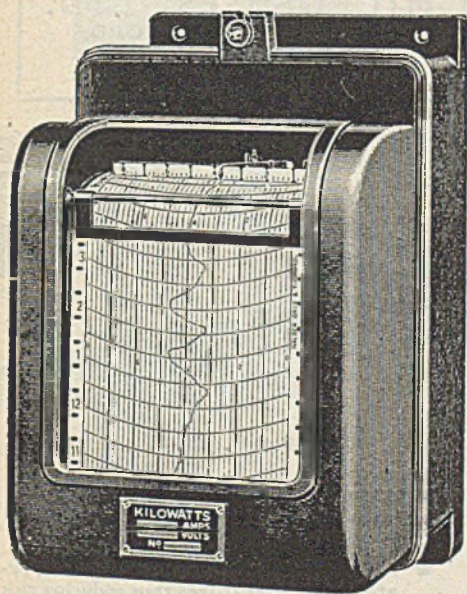
I.E.E., IRISH BRANCH.—Dublin. Conversation and Presidential visit. 6 p.m.

Friday, May 30

I.E.E., N. IRELAND CENTRE.—Belfast. Conversation and Presidential visit. 6.45 p.m.

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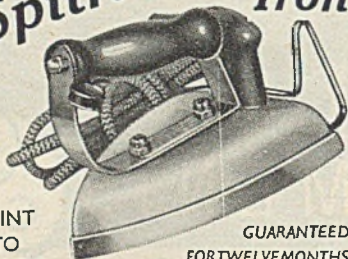
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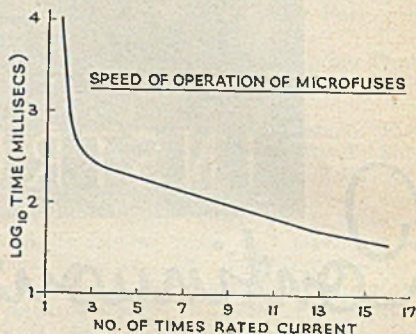


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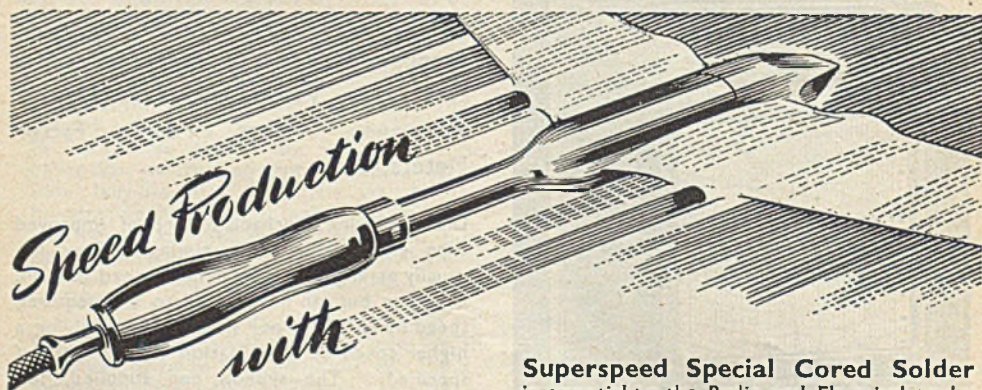
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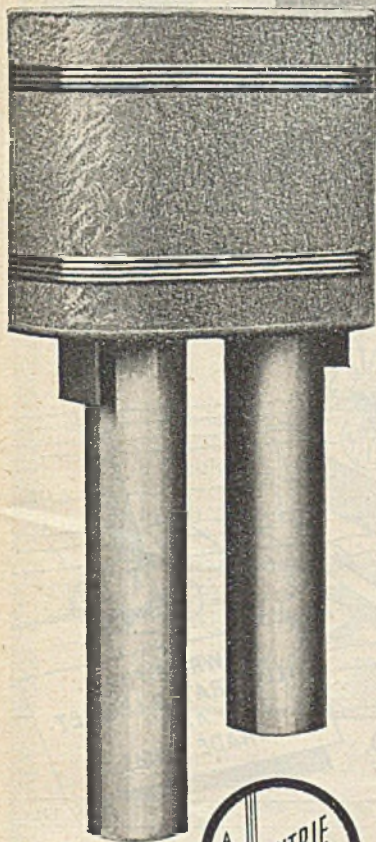
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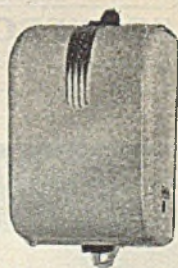
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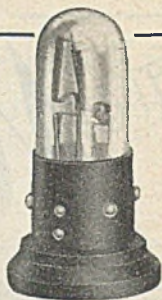
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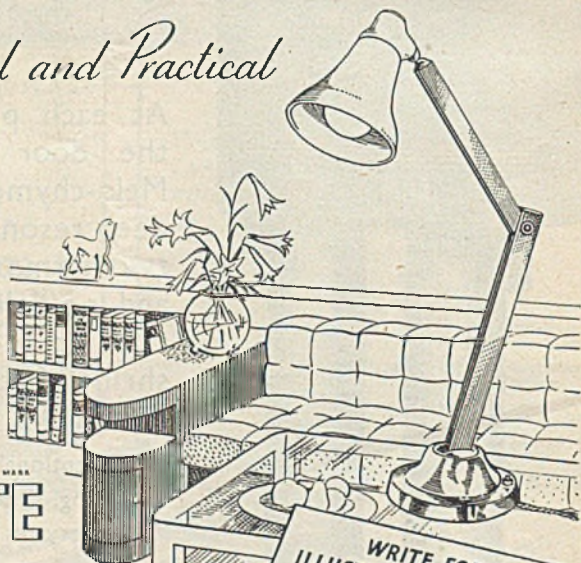
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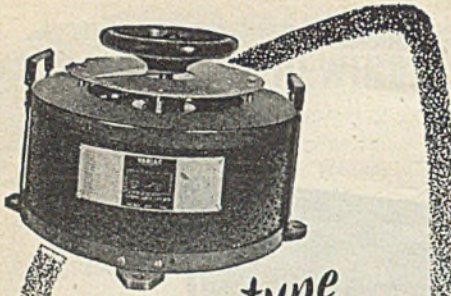
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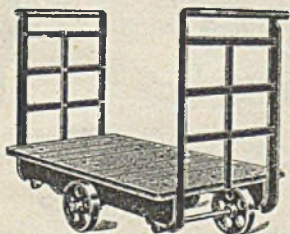
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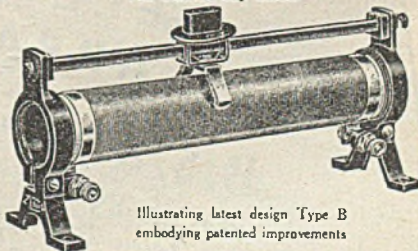
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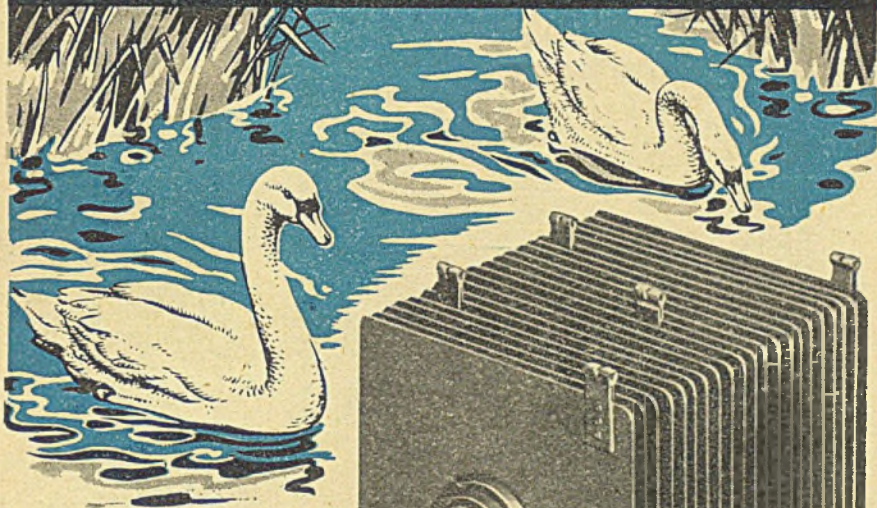
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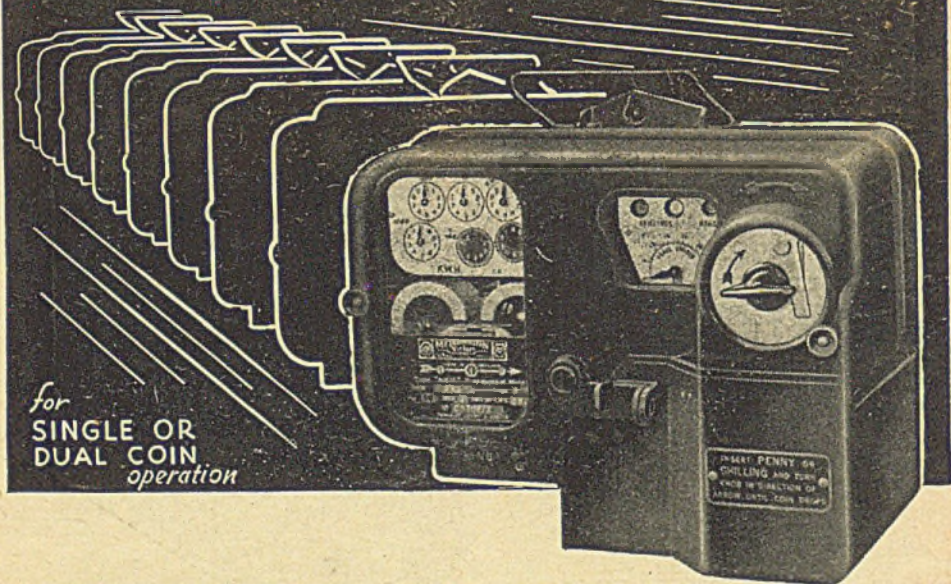


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