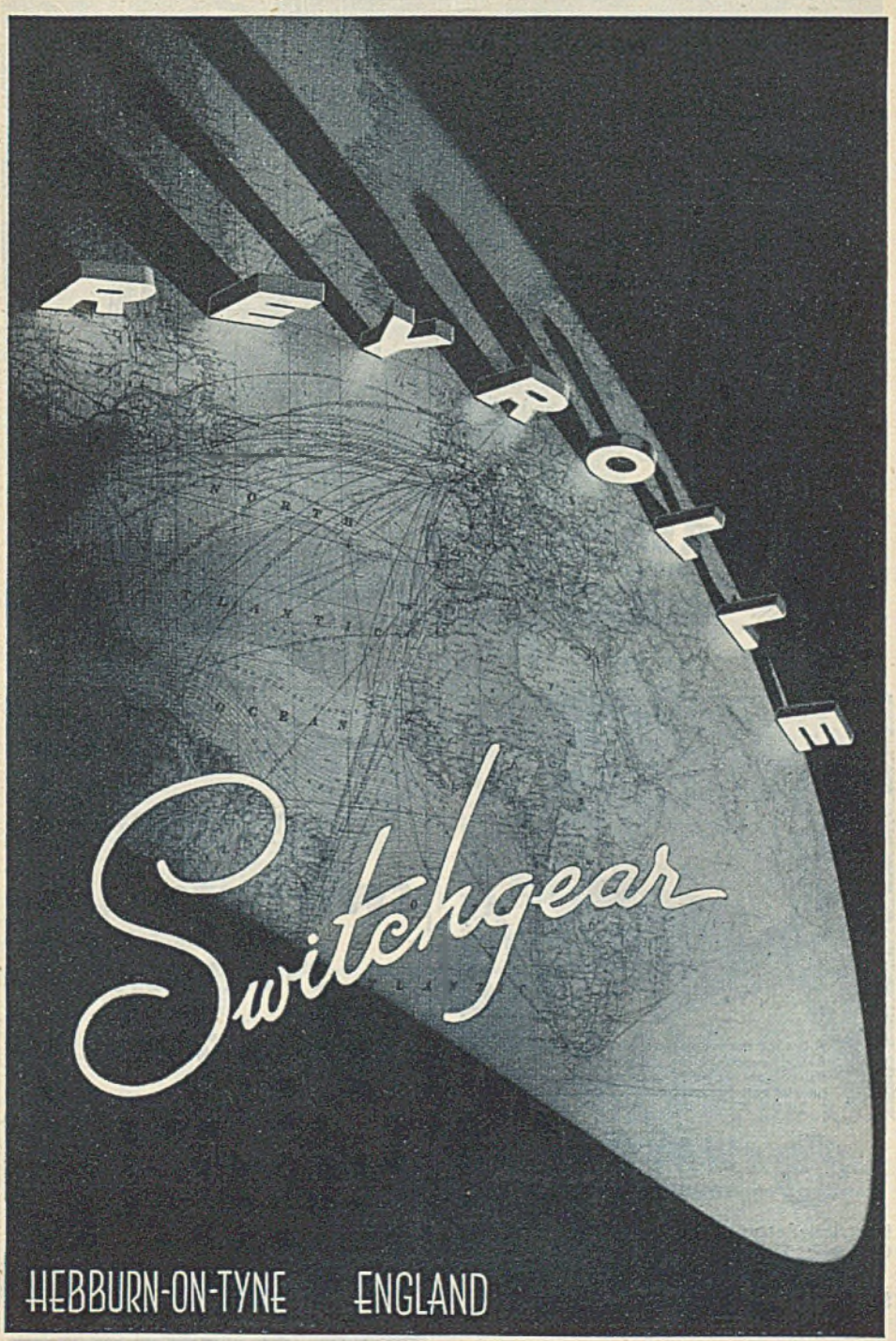
# THE ELECTRICIAN

THE TECHNICAL NEWSPAPER OF THE ELECTRICAL INDUSTRY

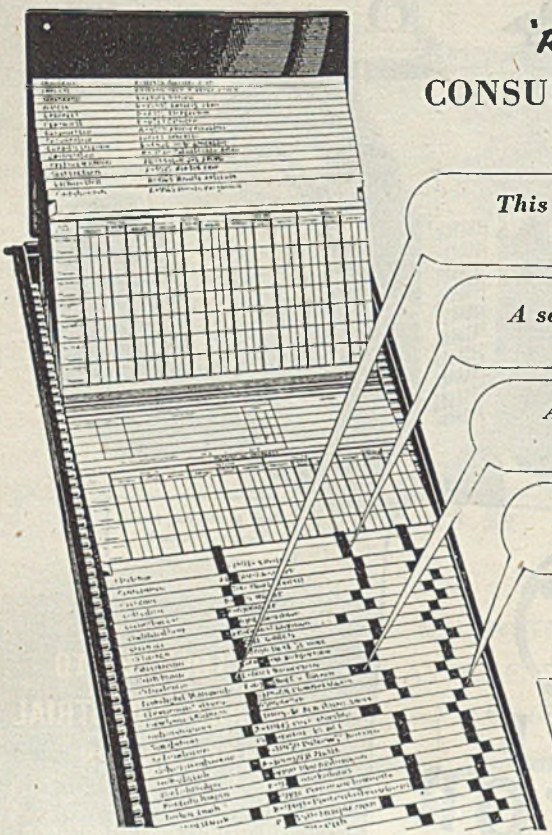


16 MAY, 1947
SIXPENCE


REYROLLE
Switchgear
HEBBURN-ON-TYNE ENGLAND

# No-it doesn't actually speak!

## 'RONEODEX' CONSUMER'S RECORDS



*This is a hire-purchase account*

*A service call is due here*

*A water-heater is in use here*

*These are industrial premises*

In place of a multitude of pages in difficult-to-get-at books, Roneodex automatically sorts out the facts you want to know and signals them at a glance. No matter how complicated or diverse your record-ing problems are, Roneo can provide all the answers with Visible Records.

**IT'S A LONG QUEUE THAT HAS NO TURNING! . . .**

**Because Roneo equipment is much in demand, both abroad and at home, there is a long waiting list. Forward-looking business will plan ahead!**

## call in RONEO and do the job properly

RONEO LTD., 17, SOUTHAMPTON ROW, LONDON, W.C.1. *Tel.:* HOLborn 5821. *Works:* Romford, Essex
*Branches throughout the country.*

# INDEX TO ADVERTISERS IN THIS ISSUE

# E.L.M.A.

## RETURN AND RE-USE OF PACKING MATERIAL

★ PACKING MATERIAL is still in short supply and the Electric Lamp Industry has been specially asked by the Government to increase economies.

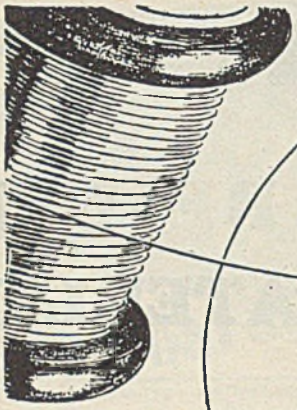
★ BULK LAMP CONTAINERS should be carefully preserved and those in good condition returned for re-use.

★ HAND THEM to the Lamp Maker's vanman or send them by rail to the Lamp Maker's nearest Depot.

★ YOUR CONTRIBUTION will save material and help to maintain your lamp supplies.

★ ★ ★

*Issued by the Electric Lamp Manufacturers' Association*



# Wire

Electrical wire may be fine and small—sometimes finer than human hair—but its importance is invariably

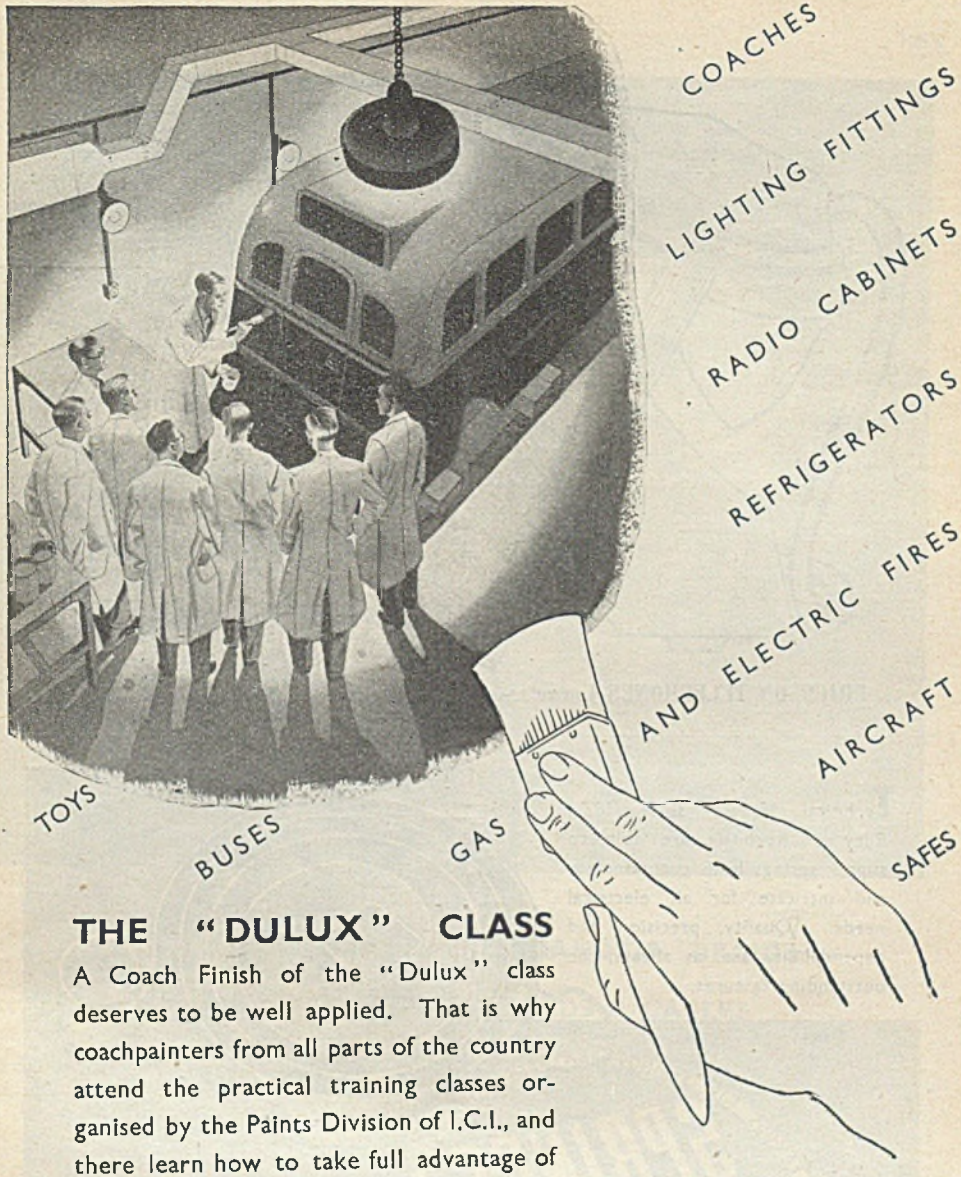
out of all proportion to

its size and cost. Resolving the problems relating to the correct type of insulated wire for specific applications is one of our jobs, because we believe we "know something" after specializing for over 60 years.

The selection is made easier for the reason that we make only first-class wires with insulations of all types—

LEWCOS INSULATED CONDUCTORS (Regd.)

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
LEYTON, LONDON, E.10




## THE "DULUX" CLASS

A Coach Finish of the "Dulux" class deserves to be well applied. That is why coachpainters from all parts of the country attend the practical training classes organised by the Paints Division of I.C.I., and there learn how to take full advantage of the special properties of "Dulux"—a fine finish with exceptional durability.

**IMPERIAL CHEMICAL INDUSTRIES LIMITED**
**PAINTS DIVISION** ICI **SLOUGH, BUCKS**
*(successors to Nobel Chemical Finishes Ltd.)*
*Telephone:* Slough 23851
D.I.747

# MISCELLANEOUS ADVERTISEMENTS

## SITUATIONS FILLED

### COUNTY BOROUGH OF PRESTON.

JUNIOR MAINS ASSISTANT.

THIS situation has now been filled. All applicants are thanked.

## SITUATIONS VACANT

### COUNTY BOROUGH OF BRIGHTON.

BRIGHTON TECHNICAL COLLEGE.

Principal: G. E. Watts, M.A., Ph.D., F.R.I.C.

APPLICATIONS are invited for the appointment of a LECTURER IN ELECTRICAL ENGINEERING who should hold an Honours Degree in Engineering or equivalent professional qualification. Duties will include teaching of Telecommunications up to Final Degree standard.

Salary will be in accordance with the Burnham Technical Scale with full allowances for approved research, industrial and teaching experience and for war service. The person appointed will be required to take up duty in September, 1947.

Further particulars and form of application may be obtained from the undersigned. The completed form should be returned with copies of two recent testimonials to The Principal, Technical College, Brighton, 7, within two weeks of the appearance of this notice.

W. G. STONE,
Education Officer.

Education Office,
54, Old Steine,
BRIGHTON, 1.

### CITY OF LINCOLN.

ELECTRICITY DEPARTMENT.

APPLICATIONS are invited from suitably qualified persons for the following positions at their St. Swithin's Generating Station:—

(1) **Chemist.**—Class "G," Grade (7) of the National Joint Board Schedule at present £494 rising to £524 per annum.
Candidates must have had extensive experience in the analysis of water, oil and fuel, also be conversant with boiler feed treatment, metallurgy and other chemical work appertaining to Generating Station practice.

(2) **Two Shift Charge Engineers.**—Class "G," Grade (8) of the National Joint Board Schedule at present £467 rising to £476 per annum. Candidates must have had a thorough technical and practical engineering training, and be experienced in the operation of large steam turbo-alternators, switchgear, high pressure boiler and auxiliary plant in a modern Generating Station.

The selected candidates will be required to pass a medical examination and to contribute to a Superannuation Scheme under the provisions of the Local Government Superannuation Act, 1937.

Applications to be made on the Application Form which must be returned together with copies of not more than three recent testimonials, in order to reach the undersigned not later than the 31st May, 1947, and enclosed in a sealed envelope appropriately endorsed.

Canvassing either directly or indirectly will be a disqualification.

F. NEWEY, M.I.E.E.
(City Electrical Engineer and Manager.)

Electricity Offices,
Brayford Side North,
LINCOLN.
1st May, 1947.

## SITUATIONS VACANT

### COUNTY BOROUGH OF HUDDERSFIELD ELECTRICITY DEPARTMENT.

APPOINTMENT OF ENGINEERING DRAUGHTSMAN.

APPLICATIONS 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, toegther 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, £402/417 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.

APPLICATIONS 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 £571/601 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.

### LONDON COUNTY COUNCIL.

ELECTRICAL ENGINEERS required in Chief Engineer's Department, with experience in drawing office work and the preparation of specifications for electrical installations in large buildings. Should hold the Higher National Certificate or its equivalent.

Salary up to £580 per annum according to qualifications and experience.

Selected candidates will be subject to the provisions of the Local Government Superannnuation Act, 1937.

Application forms obtainable by sending stamped addressed foolscap envelope to the CHIEF ENGINEER (quote 47/1), County Hall, Westminster Bridge, London, S.E.1, returnable with copies of three recent testimonials by 30th May, 1947.

Canvassing disqualifies. (1521.)

## SITUATIONS VACANT

### METROPOLITAN BOROUGH OF POPLAR.

APPOINTMENT OF ASSISTANT MAINS ENGINEER.

APPLICATIONS are invited for the appointment of Assistant Mains Engineer. Candidates are required to have had a sound technical training and previous experience of the operation, maintenance and development of a modern distribution system. Experience in the estimating of costs associated with the design and layout of E.H.T. and L.T. networks, the siting of sub-stations and installation of services connected with a heavily industrialised area will be considered an advantage.

Candidates should possess technical qualifications equivalent to those required for the Associate Membership of the Institution of Electrical Engineers.

The appointment is a permanent one and will be subject to the terms of the Agreement of the National Joint Board of Employers and Members of Staff for the Electricity Supply Industry, and to the provisions of the Council's Superannuation Acts. The selected candidate will be required to pass a medical examination and the appointment will be terminable by one month's notice on either side.

The salary will be in accordance with Class "G," Grade 6, of the National Joint Board Schedule, at present £567 per annum.

Applications stating age, present salary, full particulars of training and practical experience, accompanied by copies of three recent testimonials should be addressed to the undersigned endorsed "Assistant Mains Engineer—Electricity Department," and must be received not later than 9 a.m. on 24th May, 1947. Canvassing Members or Officers of the Council, either directly or indirectly, will disqualify.

S. A. HAMILTON,
Town Clerk.

Poplar Town Hall,
BOW ROAD, E.3.
12th May, 1947.

### THE YORKSHIRE ELECTRIC POWER COMPANY.

CHARGE ENGINEER.

APPLICATIONS are invited for the position of Charge Engineer at Mexborough generating station (60 MW).

Candidates should have had a sound technical education and training and have had operating experience with E.H.T. switchgear.

Apply stating age, training, experience and present position to GM/GH, The Yorkshire Electric Power Company, Bramhope, Leeds.

### MID-LINCOLNSHIRE ELECTRIC SUPPLY CO. LTD.

TWO CONSUMERS' ASSISTANTS.

APPLICATIONS are invited for the above appointments at a commencing salary of £364 per annum.

Applicants should give their experience in the following branches of work:—1. Preparation of specifications and estimates for wiring. 2. Installation work on Consumers' premises. 3. Consumers' Department organisation. 4. Rural, industrial and domestic load development.

The successful applicants will be required to participate in the Company's Superannuation Scheme.

Applications endorsed "Consumers' Assistants," giving age and particulars of education, training, experience and qualifications, accompanied by copies of recent testimonials, should be addressed to the Consumers' Engineer, Mid-Lincolnshire Electric Supply Co. Ltd., North House, Grantham, Lincs, and should be received not later than 28th May, 1947.

## SITUATIONS VACANT

### METROPOLITAN BOROUGH OF POPLAR.

APPOINTMENT OF POWER STATION MAINTENANCE ENGINEER.

APPLICATIONS are invited for the appointment of Power Station Maintenance Engineer, at the Council's "Selected" Generating Station at Watts Grove. Candidates must have had a thorough practical Engineering training, and be experienced in the operation and maintenance of Turbines and Stoker Fired Water Tube Boilers and Ancillary Plant. Corporate Membership of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers would be an advantage.

The appointment is a permanent one and will be subject to the terms of the Agreement of the National Joint Board of Employers and Members of Staff for the Electricity Supply Industry, and to the provisions of the Poplar Borough Council (Superannuation) Acts, 1911-1937. The selected candidate will be required to pass a medical examination and the appointment will be terminable by one month's notice on either side.

The salary will be in accordance with Class "G," Grade 5, of the National Joint Board Schedule, at present £602 per annum.

Applications stating age, present salary, full particulars of training and practical experience, accompanied by copies of three recent testimonials should be addressed to the undersigned endorsed "Power Station Maintenance Engineer—Electricity Department," and must be received not later than 9 a.m. on 24th May, 1947. Canvassing Members or Officers of the Council, either directly or indirectly, will disqualify.

S. A. HAMILTON,
Town Clerk.

Poplar Town Hall,
BOW ROAD, E.3.
12th May, 1947.

### COUNTY BOROUGH OF PRESTON.

ELECTRICITY UNDERTAKING.

**Appointment of Boiler House Engineer.**

APPLICATIONS are invited for the position of Boiler House Engineer (shift duties) at the Ribble Generating Station, from suitably qualified Engineers.

Candidates must have had technical and practical training in mechanical engineering and considerable experience in the operation and maintenance of high pressure water tube boilers and ancillary plant of modern design.

The salary and conditions of service will be in accordance with the National Joint Board Schedule, Class J, Grade 9, at present £425/445 per annum.

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

Applications, stating age and giving full particulars of technical qualifications, training and experience, accompanied by not more than two testimonials, and endorsed "Boiler House Engineer," must be received by the undersigned not later than Friday, the 30th May, 1947.

G. A. ROBERTSON,
M.Sc.Tech., M.I.E.E., M.I.Mech.E.,
Borough Electrical Engineer.

40 and 41, Lune Street,
PRESTON.
7th May, 1947.

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

### CITY OF BRADFORD ELECTRICITY DEPARTMENT.

APPLICATIONS are invited for the following positions:—

(a) SHIFT CHARGE ENGINEER.—Salary, N.J.B. Schedule, Class H, Grade 8 (at present £481 - £507 per annum). Applicants must possess sound technical and practical training in mechanical and electrical engineering, and experience in the operation of high pressure boiler and turbo-alternator plant. They must be Corporate Members of the Institution of Mechanical Engineers and/or the Institution of Electrical Engineers.

(b) TWO MAINS ASSISTANT ENGINEERS.—Salary, N.J.B. Schedule, Class H, Grade 9 (at present £402 - £417 per annum). Applicants must possess sound technical training and experience in the routine work of a large urban mains system having 33 kV main transmission, 6.6 kV underground and overhead distribution, 3-phase M.V. network, together with 3-wire D.C. and 500-volt traction supplies. They should be Corporate Members of the Institution of Electrical Engineers or have passed examinations leading to Corporate Membership.

(c) JUNIOR MAINS ASSISTANT.—Salary, N.J.B. Schedule, Class H, Grade 10a (at present £316 per annum), rising after one year's satisfactory service to Grade 10 (at present £329 - £347 per annum). Applicants must have sound technical training and experience in the operation of H.V. and M.V. A.C. and D.C. distribution systems.

(d) INSTALLATION ASSISTANT ENGINEER.—Salary, N.J.B. Schedule, Class H, Grade 9a (at present £365 - £381 per annum). Applicants must have experience in the technical and practical side of a Consumers Engineer's Section, including the preparation of specifications and estimates for all types of electrical work. They should also be capable of dealing with consumers' queries on power problems and with the remedying of faults on and general maintenance of consumers' installations and domestic appliances. Preference will be given to applicants who are Corporate Members of the Institution of Electrical Engineers or have passed examinations leading to Corporate Membership.

The selected candidates for the above positions will be required to pass a medical examination and contribute to a Superannuation Scheme under the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age, whether married or single, and giving details of education, technical training and experience, together with copies of not more than three recent testimonials, to be sent to Mr. T. H. Carr, M.I.C.E., Electrical Engineer and Manager, 45-53, Sunbridge Road, Bradford, so as to reach him not later than 3rd June, 1947.

W. H. LEATHEM,
Town Clerk.

Town Hall,
BRADFORD.
May, 1947.

DRAUGHTSMEN and Designers are required by Midlands electrical manufacturers of transformers. Experience up to 500 kVA at least desirable.—Applications with particulars of experience and salary expected, in confidence, to Box L.E.S., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

ARMATURE 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.

## SITUATIONS VACANT

### FIRST GARDEN CITY LIMITED.

THE following vacancies are open:—

(a) SHIFT CHARGE ENGINEER, for generating station, N.J.B. conditions, Grade 8, Class F, commencing salary £442 p.a.

(b) RELIEF SHIFT CHARGE ENGINEER, as above, Grade 8a, Class F, commencing salary £413 p.a.

(c) 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.

ELECTRICAL Equipment Draughtsman, preferably with wiring diagram experience and general maintenance electrical work. Payment according to A.E.S.D. scale.—Applications in writing to Personnel Manager, British Enka Ltd., Aintree, Liverpool.

DRAUGHTSMAN required for development work on Automatic Telephone Exchange Equipment. Apply in writing giving particulars of qualifications, experience, age and salary required to:—Ref.: 634, Siemens Brothers and Co. Limited, Woolwich, S.E.18.

## EDUCATIONAL

### THE CAROLINE HASLETT TRUST.

THE Trust invite applications for the award of a Travelling Exhibition tenable in Sweden during the autumn of 1947.

The holder will, for a period of two to three months, study in Sweden the manufacture and use of domestic electrical equipment, visit Home Economics Departments, and generally examine the progress of domestic electrification in the country.

Owing to Government restrictions on sterling exports the value of the exhibition cannot exceed £225, plus travelling expenses to and from Sweden.

Applicants must hold the Diploma in Electrical Housecraft awarded by the Electrical Association for Women.

Application forms, which must be returned before 1st June, 1947, may be obtained from:—

The Caroline Haslett Trust,
35, Grosvenor Place,
London, S.W.1.

## FOR SALE

55 KW. 400/440 volts, 3-phase, 50 cycles, 4-wire system, Diesel engine driven, ALTERNATOR SETS.—Horseshoe Supply Co. (Spalding), Ltd. 'Phone: Spalding 3088, Horseshoe Road, Spalding.

100 BY 19 in. Vitreous Enamel Green Flameproof Reflector Fittings. Offers invited.—H. Russell Ltd., Kirkby Trading Estate, near Liverpool.

"RELIABLE" 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.

## FOR SALE

TELEPHONES, Ex-Admiralty for Ships, Mines, Factories. Handsets, Jacks and Plugs, Indicator Lamps and Jacks. 25 000 RELAYS (20 types), 150 000 yds. Sleeving. Switch Keys. Five tons Ebonite and Fibre rod, sheet and tube. 5 line Switchboards. 10 line Portable metal switchboards. Accumulator Capacity Testing sets. 5 bank Indicators and Jacks. 4 way flat and concentric Jacks and Plugs. Resistance wires, Nichrome, Cupro Nickel, Eureka and Constanton. Laminations, Interleaving Paper. Call and inspect.—Jack Davis, 30, Percy Street, London, W.1. Museum 7960.

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

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

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

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

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

DE luxe model door chimes. Protectafil shock absorbers, radio transformers and rewinds, chokes, starter switches, 2 and 3 kW immersion heaters. Send for list.—J. E. Wildbore, 26, Marlborough Street, Oldham, Lancs.

LIGHT ALLOY SHEETS available in large quantities for immediate delivery ex-stock in all gauges from 6 ft. by 2 ft. to 8 ft. by 4 ft. from 1s. 6d. to 2s. per lb.; also Light Alloy Tubes, Bars, Strip, Coils, Angles, etc. —Box L.E.N., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

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.

**DYNAMO & MOTOR REPAIRS LTD.,**
**Wembley Park, Middlesex.**
Telephone: Wembley 3121 (4 lines).
**Also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.**
Telephone: Northern 0698.

**REBUILT MOTORS AND GENERATORS.**
Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.
SEND US YOUR ENQUIRIES.
OVER 1 000 RATINGS ACTUALLY IN STOCK HERE.

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

## FOR SALE

SPECIAL OFFER of Government surplus new timber window sashes: Size 4 ft. by 2 ft., 21s. each; 4 ft. 6 in. by 4 ft., 23s. 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.

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.

LAMPSHADES. Modern designs, beautifully executed at attractive prices. Generous trade terms. Agents wanted.—Thanet Industries (Kent), Clarence Road, Ramsgate.

HEAVY-DUTY ARC-WELDING PLANTS.—200 amps. Price £36 10s. complete. Also Spot Welders. £48 10s.—John E. Steel, Clyde Mills, Bingley. 'Phone 1066.

1—WESTINGHOUSE Slip Ring Induction Motor, 400 volts 3 phase 50 cycles, 120 h.p., 205 r.p.m., with Control Gear.—Oldfield Engineering Company Limited, 96, East Ordsall Lane, Salford, 5.

FOR SALE, 20 H.P. SCOTT D.C. MOTOR AND Starter, good order.—J. P. Williams, Gobowen.

STEEL Wire Cable, 1 000 drums, ex-Govt., unused, in perfect condition, suitable for stays, for poles carrying loads, ⅛ in. diameter, 200 yds. per drum. Sample drum sent passenger train on receipt of £4.—H. J. Boulting, 2, West Holme Street, Leicester. 'Phone 22859.

FOR SALE.—Insulated Copper Wire, 272 lbs. 26 S.W.G., Pigenam Type "1" Grey, 3 000 lbs. of 26 S.W.G. Pigenam Type "2" Natural, 950 lbs. 28 S.W.G. Enamelled and Single Rayon Covered (Mils of covering 2.9). —Box L.E.T., "THE ELECTRICIAN," 154, Fleet Street, London, E.C.4.

FOR SALE.—Two Morrison 50 cwt. Electric Battery Vehicles. 1939 Models, complete with Westinghouse Metal Rectifiers. All good condition.—Brickwood and Co. Ltd., The Brewery, Portsmouth.

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

COWARDS (Engineers) Ltd., Stoke Gifford, near Bristol. 50-h.p. Crompton Parkinson, 2 920 r.p.m., type S.R., B.B.; 45-h.p. B.T.H., 725 r.p.m., type S.R., R.O.; 45-h.p. G.E.C., 970 r.p.m., type S.R., R.O.; 40-h.p. Mather and Platt, 1 450 r.p.m., type S.R., R.O.; 10-h.p. A.E.G., 720 r.p.m., type S.R., R.O. All the above are suitable for 3-phase, 50 cycles, and available for early delivery.

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

A.C./D.C. Motors can be supplied from stock or at short notice.—JOHN PHILLIPS AND CO., ELECTRICS, 31, Fortune Green Road, N.W.6. Hampstead 8132.

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. Bermondsey 3449.

## FOR SALE

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 1⅜ in. by 1⅜ in. by 8½ in. Price £1 6s. each net. Carriage extra.—Write Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel.: GER. 1461/2/3.

FLUORESCENT LIGHTING. — 30 watt fitting complete with self-contained control gear and 36 in. tube, £6 12s. 6d. Immediate delivery with guaranteed component and tube replacement service.—Apply Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel.: GER. 1461/2/3.

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## WANTED

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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 8132.

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

## WANTED

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ELECTRIC MOTORS WANTED, any h.p. from 1 up to 100 h.p., with starters, for 400 volts, 3-phase, 50 cycles. S.C. or Slip Ring. Also Geared Motors 1 to 10 h.p.—Edward Booth, Booth Street Mill, Congleton, Ches. 'Phone 375.

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

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ARMATURE rewinds.—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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## NOTICES

### UNIVERSITY COLLEGE, LONDON.

PROFESSOR R. O. KAPP'S Course on THE PRESENTATION OF TECHNICAL INFORMATION will be repeated at the request of many who were not able to gain admission.

The repeated Lectures will be delivered on MONDAYS, JUNE 2nd, 9th, 16th and 23rd at 5.30 p.m., at
THE INSTITUTION OF ELECTRICAL ENGINEERS,
Savoy Place, Victoria Embankment, W.C.2. Syllabus may be obtained from Assistant Secretary, University College, London, Gower Street, W.C.1 (stamped envelope required).

## PATENT AGENTS

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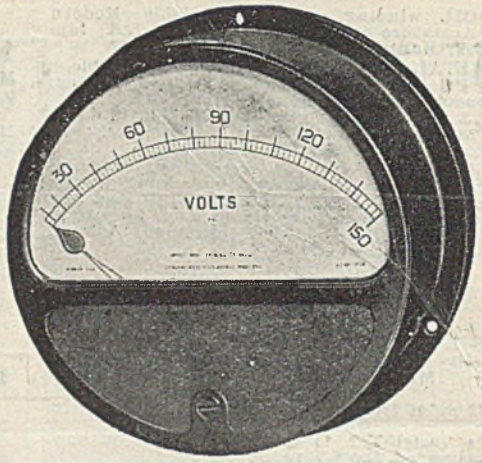


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# Station Siting

THOSE engaged in the controversy centred about the Government decision to permit the erection of a new power station on the Bankside site at Southwark, appear to assume that the schemes for the re-building of London are in fact economically possible, and that they are likely to be put into effect within a measurable period of time.

Sites for new stations are not easy to find and, bearing in mind the fact that the Central Electricity Board programmes for the five years 1946 to 1950 provide for the building of eighteen new stations, delays in construction resulting from the opposition which is raised every time a station is sited, aggravate the position. In determining the location of new stations consideration has to be given to a number of factors, including transport facilities for fuel, the anticipated incidence of the load, the capacity of the grid transmission system, and any extension of that system which may be involved.

Those opposing the Bankside station site have been informed of these things and, while admitting them to be reasonable from an engineering point of view, withhold agreement to the building of the station on the site chosen, in the hope that in its stead gardens may be laid out, affording a full view of the river with St. Paul's in the background. An inspection from the river bank at Southwark shows that the north shore opposite has little to offer from a scenic standpoint and though the dome of St. Paul's, as the opposition contends, is clearly visible, the view is already

marred by commercial buildings. It has been suggested that the erection at Bankside of a new power station would eclipse the grand old cathedral even further, but from what location has not yet been made sufficiently clear; surely not from the site of the proposed promenade, for if this is to be laid out along the river front, the station would be behind the observer.

## Town Planning and Fundamentals

THE controversy which has in recent years accompanied the siting of new stations, has about it in most cases an insufficient appreciation of the fact that town planning cannot ignore fundamental requirements. Whatever may be desirable in the future, we must meanwhile live, and if we are to live we must work—two necessities in the meeting of which electricity plays so increasing a part that the building of new power stations to supply it has become a major national issue. We offer no defence of the Bankside or any other site, in that there are many more qualified to deal with the questions raised, but any town planning scheme which does not include provision for the erection of new power stations must surely be regarded as falling short of its requirements. The demand for new stations cannot be in question and yet the London plans, designed to make the city an example for all other town planners to follow, appear to make no long term arrangements for electricity service, while their promoters, instead of looking upon any remedy of the omission as adding to the value of the plans, regard it as a challenge.

## Power Load Danger

RUNNING parallel with the generating station controversy is the question of reducing the power load next winter, so that existing generating capacity may not be overtaxed and industry be denied supplies. In an attempt to find an answer to the problem, the Ministry of Supply has made available materials for the manufacture of Diesel-electric sets, by the use of which it is hoped by next summer to reduce the deficiency between power station capacity and demand by some 15 per cent. British manufacturers of these small sets now rank for raw materials immediately after the makers of power station plant, and it is hoped by their efforts that firms engaged in work of national importance will instal Diesel-electric plant of a capacity to carry at least a third of the load now met by the grid. Details of the arrangements are given at length in this issue and though an indication of the response to the scheme will not, of course, be immediate, some appreciation of the acceptance of the idea may be given by the load curves built up next winter.

## Electricity Area Boards

ADDRESSING delegates of the E.T.U. at a conference at Margate last week, the Minister of Fuel had something to say with respect to the composition of the area boards which form part of the nationalisation plan. The Government, he said, has provided for representation on the boards of those who have had extensive organisation experience, and intended to appoint personnel only after consultation with the unions. It was not always, he continued, the most popular man who was best fitted to serve on a board and provision must be made, therefore, for the utmost possible consultation between the workers' representatives themselves and those who were appointed to the boards. We are not quite sure what this means, but if our understanding is correct, the E.T.U. and perhaps others are seeking to determine the technical level of the area boards, when in fact that level should be decided by the location of the area, its size, the nature of the load it offers, the generating capacity in the area, the size of the units which make up that capacity, and so on; all conditions which the E.T.U. members would, no doubt, admit themselves are difficult to assess without first-hand experience of public electricity supply to guide them.

## Nationalisation Committee

SIGNIFICANCE of Mr. SHINWELL'S reported remarks at Margate was made perhaps a little clearer on Tuesday when, in the House of Commons, he announced the setting up of an Organising Committee for the Electricity Industry under the chairmanship of Lord CITRINE, whose long association with the trade union movement is well known. The purpose of the Committee is to make the necessary plans to take over the industry when the Nationalisation Bill becomes an Act, and its members, in addition to

Lord CITRINE, will be Sir JOHNSTONE WRIGHT and Mr. J. HACKING, of the Central Board, Lt.-Col. E. H. WOODWARD, of the North East E.S. Co., Mr. J. ECCLES, of Liverpool, and Mr. E. W. BUSSEY, of the E.T.U.—advised and assisted by the Electricity Commission. The new set-up will quite understandably cause something of a reorientation of personalities in the supply field and first evidence is the resignation of Mr. HAROLD HOBSON from the chairmanship of the Board as from July 31, without any indication of his future intentions, and the appointment of Sir JOHNSTONE WRIGHT as his successor.

## Preparing the Industry

THE industry will take note in connection with the setting up of the Organising Committee, that though no official date has yet been given to the vesting day, Lord CITRINE has already expressed a willingness to accept the chairmanship of the British Electricity Authority if and when the supply industry is nationalised, indicating thereby that effect to the new organisation is relatively near, in anticipation if nothing else. Meanwhile the appointment of a preparatory Committee of members so strong in technical qualifications and administrative skill as those named, is something of an assurance against too great a play by political influences. Made up of four engineers and two trade union personalities, the Committee has no small task to perform, and judging from their long established enthusiasm for the industry, the engineers at any rate may be relied upon to do their best to steer official direction along a course which will finally lead the industry to new surroundings as technically sound as the new set-up will allow; a course which well be followed by everyone with close attention and critical interest.

## Redundancy of Employees

WHILE attending the E.T.U. conference at Margate, Mr. SHINWELL also spoke on redundancy and pointed out that the Government intended, so far as the electricity supply industry was concerned, to safeguard the rights of every employee. If certain rights had been acceded to in the past they would be accepted as an obligation imposed on the new authority. That affected compensation for persons who might be regarded as redundant. He wished that every person could be employed in the industry, but it might be that some would become surplus because of re-organisation. In these circumstances there must be a measure of compensation. There was also the question of pensions, and this matter, too, would be safeguarded. What arrangements have been made to honour these promises cannot be said with certainty until the Electricity Bill becomes an Act, but the position obviously warrants the close attention of those organisations in the industry concerned with the protection and welfare of supply personnel.

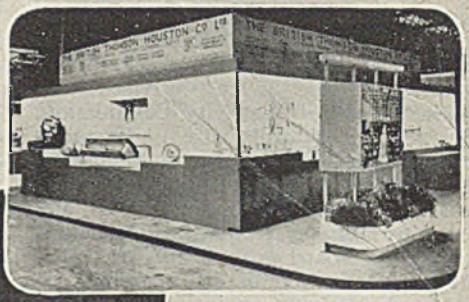
## Automatic Control Convention

ON May 19 Mr. JOHN WILMOT, Minister of Supply, will introduce a four-day convention dealing with automatic control and servo mechanisms organised by the Measurements Section, acting on behalf of the Council of the I.E.E. Automatic control was the subject of important development by all the Services during the war and the rapid advance made in design permitted tasks, which had hitherto required highly trained and skilled operators, to be performed with a greater degree of precision and reliability either by unskilled operators or entirely automatically. It will be apparent that this is precisely the type of control required in many trades and it is the purpose of the convention to relate the military achievements of automatic control to industry.

## E.A.W. New Headquarters

THE change of venue for the twenty-second annual conference of the E.A.W. from Southport to London was not regretted by the many provincial delegates who journeyed to town this week in that they were, among other things, afforded an opportunity of attending a "house warming" at the new headquarters of the association at 35, Grosvenor Place. The association has related its electrical education for the time being to the national fuel economy campaign, and a feature of the visit was an exhibition illustrating by means of apt slogans composed by the staff and attached to various domestic appliances, how economies in domestic consumption can be effected, and how cookers and apparatus other than fires can be used to the best advantage.

# SOME STANDS AT THE FAIR




*The B.T-H. stand at Castle Bromwich, where lighting features were shown, among other developments*

*Motors formed the chief interest on the stand of Newman Industries, Ltd.*



*View of some of the English Electric Fuse-gear displayed*

*Above, the D.P. Battery display at Birmingham, and right, the Marconi exhibit at Olympia*

# LIGHTWEIGHT TRACTION MOTOR

## EXPERIMENTAL INSTALLATION ON THE SOUTHERN RAILWAY

*Brief details of a ventilated machine developed to meet the needs of both suburban and express services. It is claimed that the motor lessens bogie and track stresses and saves fuel.*

FROM the inception of d.c. electric traction on the L.S.W.R. in 1915 to the present time it has been the policy of the S.R. to use totally-enclosed traction motors on its electric multiple-unit stock.

The increase in number of electric vehicles, coupled with improvements in traction motor design, has, however, indicated that the adoption of a lighter ventilated motor for both suburban and express services would have considerable advantages.

In anticipation of these needs, the development of a suitable motor was undertaken as opportunity offered during the war and the first four of the new machines have recently been completed for suburban service on a four-coach unit. The motors have tapped fields, and are so designed that on full field they reproduce the characteristics of the standard type 339 suburban machine; the standard express, type 163, motor performance being obtained with weakened field. They can, therefore, be used on either type of service.

The appearance of the motor as mounted on the bogie is shown in Fig. 1, the fan being at the pinion end of the shaft. The commutator cover has been removed; and behind it, to the left, can be seen the air inlet flange. Six connecting leads are shown; the sixth lead (3rd from right) is the power circuit negative return connection to the motor frame.

The use of roller axle suspension bearings in addition to armature bearings is very attractive from a maintenance viewpoint, and their adoption has been carefully considered. It was finally decided, however, that, successful as these had been on traction systems with insulated return, their use on a running rail return system might lead to trouble.

Under heavy current conditions, *e.g.*, overload or fault on the power circuit, it is difficult to shunt such bearings effectively with an axle earth-brush arrangement, and in view of the damage likely to result from pitting of races and rollers it was felt to be advisable to retain the sleeve type. Improvements have, however, been made in these also. In place of the usual heavy cast steel bearing caps and oil boxes, fabricated top caps and oil boxes have been provided which are 50 per cent. lighter and have 100 per cent. greater oil capacity.

As this was a trial installation the additional provision required for self-ventilated motors was arranged in such a way as to involve minimum alteration to the coach bodywork and underframe, and in the unlikely event of the new motors not proving satisfactory, they could be replaced by standard 339 motors with little trouble. Providing for this contingency necessitated motor leads longer than they will be in the final design, to enable them to be brought back to an existing connection box.

The ventilating air is drawn through ducting in the guard's van from a settling chamber supplied from louvred openings in the coach roof. Each motor requires a volume of cooling air which rises to 600 cu. ft. per min., at 60 m.p.h., and as no running experience under Southern conditions was available, the settling chamber in the van roof was included in the layout so that as much as possible of the dust and moisture in incoming air could be deposited clear of the motors. The ultimate aim is an arrangement which will run between major motor overhauls (a period of 12-16 months) with-

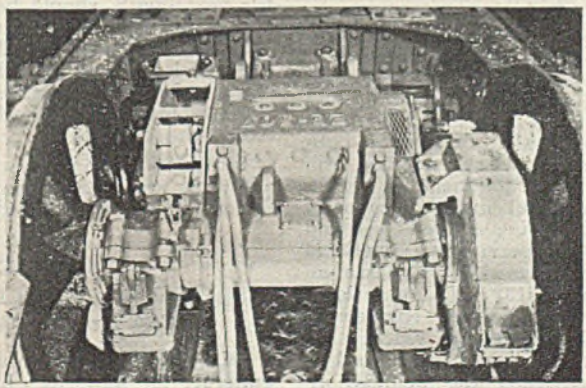


*Fig. 1.—Lightweight motor in position on bogie*

out cleaning being at all necessary.

COMPARATIVE PARTICULARS OF THE THREE MOTORS

| Motor | 339 | 163 | Light-weight |
|---|---|---|---|
| Total weight* (tons) | 3.6 | 3.38 | 1.92 |
| H.P. max. accelerating ... ... | 300 | 210 | 300 |
| H.P. continuous ... | — | — | 180 |
| Type ... ... | Totally enclosed | Totally enclosed | Ventilated |
| Max. safe armature speed ... ... | 1 600 r.p.m. | 1 680 r.p.m. | 2 550 r.p.m. |
| Gear ratio ... ... | 21 : 59 | 23 : 57 | 17 : 65 |
| Bearings ... ... | Sleeve | Sleeve | Roller |

* Includes gears and gearcase.

The motors and the equipment were made by the English Electric Co., Ltd.

# Correspondence

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

### Training Power Engineers in India

[TO THE EDITOR]

Sir,—I solicit the courtesy of your columns in the hope that I may have the benefit of your readers' comments and experience.

We in India have been considering for some time the training of engineers for the projected electric power development in this country. For this purpose, an expert committee was formed, including among its members some of the foremost scientists and engineers, and the Electrical Commissioner with the Government of India, in order to prepare a scheme for the establishment of a suitable institution. I have the privilege of serving on this committee, and have been in a large measure responsible for drawing up the plan.

The course is to be a post-graduate one, of two years duration and the establishment will be equipped with all the essentials and laboratories requisite to turning out a first-class power engineer, both thermal and hydro. The institution will include among its equipment a power station with an initial installed capacity of 1 500 kVA, including a Diesel set and also a mile of experimental overhead transmission line designed for a maximum operating voltage of 132 kV. A national laboratory for high voltage engineering and research will also be provided.

The Government of India has agreed to the scheme, sanctioned the finances involved, and a department to be called the Power Engineering Department is to be opened at the Indian Institute of Science, Bangalore, the body responsible in the first instance for setting up the expert committee.

I have been asked to organise the department and have accepted. I am relinquishing by present office with the Calcutta Electric Supply Corporation, to take over the new appointment with effect from May 15, and I shall be pleased to hear from readers c/o The Indian Institute of Science, P.O. Malleswaram, Bangalore, India.

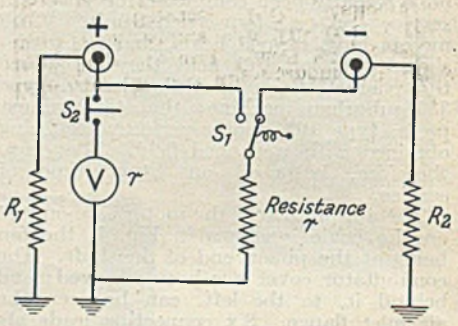
Yours faithfully,

M. S. THACKER, B.Sc., ENG., M.I.E.E.

### Insulation and Unearthed D.C.

[TO THE EDITOR]

Sir,—The article "Insulation and Unearthed D.C," by G. W. Stubbings in THE ELECTRICIAN of April 18, is quite interesting. it attracted my attention as I was




teaching one of our classes about mains testing. It is unfortunate that there are some errors in the second column of p. 100. Equation (1) should start $Gv_1 -$ and on the next line $S_1$ should be used. The last two expressions further down should have "r" instead of "v." These slips make the article difficult to follow and the inclusion of the two insulation resistances of the live mains would help the reader to follow the derivations.

I include a diagram which gives these additions and the resistance of the voltmeter (r) is also included.

Yours faithfully,

J. E. MACFARLANE.

Electrical Engineering Department,
City Technical College, Liverpool.

[Mr. Macfarlane is quite right. I am grateful to him for his correction.]—G.W.S.

# E.A.W. Conference

## Annual Meeting and Luncheon in London

THE twenty-second annual conference of the Electrical Association for Women took place in London on Tuesday and Wednesday, May 13 and 14, and was attended by about 380 delegates from 86 branches.

The proceedings opened with the annual meeting at the Connaught Rooms, Great Queen Street, at which the chair was occupied by the president, the Dowager Lady Swaythling, who, in her introductory remarks, said there was evident a spirit of great vigour and enthusiasm in the E.A.W.

The twenty-second annual report of the National Executive Committee, read by Miss Caroline Haslett, director of the association, stated that there was indication of the strengthened belief in the association's aims of electrical education and the hopes which had been growing among the women of Britain for a realisation of the electrical ideal in their own homes and surroundings. Those hopes, unfortunately, had been deferred, but the conviction remained that in the fullest use of electricity in the home lay the surest way to combined efficiency and grace in modern living.

New branches were formed at Bangor, Dudley, Erith, Halesowen, Middleton, Newport (Mon), Newport (Salop), Northallerton, Shrewsbury and Wellington. Glasgow was the first branch to celebrate its 21st birthday.

### EFFECT OF P.T. ON COOKERS

The meeting approved a resolution of the North-West area of the E.A.W. asking for the removal of the 66⅔ per cent. purchase tax on the wholesale price of electric cookers on the ground that as electric cookers were only available under high priority, this unfair tax was being charged on apparatus necessary to the life and well-being of a large section of the community; and, further, asking the Government to reconsider the imposition of the tax on vacuum cleaners in view of the small amount of energy used in their running, and to give consideration to the special needs for electrical labour-saving appliances in areas where married women were urgently required to return to industry.

The following members were co-opted to the National Executive Committee to represent the areas: N.W. England and N. Wales, Mrs. H. E. Rhodes (Preston); N.E. England, Miss Norah Balls (Newcastle); Central England, Miss G. Clay (Derby); Mid-East England, Mrs. Cowling (Bradford); East England, Mrs. P. E. Rycroft (Great Yarmouth); South-East England, Mrs. Quick (Worthing); S.W. England and S. Wales, Mrs. Pascoe (St. Austell); Scotland, Mrs. J. R. L. Wright (Ayrshire).

A ballot resulted in the election to the National Executive Council of Ald. Mrs. Armitage, president of the Watford branch; Mrs. J. A. Crabtree, president of the Walsall district branch; Miss F. E. Jones, past hon. treasurer of the association; the Dowager Lady Swaythling; and Mrs. M. Thwaits, chairman of the Manchester branch.

The hon. officers: the Dowager Lady Swaythling, president; Mrs. F. N. Rendell Baker, chairman; Mrs. A. B. Lewis, vice-chairman; and Ald. Mrs. Gregory, hon. treasurer; were re-elected.

### MINISTER'S TRIBUTE

Proposing the toast of "Electrical Education" at the luncheon that followed the annual meeting, Mr. George Tomlinson, Minister of Education, paid a tribute to the work of the E.A.W., and said we would get out of our latest difficulties; the generating plant would be manufactured and the coal would be obtained, and in the meantime he wanted the members of the association to get on with their work, because this generation, which had suffered so much as a result of the war, was entitled to the blessings that would come from electricity. He believed that having created leisure by popularising electrical appliances they would help him to solve the problem of educating the people in the use of leisure.

The Dowager Lady Swaythling, who presided, responded. She said that electrical education had been the association's theme for over 22 years as they were convinced that the introduction of scientific labour-saving methods in all homes would free women from drudgery and give them home and the interests of their husbands and children and also enable them to take a more active part in the affairs of the community.

In the afternoon the members attended a "house warming" and fuel economy exhibition at the new headquarters of the association, and tickets were available for a party to go to the British Industries Fair ball at the Dorchester Hotel. Arrangements were made for parties of delegates to visit the British Industries Fair at Olympia and Earl's Court on Wednesday afternoon.

Owing to the difficulty in obtaining handicaps the golf competition planned for Wednesday afternoon was postponed.

# • 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.*

SIR CLIFFORD PATERSON, on the joint recommendation of the presidents of the Royal Society and the Institution of Civil Engineers, has been awarded the James Alfred Ewing Medal for 1946, for specially meritorious contributions to the science of engineering in the field of research. Sir Clifford Paterson is in charge of the research laboratory of the General Electric Co., Ltd., at Wembley. His contributions to the science of engineering in the field of research have extended over 45 years. His work at the National Physical Laboratory until 1919 and later with the G.E.C., has been outstanding in the development of new sources of illumination, in the study of their use and in their precision measurement. More recently he has co-ordinated the work of numerous teams in connection with important developments in the use of high radio frequencies. Sir Clifford was elected a Fellow of the Royal Society in 1932. He was awarded the Faraday Medal in 1945, and knighted this year.

SIR CLIFFORD PATERSON

MR. REGINALD GREGORY, who has been electrical engineer to the Mold (North Wales) Urban Council for the past 20 years, has just retired. He was the Council's first electrical engineer.

MR. LESLIE GAMAGE, vice-chairman and joint managing director of the General Electric Co., Ltd., received a silver tea service with an engraved tray from the senior staff of the home organisation of the company, and an engraved silver cigarette box and two ashtrays to match from the senior staff of the overseas organisation in commemoration of his 60th birthday on May 5. Mr. Leslie Gamage joined the company 28 years ago and was elected to the board of directors in 1925, when he assumed responsibility for the export business.

MR. G. W. ALEXANDER has been placed in charge of the mining department of Metropolitan-Vickers Electrical Co., Ltd., in succession to Mr. H. Watson-Jones, whose appointment as chief electrical and mechanical engineer to the North-western Division of the National Coal Board was announced some time ago. Mr. Alexander obtained the engineering degree of London University as a student at Brighton Technical College. He spent two periods as a vacation apprentice at Metropolitan-Vickers, and in 1931 returned to Trafford Park as a college apprentice. Two years later he joined the engineering side of the mining department. During the war Mr. Alexander went to the company's special contracts department. Recently he visited Germany as a member of a B.I.O. Sub-Committee to investigate the use of Koepe winders. Mr. E. Loynes, of the mining department of the company, has been appointed divisional electrical engineer to the North-western Division of the National Coal Board. Mr. Loynes gained the associateship of the Manchester College of Technology, and served his apprenticeship at the Metropolitan-Vickers works. In 1928 he joined the mining department, being placed in charge of the drawing office in 1929, and later moving to the engineering side. He was concerned with the design of some large electric winders for Russian coal, iron and gold mines, this entailing visits to Germany in 1932 and to Russia in 1935. From 1941 to 1944 Mr. Loynes was manager of one of the Metrovik "dispersed premises" at Timperley, where radar equipment was manufactured for Government contracts. Soon after his return to the mining department, he visited Germany as a member of the skip and cage winding investigation team organised by the Ministry of Fuel and

MR. G. W. ALEXANDER

MR. E. LOYNES

Power. Mr. Loynes has been a member of the M.E.M.E. since 1937.

MR. T. SETTLE, manager of the industrial heating and carbon departments of the General Electric Co., Ltd., and a well-known figure in the electrical industry, retired recently, after completing almost 50 years in the industry, the last 39 of which were with the G.E.C. He has been a member of the I.E.E. since 1912. Mr. Settle was educated at the Universities of Vienna and Heidelberg, and after gaining technical experience on the Continent, came to England in 1904 and joined the G.E.C. in 1908 as manager of the arc lamp and carbon department. He was responsible for much of the development in the lighting of streets and works by arc lamps and in the use of carbons for the cinematograph industry. After the first world war he took charge of the heating department of the company, with responsibility for both industrial and domestic equipment, and when, in 1926, it was split into two separate departments, Mr. Settle retained the section dealing with industrial heating. During the late war, Mr. Settle was closely connected with Arc Lamp Carbon (War Emergency) Pool. Mr. Settle has served in several B.E.A.M.A. sections and groups, and he instituted the group dealing with electric resistance furnaces, acting as its chairman for twelve years. He also represented the B.E.A.M.A. on several equipment committees of E.D.A. and B.S.I. He has been a director of United Lamp Black Works, Ltd., since the formation of that company twenty-seven years ago.

MR. T. SETTLE

LORD FORRESTER, managing director of Enfield Cables, Ltd., who, as was announced in our last issue, was seriously injured by a fall at a hydro-electric power station in Northern Portugal on May 1, is, we are informed, making slow but satisfactory progress towards recovery.

LIEUT-COL. JAMES RANKIN, director and general manager of North Wales Power Co., has been elected a Companion of the I.E.E. by the Council of the institution. He was appointed by the Central Electricity Board recently as one of the Board's representatives on the Council of the E.D.A. When the Industrial Association of Wales and Monmouthshire, representing over 450 firms, was constituted recently, Colonel Rankin was elected a member of the North Wales executive of the association.

MR. LESLIE BATES, who takes up the duties of borough electrical engineer and manager at Reading next week, is the son of Ald. J. Bates, of Nuneaton. He was educated at the King Edward VI Grammar School and the County Technical School in that town. He was mains assistant with the Nuneaton electricity department, and then at Hinchley with the Leicestershire and Warwickshire Electric Power Co., who promoted him to the position of district engineer in 1931. Mr. Bates went to Grimsby as distribution engineer in 1937, and was made deputy borough electrical engineer in 1943.

MR. ERIC COLE, on April 30, was presented with an exquisite Indian plaque in silver, copper and brass brought to him from Bombay as a memento of the Ekco dealers' conference just held in India, and as a token of goodwill from Messrs. Fazalbhoy who organised the conference. The plaque was handed over by Mr. J. F. Young (joint managing director, Ekco-Ensign Electric, Ltd.) on behalf of Messrs.

*Presenting the 7-valve Ferguson radio set to* MR. A. BRAMMER, *and a silver dressing table set to* MRS. BRAMMER, *at the annual dinner of the A.S.E.E. last week. The presentation was in recognition of* MR. BRAMMER'S *25 years' service as general secretary. The report of the proceedings was given in the last issue*

Fazalbhoy. Mr. Young has just returned from a special visit to India.

Mr. D. R. SMITH has been appointed sales manager for the home sales department of Duratube and Wire, Ltd., and succeeds Mr. R. W. Bishop, who has left the company. Mr. Smith received his technical and commercial training with Siemens Bros. and Co., Ltd. In 1928 he joined the sales staff of the London Electric Wire Co. with whom he served until 1946. Mr. John W. Tydeman has been made the manager of the company's export department. He commenced his career with the National Tele-

MR. D. R. SMITH

MR. A. T. BUSS

MR. J W. TYDEMAN

phone Co. and Post Office, and was with the latter until after war service in 1918, when he became the Western Electric Co.'s branch manager in South Wales. From there he went to Standard Telephones and Cables, Ltd., and in 1934 joined the Telephone Manufacturing Co., Ltd., as sales engineer. Mr. A. T. Buss has been appointed manager of the company's engineering and design department, in which capacity he will also be responsible for all publicity and propaganda matters. He received his early training with Wm. Warne and Co. in their rubber and thermoplastics laboratory. In 1936 he joined the technical staff of Johnson and Phillips, Ltd., of Charlton, where he was responsible for the development and research of thermo-plastics in the manufacture of electric wires and cables.

MR. H. R. DENNE has been appointed by E. K. Cole, Ltd., as television outside-service engineer, operating from their main service department, Somerton Works, Southend-on-Sea.

## Obituary

MR. A. ALBRECHT, director since 1931 and a past-president of the Electrical Wholesalers' Federation, at Newcastle-on-Tyne, on May 9, aged 64 years. Before becoming director of the Federation, Mr. Albrecht had served on the Council, and he held the office of president for the year 1930-31. The funeral took place at the West Road Crematorium, Newcastle-on-Tyne, on Monday, May 12.

MR. WILLIAM H. MORTON, director and secretary of Bruce Peebles and Co., Ltd., at Edinburgh, aged 66 years. Mr. Morton was born at Wilmslow, Cheshire, and served his apprenticeship with a Manchester firm of chartered accountants. He qualified as an Associate of the Society of Incorporated Accountants and Auditors in 1909, and joined Bruce Peebles and Co., Ltd., as accountant in March of the same year, becoming secretary of the company in 1913, which posts he held until his death. He was appointed a director in 1943.

*Delegates to the Marconi Jubilee Convention photographed outside the high-voltage research laboratories on the occasion of their visit to the Stafford works of the English Electric Co., Ltd. In the centre is* SIR GEORGE H. NELSON, *and on his right is the* MARCHESE G. MARCONI, *a descendant of the famous inventor* (*see page 1313*)

# I.E.E. Annual Report

## Total Membership Over 30 000—Technical Investigations

DURING the year, the rate of increase in membership of the Institution was well maintained, states the Council report for 1946-47, presented at the seventy-fifth annual meeting of the Institution of Electrical Engineers yesterday (Thursday). The number of new members elected was 2 900 (compared with 3 237 last Session), the lower figure being accounted for by the introduction of the Common Preliminary Examination in July last, which has had a slight retarding effect on elections in the student class.

In addition to the 2 900 elections, the Membership Committee have dealt with 2 017 (1 851) other applications, mostly for transfer from one class to another, making a total of 4 917 (5 088) in all. There are now 14 501 Corporate Members on the Register, and the total membership at the year ending March 31, 1947, stood at 31 260, compared with 29 158 the previous year.

Meetings held in London and at the local centres numbered 1 115, and there were 15 Ordinary Meetings in London with an average attendance of 327, compared with 355 for the previous year. Dealing with the activities of individual sections, the report states that the Installations Section has now a membership of 2 339, and held eight meetings, with an average attendance of 110. The Measurements Section, to which 95 new members were admitted during the year, has 1 323 members; 13 meetings were held, with an average attendance of 120.

In the Radio Section, the formation of local Radio Groups resulted in a noticeable increase in membership, which is now 3 311. Twenty-nine meetings, including the 11 special sessions of the recent Radiocommunication Convention, were held during the Session, with an average attendance of 230 (210).

The Transmission Section now has a membership of 1 932, and held during the year ten meetings, with an improved average attendance of 134. To avoid uncertainty as to the scope of this section, the Council have approved an amendment to the Regulations defining the scope of the section, to make it clear that this includes all matters relating to transmission and distribution lines, both overhead and underground, and their associated apparatus and equipment.

There were also six informal meetings, which had an average attendance of 104, compared with 80 for the last Session. Thirteen Students' Sections were in operation, and a further section is now in process of formation.

The past year saw the resumption of activities in the Local Centres on the pre-war scale; changes during the year included the raising of status of the E. Midland Sub-Centre to a Centre, and the renaming of other Sub-Centres.

Dealing with technical investigations, the report states that Drafts for Comment of ten Codes of Practice were circulated during the year, final publication being expected shortly, while seven further Codes outside the scope of the standing Codes Committee are now in course of preparation.

The work of the advisory service on education and training has been continued, and 2 500 ex-Service personnel have applied for advice, with new applications being dealt with at the rate of about 15 a week. Other educational activities have been continued.

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## Delegates at Stafford

FIFTY delegates including the Marchese Marconi, from 30 countries, to the Jubilee Convention organised by Marconi's Wireless Telegraph Co. visited the English Electric Co.'s Stafford works on May 6. They were welcomed by Sir George H. Nelson, chairman and managing director of the English Electric Co., Ltd., and chairman of the Marconi group of companies. The visitors saw something of the company's contribution to the export drive, and generating sets being built for British power stations. They were then entertained at lunch at the Swan Hotel, and were joined by the Mayor of Stafford, Ald. R. Turney, and the Mayoress, Mrs. Turney, and the Town Clerk, Mr. H. Broughton Nowell. Sir George Nelson said that although they were there because of their association with the Marconi Co., many of the delegates had been associated with the English Electric Co. quite independently, and had been the means of bringing much work to the people of Stafford. On behalf of the town of Stafford the Mayor welcomed the Marchese Marconi and the delegates, and Mr. H. W. Alexandersson, of Sweden, replied for the visitors. In the afternoon the delegates saw the educational department and witnessed a number of tests in the research laboratories. (*Picture on p.* 1312.)

# *Views on Sales Management*

## *CONCLUDING STAGES OF THE E.D.A. CONFERENCE*

THE second post-war Sales Management Conference, held by the British Electrical Development Association in London, concluded on Friday, May 9. Abstracts from the papers read and discussed during the first and second days were given in our last issue. Below are set out points from the papers submitted on the third day.

### SHOWROOM DESIGN

The morning session on Friday opened with a paper on " Showroom Design and Layout " by Mr. C. Warrenne (E.D.A.), who emphasised the need for changeability in interior treatment. The main function of the electricity showroom, he said, was service to the consumer, over-the-counter sales being only secondary or incidental. The showroom must be planned to allow free movement and give visitors pleasant and positive impressions, encouraging them to enter unhesitatingly and to feel at home. The interior should be so designed that a complete change of treatment could be effected and variations of lay-out and display afforded. The inclusion of a temporary exhibition space provided the opportunity to make the showroom a centre of topical and local interest by enabling the staging of special feature shows throughout the year. Interviewing and reception rooms, the demonstration theatre, lighting, colour, permanent and temporary fittings were discussed, and the speaker used a number of plans and diagrams to illustrate his remarks.

Mr. E. G. Quested (Milk Marketing Board), followed with a paper on " Dairy Farming and Electricity." He could think of no industry, he said, which had a greater need for electricity than dairy farming. So far as they could see, the solution to the farmers' biggest problem—that of labour—could only be found in mechanisation, for the achievement of which electricity was all important. Secondly, from the aspect of hygiene, electricity was the cleanest form of power for dairy purposes; and, finally, electricity was the ideal foundation for all mechanical aids to the production of clean milk, its scope, apart from lighting embracing milking, cooling, sterilising and other processes.

### THE LUNCHEON

There was a full attendance at the luncheon, presided over by Mr. V. W. Dale (general manager and secretary of the E.D.A.), who was chairman at all the sessions of the conference. It was one of those pleasant social gatherings without set speeches, but informal remarks, limited in time to one minute, were invited from Miss Caroline Haslett, director of the E.A.W., and Mr. H. F. Carpenter, chairman of the E.D.A. Council, who on the previous day had flown back from Canada, where he had been on a ten-days' goodwill mission.

Miss Haslett spoke appreciatively of the wise co-operation the E.A.W. had always had from the E.D.A., and added that in these days, while supporting the fuel economy campaign, both associations were fully conscious of the importance of keeping alive the electrical idea. The fact that there was an increasing demand for new branches of the E.A.W. was evidence that housewives were becoming electrically minded, and she felt that the setback caused by fuel economy was not really going to hinder the great forward movement of electrification.

Mr. Carpenter said he was glad to see such a large attendance at the Sales Management Conference. Those conferences represented the core of the activities of the E.D.A. He made brief reference to his Canadian visit, and kitchens he was privileged to see in Canadian homes.

### PHOTOGRAPHY IN INDUSTRY

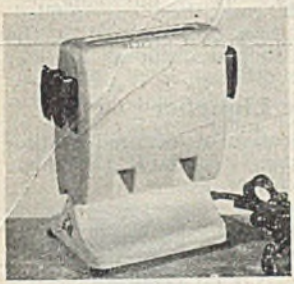
In the afternoon Mr. W. White (E.D.A.) contributed a paper on " Photography," dealing with the extended use of this aid in industry and commerce in relation to research, production and administration, and for instructional and propaganda purposes, stressing the importance of quality in photographs and indicating some of the processes which could be employed in the electricity supply industry. He drew attention to the useful service provided by the E.D.A. photograph library. This, he said, contained a large collection of photographs dealing with the generation, distribution and uses of electricity and appliances; and, in addition to supplying members, the staff dealt with requests for photographs from education, health and housing authorities and various Government departments. He made a special appeal to member undertakings to help to maintain the supply of photographs by providing prints that would assist in the advancement of the electricity supply industry.

The conference concluded with a general discussion.

# Equipment and Appliances

## Aluminium Toaster

An attractive die-cast aluminium electric toaster, with a golden gilt matt exterior, is to be marketed by Erinex, Ltd., of Flore, Northants. Features of the design are that the corner feet prevent slipping and scratching of the table, while the swinging down of the toast holders, by heat resisting handles, turns the toast without touching. These holders cannot, in any position, rest on the table. Rated at 650 W, and available for 200-250 V, the elements are easily accessible for replacement, and, for table use, an on-off switch is provided. The toaster is complete with 6 ft. of three-core flexible cable.



*Die-cast aluminium toaster, made by Erinex, Ltd.*

## Marine Amplifier Set

The "Sonamarine" ship's broadcast and entertainment loudspeaker system, evolved by Ardente Acoustic Laboratories, Ltd., of Guildford, is notable for the provision of an interesting priority system for emergency announcements. The standard amplifier rack, with a power consumption of about 500 W, is kept in the wireless cabin, and houses the entire main equipment, including a radio receiver, mixing unit, a speaker group-selector switch panel, and a small monitor loudspeaker. Up to three control microphones are situated at strategic points in the ship, allocated, for example, to the captain's table, the bridge and the purser's office. A fourth control runs from a gramophone turntable in a music cabin. Each of the microphones has priority over the entertainment programme, the bridge microphone taking precedence over that in the purser's office and the captain's microphone having the highest priority of all. Thus, for emergency announcements, the captain is able to address passengers and crew in all parts of the ship without delay, no matter what programme has been broadcast a few seconds before. Two patterns of loudspeaker are provided, small diffusion models for saloons, etc., and cabinet speakers for the larger rooms. Although the loudspeakers may be fitted with independent volume controls and on-off switches, the circuits are arranged so that emergency announcements by-pass these and come through at full power. The group-selector, on the main panel, permits individual parts of the ship to be selected, as desired.

## Waffle-Making Machine

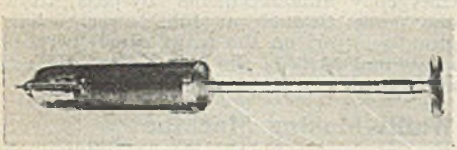
The "Lexington de Luxe," one of the first post-war electric waffle machines, is now being manufactured and marketed by the Cooper Manufacturing Co., of Hanway Works, Hanway Street, London, W.1. Constructed throughout in solid aluminium and with a polished anodised finish, the machine is solidly built and is suitable for use either domestically or in catering establishments. The two platen sections are hinged together by means of a full-length piano-type hinge, and no current is carried through the hinged section, there being separate input sockets for each of the 450 W elements. The machine is mounted on an aluminium grease-tray, provided with rubber feet, to protect the surfaces of polished tables. Wound with iron-free nickel-chrome tape supported on mica, the elements are of standard design and are readily interchangeable; the side-entry input sockets are shrouded and are mounted on mica supports to prevent breakdown through heat. The cooking time is 1½-2 minutes, and the machine is rated to withstand over-running for long periods. Waffle recipes are provided with the appliance, which is available for 200-250 V and 100-110 V mains.

*The "Lexington" waffle-making machine, on its polished tray*

## "One-hand" Suction Cleaner

Shortly to be marketed is a vacuum cleaner of unusual construction, designed

to meet the needs of a small house or flat by Midland Industries, Ltd., of Wolverhampton. Known as the "Milvac," and constructed of light alloys, it weighs only 5½ lb. and is intended for one-handed manipulation. A prototype shown at the



*The "Milvac" one-handed suction cleaner. Its total weight is 5½ lbs.*

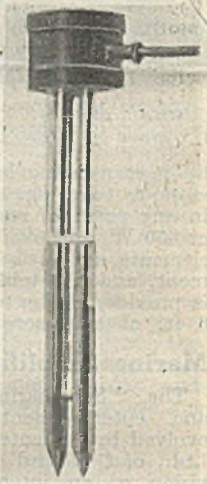
Earls Court section of the B.I.F. has been arousing considerable interest. The cleaner is of one-piece construction, with no accessories or removable tubes, and the suction nozzle combines the features of the conventional brush, for smooth flooring, with those of the metal attachment normally used for carpets. A moulded handle, containing the switch, is placed at the point of balance to facilitate use of the cleaner either on floors or curtains and furniture, and a hook at the rear end permits vertical storage in a broom cupboard, thus saving space. The mains cable is permanently connected. Crackle-finish is used on the main part of the body; the remainder of the cleaner is highly polished.

## Mining Cable Couplers

In view of the need for increased mechanisation in mines, and the correspondingly greater demand for underground electric supply systems, a range of flameproof cable couplers, made by the Liverpool Electric Cable Co., Ltd., of Bootle, may be of interest. Marketed under the name of the "Lecupler" system, the fittings are so constructed, it is claimed, as to render possible an almost unlimited variety of connections. The body carcases are one-piece non-ferrous castings, and the armour clamp assembly, which represents a departure from the orthodox, is completely enclosed within the body of the coupler. This construction permits of the armour clamp and the exposed armour wires being sealed under compound, and so protected from damage and corrosion. The clamp so protected can be tightened, if necessary, by three exterior studs, ensuring uniform pressure being exerted around the whole circumference of the armour gland ring. Improvements have recently been made to the design of the insulator, which now consists of a massive one-piece Bakelite component, into which are fitted three contact tubes. Efficient electrical contact to the copper connector pins is maintained by steel springs. Machine adaptors, which are again of one-piece construction, are supplied in three types: external type (normal); external type (right angle) and internal or flush type, a pattern offering advantages where space is limited. The adaptors are usually compound filled, but can be supplied for sweating tails directly into the contact tubes, in which case they are unfilled. Two ranges of sizes are available, the lower range up to and including 3.3 kV, 100 A, and the other, 3.3 kV, 200 A.

## Infra-red Fat Liquefier

A novel application of infra-red heating has been developed by L. and B. (Patents), Ltd., of Manor Parade, London, N.16. Semi-solid fat or highly viscous oil, of the kind employed in the catering and allied industries, is distributed generally in steel cans with a narrow aperture. This gives rise to difficulty in removing the last of the contents, the normal methods being either to apply local heat to the outside of the container, which results frequently in burned fat, or to force open the can, thus damaging the container. The solution worked out by the inventors, which they have called the "Underwood" liquefier, consists of a twin-tube-element heater, the radiation of infra-red rays being made possible by the excitation of low-temperature heater coils, consuming in all less than 2 A at 250 V. This arrangement enables the normal capacity of two gallons to be completely molten within a period of 4 to 12 hours, depending upon ambient temperature, without risk of spoiling the material. The heating elements are housed in chromium-plated non-ferrous tubes whose extremities are conically shaped to facilitate initial penetration of the solid fat. This, however, can be still more easily effected if the apparatus be placed in circuit for a few minutes before insertion into the can, thereby considerably raising the external tube temperature. Each is supplied with 5½ ft. of three-cored flexible, and the total weight is approximately 3 lbs. The distributors are Underwood (Electric), Ltd., of 200, Great Portland Street, London, W.1.



*"Underwood" fat liquefier*

# Book Review

**Electric Contacts:** By RAGNAR HOLM, Ph.D. (Stockholm: Hugo Gebers). Pp. xvi + 398. 45 Swedish Crowns, (about 62s.).

The importance of the subject, its treatment in the present work, and its previous neglect in book form, all make this book more noticeable than usual. It is a translation of the author's extensive experimental and theoretical work, both at Siemens in Germany and in Sweden, correlated with information from many other sources, all carefully referred to and tabulated. The economical design of contacts requires close attention to physical principles and reliable formulæ, with adequate data for the materials available. The author is concerned with relatively weak currents and excludes the power arcs of circuit-breakers.

The history of the subject is comparatively short and there are many avenues to be further explored. Its proper starting point seems to be when the definition of a metallic contact was first formulated, viz., a contact in which the reversible characteristic rises. The author is wise in devoting the first chapter to a résumé of the rest of the work, so that a reader new to the subject is not confused with the more difficult arguments.

A misconception is first dismissed. In the sense that there might be a contact resistance localised in the interface between two touching bodies, this has never been measured; indeed, experiments quoted show that the resistance localised in a film-free interface vanishes, and, in the absence of contaminating impurities, becomes unmeasurable. The resistance across a contact which is normally measured is a constriction resistance, which arises from the fact that the points of actual contact through which current flows are relatively small, in some instances minute in comparison with the apparent area of contact; the effective resistance, e.g., increase in resistance as compared with a weld, arises from the necessity of concentrating the filaments of current into these minute paths.

If two solid bodies are pressed together with a definite contact load, the apparent contact area may be considerable. Ideal hard plane surfaces would contact at three points only, where the surface stress and strain are concentrated. Ordinary bodies deform and cannot be perfectly plane; these point contacts, therefore, take on multiplicity and finite areas. Moreover, there is a limit to the stress (pressure per unit area) because the surface has a finite hardness, measured by the limit of this stress, above which there is deformation, either plastic or splintering. A good contact may bring the average stress down to half the hardness; the author found it extremely difficult to smooth surfaces so that the average contact stress came down to 1/40, actually in a brush and a slip-ring of graphite.

In a metal contact, conduction is almost entirely through clean or quasi-clean metal surfaces, any tarnishing film being practically non-conducting. A quasi-metal contact is where there is an alien monomolecular film on one or both members. Such a film offers no perceptible resistance. Good contact conductance in air, which always tarnishes base metals, can, however, occur in either of two ways. By reaching the limit of stress of the surface in some part or parts of the apparent contact area and so causing deformation; where there is a film, the latter splits under these localised high pressures and so affords possibility of metallic contact in the resulting fissures. Sliding of the contact is naturally conducive to the formation of fissures and eliminates the local heating effects, which can otherwise be very important. The other way is by coherer action, of long empirical use for the detection of radio-waves. Here minute bridges built up in the film as a consequence of exceeding critical field-strengths resulting in breakdown, when the holes in the film are filled with molten metal. The ancient coherer used nickel filings in an oxygen-free atmosphere to get its fineness of film, puncturable with very low voltages. It is stated that coherer action is the mode of operation of brushes on rotating machines, where the load-bearing contact between a brush and a slip-ring may be hundreds or thousands of times smaller than the apparent contact surface, even if properly ground and polished.

When a contact is opened, the current is liable to be maintained for a brief period as an arc, which transfers material and is, therefore, a source of wear. If circuits could always be designed so that currents are only made and never broken by contacts, many headaches would vanish.

A paradox is the epilamen or monomolecular layer of lubricant between surfaces which are supposed to be lubricated. Many layers of molecules cannot endure the high contact stresses normally present, but the single molecule layer which is left must be considered as a hard film, with

the possibility of fissure. Multilayer films of lubricant are built up by sliding, as in any bearings rotating in a journal.

An example of good contact is crossed wires of noble metals with a total load of, say, 5 kg. Here practically all the surface is deformed, the stress is up to the limit of hardness, except in a negligible boundary zone.

Between a metal and mercury there is complete conduction where there is no film; the latter cannot be broken down by pressures. Normally, mercury carries contact, whereas freshly etched rods, offer only $10^{-3}$ to $10^{-5}$ of the apparent contact area as metallic or quasi-metallic contact: freshly etched rods, cleaned with ether, give 100 per cent. quasi-metallic contact area.

Cleaning metallic surfaces generally means evaporating some metal off the surface in vacuum, and then keeping base metals free from contact with oxygen. Grease and lubricants are removed with the usual solvents, but soapy water, tap water, and then alcohol seem as effective.

The above-mentioned topics are hints from the physical aspects of the subject. In his monumental text the author devotes whole chapters to many of these aspects, with a final historical review, which cannot profitably be summarised. It is hoped that this work will become easily available in this country.—L. E. C. H.

# 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*

**Why is it permissible to employ a higher flux density in the air gap of a large machine than in a small machine?**

The maximum allowable flux density is governed largely by the permissible density in the teeth, this being the part of the magnetic circuit in which the density

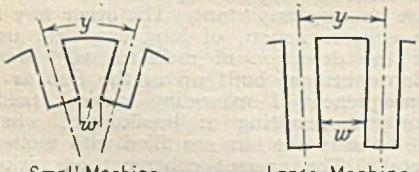



*Fig. 1.—Tooth shapes*

is highest. If parallel slots are employed, as is usual except in small machines, the teeth are tapered as shown, for rotor teeth, in Fig. 1, the taper being, of course, greater with the small machine.

The maximum permissible flux density in the teeth is between 17 000 and 20 000 lines per sq. cm., since higher values than this lead to excessive iron losses. If a single slot pitch is considered the cross-sectional area of the path available for the flux is L × y at the gap and $L_i$ × w at the narrowest portion of the tooth, where L is the core length and $L_i$ is the actual length of iron part of the core (= L − ducts and insulation between laminations) and assuming all the flux goes down the tooth and none down the slot. If there are no ducts $L_i$ = 0.9 L, and with ducts it will be slightly less. If the flux density in the gap is $B_g$ the flux density in the root of the tooth will thus be

$$B_t = B_g \times \frac{L \times y}{L_i \times w} = 1.15 \frac{y}{w}$$

It can be seen from the diagrams of Fig. 1 that the ratio y/w is about 4 for a small machine and about 2 for the large machine so that the maximum permissible value of the gap density is

$$Bg = 19\,000 \times \frac{1}{1{\cdot}15} \times \frac{1}{4} = 4\,150 \text{ lines/cm}^2$$

for the small machine, and

$$Bg = 19\,000 \times \frac{1}{1{\cdot}15} \times \frac{1}{2} = 8\,300 \text{ lines/cm}$$

for the large machine.

A curve relating gap density with the armature diameter for typical machines is

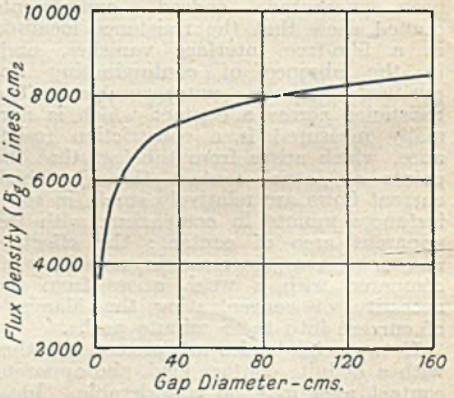



*Fig. 2.—Typical values for flux density in gap*

shown in Fig. 2. In some small machines where the method of winding permits, *e.g.*, small induction motors, an increase in the allowable gap density is obtained by the use of parallel teeth and tapered slots.—E.O.T.

# Rayon Factory Installations

## SPECIAL PROBLEMS OF CHEMICAL CORROSION

A PRELIMINARY review of the chemical processes involved in the manufacture of rayon yarn was given in an I.E.E. Installations Section paper on "Special Electrical Requirements of a Viscose Rayon Factory," read by Messrs. C. F. Freeman and H. V. Mather (Courtaulds, Ltd.) on May 8.

Although rayon was a textile, the authors began, its manufacture was a chemical process and the factory was, therefore, one where the electrical installation must be suitable for giving reliable service under conditions of attack by corrosive gases and liquors, particularly hydrogen sulphide which readily attacked copper or silver or any alloy containing either of these metals.

Since rayon manufacture was a continuous process, the reliability of private generating plant had been preferred, and the authors said that with their own plant, shut-downs had been extremely rare. The power plant had to include, besides a 50-cycles supply, a high-frequency supply of the order of 100-150 cycles. This was required to drive the 7 000 r.p.m. spinning boxes, but present developments suggested that in future the higher-frequency supply would be unnecessary.

Next, the paper described typical rayon factory distribution systems and switchgear, and dealt at some length with the design requirements of the spinning motors. At one stage of the process, there was a danger of explosion with carbon disulphide, and this required special care with electrical machinery. Finally, some aspects of plant standardisation were surveyed.

MR. L. J. LEPINE, opening the discussion, said that when Topham designed his ingenious box, which revolutionised the rayon industry, there was nobody of equal status to design a suitable motor to run the box, and it was only because particularly long spindles were put in that it was able to be run at all. For the sixteen years during which the patents had to run no improvements were made to the motor, but as soon as the patents were about to expire the continental manufacturers, and particularly Siemens, started on the design of a suitable apparatus. The Courtauld motor, as he would call it, consumed 100 watts, but to-day it was possible to buy a motor which consumed only 40 watts, and that reduction in consumption was due to the fact that scientifically minded people had designed a motor from first principles and had not merely converted an ordinary motor for use in spinning operations.

It was interesting, he said, to note how processes changed and affected the installations. There was in progress at the present time a change-over to what was called the continuous process, and with the introduction of that process the spinning boxes would go out of use. Instead of requiring 4 000 kW to run the factory and 4 000 kW to run the spinning boxes the whole operation could be done with 4 000 kW. There was, therefore, an opportunity for manufacturers to achieve a large reduction on the consumption of power.

MR. J. P. CRANMER (B.T-H.), dealing with switchgear, said that great attention was paid to the special requirements of rayon factories. There were two reasons for that. The rayon factory worked a 168-hour week for weeks on end. Consequently circuit-breakers remained in one position for long periods, and that, combined with the atmospheric conditions in the factory, made it essential to give careful consideration to the mechanism of the breakers. If that was not done, trouble might occur through "sticking-in," particularly on the older types of equipment. Then, although many people might say that a 168-hour week was usual in the case of supply companies, it would be agreed, he thought, that there was a great difference between the effects of a shut-down of a public supply company on, for instance, a residential area and the effects of a shut-down of the electrical plant in a rayon factory. Mr. Freeman had pointed out that a shut-down for even a few minutes was a very serious matter, but if it were continued the chemical action which went on would destroy the raw material which was in the process of being made for the spinning machines. It was a serious matter for the production department if there were a shut-down, and from that point of view the authors' conservative methods were 100 per cent. justified.

A very important consideration was the effect of the atmospheric conditions in a rayon factory, especially in the spinning room area, on the metalwork of switchgear. The authors' quoted results for some accelerated tests on switchgear contacts, and the results of some tests with which he was associated tallied closely with them. The contacts were immersed in a strong solution of sodium

chloride, plain copper contacts being employed as against silver contacts. The resulting difference in contact resistance was very marked. Ordinary copper immersed in the solution increased its contact resistance a hundredfold in four days, whereas silver only increased by 1.7 times in 26 days. In addition, loose contacts were sent to Messrs. Courtauld for placing just in the atmosphere in a very bad position in the spinning room, and there again a very marked difference between copper and silver-plated contacts was observed.

MR. F. H. MANN (Ministry of Labour Factory Dept.), referring to the problem of providing safeguards against explosive atmospheres, said it should be borne in mind that in factory legislation in this country it was implicit that the best known safeguard should be used, and therefore flameproof gear was usually adopted. The immunity from accidents to which the authors referred was, however, undoubtedly due to ventilation as a primary safeguard. The use of flameproof gear was regarded only as a secondary measure, and ventilation designed to reduce the concentration of gas to within safe limits was the primary safeguard which should always be adopted. Where one had, as in the case of carbon disulphide, an explosive range of between 1.5 and 50 per cent., it was quite obvious that no risks could be run, because local concentrations might arise which, without some form of protection being employed, would prove to be disastrous if electrical apparatus in the region failed. Whereas the Americans were apparently quite content to have $CS_2$ in a free state floating about, we should view those conditions with some misgiving.

MR. R. T. LYTHALL (Johnson and Phillips) expressed the view that the stone cellular type of switchgear used by the authors, although it was excellent from the point of view of accessibility for maintenance purposes, had several disadvantages which were not exhibited by the metalclad compound-filled type. It would probably be generally accepted, he said, that the majority of electrical failures were due to open arcing, and open arcing could occur readily in the open type of switchgear such as the stone cellular or truck types, but not so readily in the metalclad compound-filled type. Another advantage of the compound-filled switchgear was that there was not so much copper available to free air and to hydrogen sulphide as there was in the open types. He was pleased to note the basis adopted by the authors for designing their sub-stations, and said he could only hope that more industrial users would adopt the principle of limiting the sub-station to 1 500 kVA and of building up that 1 500 kVA in three 500 kVA banks.

MR. B. PRINGLE (B.T-H.), referring to Mr. Lepine's remarks on the power consumption of the spinning spindle motors, said that quite large factors in power consumption lay not within the spindle motor itself but within the spinning pot, depending upon its shape and so forth.

MR. B. C. ROBINSON (British Nylon Spinners), who explained that he was concerned with the running of a comparatively small nylon production plant and the design of a much bigger plant in South Wales, asked about the rating of the low tension switchgear. The authors stated that it should be amply rated for long periods of service, but it would be of assistance if they gave some indication of what they considered to be an ample rating. Would they regard, for instance, a 500 A capacitance breaker loaded fairly continuously at 400 A as being amply rated?

MR. J. K. CLARKE said he was struck by the flimsiness of the shafts of the spinning motors. In approaching the problem the designer had to choose between having a very stiff shaft or a very flexible one, and—no doubt for good reasons—it seemed that the designers of these machines chose a flexible shaft.

MR. W. M. CRAIG said that in the section of the paper dealing with general 50 cycles distribution, reference was made to the use of conduits, and the authors stated that they had found it desirable to add steel-wire inside the conduit. Was that due, he asked, to the chemical action on the conduits causing an increase in resistance? He had a case in mind where both hydrogen sulphide and sulphur dioxide were present, and it appeared as though there was no reasonable conduit to stand up to those conditions.

MR. H. V. MATHER, in reply, said it was necessary for the shafts of the spinning motors to be flexible because they had to go through critical speeds. There was a tendency towards some vibration which would cause some crystalising of the shafts, and they would break off very readily if they were not of this flexible nature.

With regard to steel earth-wires inside the conduits, it was better to have them inside the conduits, particularly to keep them away from the gas as much as possible, in order to preserve continuity of circuits.

MR. C. F. FREEMAN said he would like to consider the question of the rating which should be applied to a circuit breaker, but he could say that at least one manufacturer took the view that if it was a really continuous loading, it should be taken at 80 per cent. of its nominal continuous rating.

# What Manufacturers Are Doing

## Switchgear Firm Rebuilds its Works—Labour Shortage

FOLLOWING heavy damage by enemy action to the Lancashire Switchgear Works of Erskine, Heap and Co., Ltd., in Salford in December, 1940, and June, 1941, a licence for reconstruction of the works was granted in 1945, and this work has now been completed.

The works destroyed had been occupied by the firm since they moved from Waverley Mills (occupied for seven years) in 1912, and consisted in the main of three stories. The new building, which consists of a single storey works and 2-storey office block, comprises machine and fitting shops in three long bays, adjacent to the switchgear erecting shops which were the only part of the works undamaged. A building adjacent to the works was also acquired and has been reconstructed to house the welding, radial drilling, grinding, plating and painting departments.

*A portion of the new drawing office of Erskine Heap and Co., Ltd.*

The works have been constructed partly on the old site and partly on a site left vacant by the destruction of other works in the neighbourhood, which necessitated a Ministry of Town and Country Planning inquiry at which the local Regional Planning Authority's decision to limit the life of the works was overruled.

New offices were also constructed, the originals being completely destroyed.

The floor area of the works and offices is just under 100 000 sq. ft., and the site area, including all buildings and offices, covers some three acres. The lighting throughout is either of the mercury vapour or fluorescent type, and in the works the power supply is carried by an overhead busbar trunking system from which it is distributed.

Government regulations have made it necessary for the works to be of brick, concrete and steel construction, the only timber used being for doors; the roof is lined with Celotex for heat conservation purposes.

The floors of the machine shop have a granolithic finish, and in the fitting shops and offices, a concrete foundation is covered with Colourphalte, a surface, though of a pleasing appearance, is not cold or tiring to the feet.

Full production has been established, in addition to new developments, and the manufacture of high and low tension switchgear and all types of a.c. motor control gear is in full swing. As is general in the industry, the company has many large contracts in hand, mainly for the colliery industry, the equipping of a large number of textile mills, and export work for, among other places, Brazil, South Africa, India and New Zealand.

One contract going through the works is for 37 cubicle type switchboards for the rehabilitation of Burma where all the power stations were destroyed by the Japanese. Another export order in hand is for switchgear and motor control gear for a big oil refinery.

Numerous switchboards in various stages of construction are in hand for textile mills, both in this country, India and Brazil. One contract for flameproof switchgear for a Lancashire colliery is

*The new fitting shop in the foreground, with the machine shop at the far end*

being rushed through in an endeavour to help increase coal production.

An interesting item of control gear to be seen at the works is a large auto-transformer starter of 680 H.P. at 3 300 V, for a paper mill in the south. The starter comprises two cubicles containing three oil switches and an auto-transformer, the three switches being interlocked to realise the Korndorffer connections in starting up. A special feature of the Korndorffer scheme is that the supply of power during the starting period is not interrupted, once it is initially established through the auto-transformer windings. It is widely used for large horse power medium voltage motors, and for most high voltage motors. For the smaller sizes, a single handle starter has been designed and patented.

A noticeable feature in the company's smaller types of motor control gear is the robustness of the starters. All the cases and lids are of cast iron and only wound solenoid overloads with adjustable time lags are employed. This feature, it is claimed, does away with the need of a single phasing preventor, the overloads being sufficiently accurate to eliminate any trouble. A combined type stator and rotor starter which gives a saving in floor space is also made. The ironclad vertical drawout switchgear, to be seen at the works, recalls the fact that the company claims to be the original patentee of this form of isolation.

Moving iron ammeters and voltmeters are manufactured in the instrument department which is set apart from the rest of the works, to ensure complete cleanliness and absence of vibration; incidentally, the firm winds all its own coils, auto-transformers, current and voltage transformers.

# Latest Electrical Trade Marks

*Permission to publish this list of British Trade Marks has been obtained from H.M. Controller of Stationery Office. The information has been selected from past issues of the Trade Marks Journal*

CINCH. No. B636722. Valve connector clips, valve retaining clips, valve holders and similar sockets, valve pins, terminal tags and strips, aerial and earth terminals and clips, fixing clips for control knobs, condensers, plugs and sockets, tuning indicator sockets, screening cans and sockets therefore; all being parts of wireless apparatus. Carr Fastener Co., Ltd., 55, Nottingham Road, Stapleford, Nottingham.

TRIXONIC. No. 642635. Electrical apparatus and instruments included in Class 9; scientific, cinematographic and teaching apparatus and instruments, coin or counterfreed apparatus and talking machines. The Trix Electrical Co., Ltd., 1-5, Maple Place, Maple Street, Tottenham Court Road, London, W.1.

AGRIPPA. No. 644031/7729S. Permanent magnets. James Neill & Co. (Sheffield), Ltd., Composite Steel Works, Napier Street, Sheffield.

ILLUMINEERING. No. 638775. Lighting installations and lighting fittings and parts (not included in other classes). Holophane, Ltd., Holophane House, Elverton Street, Vincent Square, London, S.W.1.

ITONIA. No. 642959. Electrical apparatus and appliances included in Class 9. David Sidney Bilantz, 3, Leeds Place, London, N.4.

MILLER-MULTIPOL. No. B643706. Lighting dynamos for vehicles. H. Millner & Co., Ltd., Monarch Works, Aston Brook Street, Birmingham, 6.

ERINEX. No. 641631. Electrical apparatus included in Class 9. Erinex, Ltd., High Street, Flore, Northampton.

NICO. No. 641022. Gas burners and gas mantles; electric lighting fittings, electric hot plates, electric curling-tong heaters and electric hair driers. Nico Light Engineering Co., Ltd., 1, Laud Street, Croydon, Surrey.

ERINEX. No. 641632. Lighting and heating apparatus. Erinex, Ltd., High Street, Flore, Northampton.

CRINOLITE. No. 644232. Lamp shades and installations for lighting, heating, refrigerating, drying and ventilating. Imperial Chemical Industries, Ltd., Wexham Road, Slough, Bucks.

CRINOTHENE. No. 644234. Lamp shades, and installations for lighting, heating, refrigerating, drying and ventilating. Imperial Chemical Industries, Ltd., Wexham Road, Slough, Bucks.

DENCO. No. 644276. Polystyrene plastics in the form of tubes, rods and sheets for electrical insulating purposes. Denco (Clacton), Ltd., 357-359, Old Road, Clacton-on-Sea, Essex.

TESVAC. No. 644844. High-frequency Tesla-coil testing apparatus. Ferranti, Ltd., Wickentree Lane, Hollinwood, Lancashire.

FROLIC. No. 642706/7723S. Electric flat irons. Tool & Steel Products, Ltd., Abbeydale Works, Woodseats Road, Sheffield, 8.

COROTHENE. No. 644936. Electrical apparatus and instruments included in Class 9. P. Buttimore (Export) Co., 51, Crutched Friars, London, E.C.3.

MEDITRON. No. 644945. Apparatus for radio-therapy. A. H. Ratcliffe, 17-21, Victoria Station Approach, Manchester, 3.

# Industrial Information

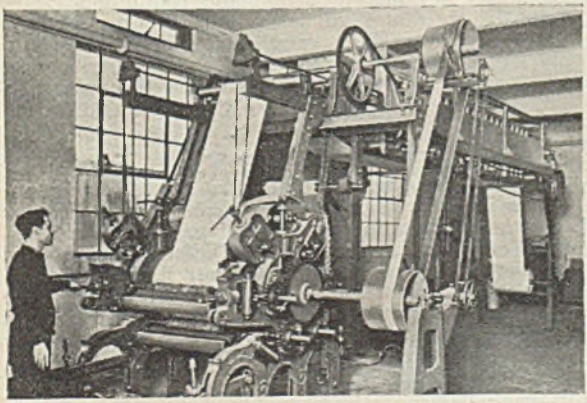
### L.E.P. Co.'s Amateur Dramatic Society

The Lancashire Electric Power Co.'s Amateur Dramatic Society successfully presented the comedy "Quiet Week-End," to packed houses at the Queen's Hall, Manchester, on April 23, 24, and 25. Some members of the cast were making their debut, but under the skilful guidance of the producer, Mr. I. L. Thomas, they acquitted themselves remarkably well. When the final curtain was lowered on the last night, Mr. M. H. Adams (chief engineer and manager), who is president of the society, congratulated the players on the very good work that had gone on behind the scenes to produce such a splendid result. The Ormskirk branch of the Dramatic Society recently produced "Outward Bound," a play in three acts by Sutton Vane, and last Friday the Chorley branch performed three one-act plays.

*Cast in the play "Quiet Week-end," produced by the L.E.P. Co.'s Amateur Dramatic Society*

### Fifty-thousandth Refrigerator

Mr. W. Leonard, M.P., Joint Parliamentary Secretary to the Ministry of Supply, accompanied by Mr. Shaw, Senior Director of Housing Equipment, visited the Luton works of Electrolux, Ltd., when the 50 000th M.151 refrigerator came off the assembly lines to complete the Government contract for temporary prefabricated houses. Before asking Mr. Leonard to address the workers and to autograph the refrigerator, Major-General Sir Harold Wernher (director) said the speedy completion of the contract, despite material and fuel shortages, was evidence of good relationship between the management and workers.



*Electric infra-red plant for drying colours on wallpaper*

### Visit to Meaford Power Station

The members of the I.E.E. South Midland Centre are holding their summer meeting on Saturday, June 21, at the new Meaford generating station which will be inspected after lunch.

### Drying Wallpaper Colours

At the Willad Paper Mills there has been installed recently a Metrovick infra-red plant for drying colours on wallpaper. This enables the paper to be rolled immediately it passes through the drying oven. The slower method of festooning the paper in hot air ovens is completely outmoded. Drying times vary according to the depth of colour deposit applied. The plant, as shown in the illustration, is 18 ft. long, employing 132 infra-red lamps with a load of 33 kW, and deals with paper 22 in. wide, with a normal print deposit in various colours at the rate of 90 ft. per minute. Machines 27 ft. long, fitted with 198 lamps, are now being constructed to deal with up to 150 ft. of paper per minute. The application of this type of plant is not confined to wallpaper dry-

ing, and the Metropolitan-Vickers Electrical Co., Ltd., has successfully installed equipment for drying purposes in the textile, boot and shoe, and other industries.

### Office Lighting

An office lighting installation of some interest is being carried out at Royal Mail House, Leadenhall Street, London, E.C.3, for the Royal Mail Lines, Ltd. The offices, which are being lighted entirely by "Sieray" "warm white" fluorescent 80 W tubular lamps, are of dimensions varying from 8 ft. by 10 ft. up to 40 ft. by 100 ft., with a ceiling height of approximately 9 ft. 6 in. throughout. The majority of the ceilings are traversed by cased beams, and consequently a uniform mounting height of 8 ft. was selected. A feature of the scheme is the use of open top trough fittings sprayed cream externally. The effect of these can clearly be seen in the accompanying reproduction of a night photograph of the accounts section. Both single and two-lamp open top fittings are in use as well as decorative fittings glazed with opal Perspex. The installation provides for a uniform intensity of 15 lumens per sq. ft. in service, this value being obtained at desk-top height. The system is free from glare, and the use of local desk lamps is entirely avoided. The scheme was prepared by the illuminating engineering department of Siemens Electric Lamps and Supplies, Ltd., 38-39, Upper Thames Street, London, E.C.4, and the installation was carried out by Rashleigh Phipps and Co., Ltd., 2, Hanover Square, London, W.1.

*Accounts section at Royal Mail House, Leadenhall Street, London, lit by "warm white" fluorescent lamps*

### Home Economics in Sweden

The Caroline Haslett Trust are now inviting applications for the second travelling exhibition which will be tenable in Sweden in the autumn. The successful applicant, who must possess the diploma in electrical housecraft awarded by the E.A.W., will travel in Sweden for two or three months to study home economics, particularly in the application of electricity to housecraft. She will meet the leading women of the Swedish home economics world, visit works where domestic electrical equipment is manufactured, and see the latest electrical developments.

### Lamp Supplies

The tender of Thorn Electrical Industries Ltd., for the supply of Atlas lamps to the Westhoughton U.D.C. has been accepted for 12 months from April 1 last.

### B.E.A.M.A. Contract Price Formulæ

For purposes of calculating variations in: (a) Rates of pay, the rate of pay for adult male labour at May 10 shall be deemed to be 110s.; (b) costs of material, the index figure for intermediate products last published by the Board of Trade on May 10 is 215.9 and is the figure for the month of April.

### Public Works Exhibition

Mr. Clement Attlee, Prime Minister, is to open the 11th Public Works, Roads and Transport Congress and Exhibition to be held at Olympia on July 21. Mr. Aneurin Bevan, Minister of Health, who is president of the Congress and Exhibition, will be in the chair. Included among the exhibitors is the Department of Scientific and Industrial Research.

### Course for Demonstrators

A one-week intensive course for demonstrators in the electrical industry and for domestic science teachers will be held at the London School of Electrical Domestic Science, Imperial Court, 2, Basil Street, Knightsbridge, S.W.3, from July 28 to August 1 inclusive. Applications should be sent to the secretary at the school as soon as possible.

### Bruce Peebles 1947-48 Calendar

Bruce Peebles and Co., Ltd., have sent us a copy of their 1947-48 calendar which is the tenth of a series illustrating Scottish castles. The picture this year is Craig-

ievar Castle in Aberdeenshire, one of the finest examples of 17th century Scottish architecture, and is printed in three colours. The calendar dates from May, 1947, and runs on to April, 1948, and is provided with monthly tear-off sheets, each printed in bold easily read figures, with the current month and also the preceding and following months.

### Underground Power Station

The current Pathé News reel includes a report from an industrial survey team on Morar, in Inverness-shire, where the first underground power station is being completed in the heart of a rocky hillside. In a pit 80 ft. deep, will be two turbines and generators, each capable of developing 300 kW. Little more than the doorway will be visible from the outside. The Morar scheme will bring an initial annual output of one-and-a-third million units to an area of 71 square miles.

### Notes for Contractors

With the exception of lighting and wireless appliances and apparatus, gramophones and player pianos, clocks and parts of clocks, warming pads and blankets, hair drying machines, infra-red and ultra-violet ray lamps and radiant heat lamps, all domestic electrical appliances and apparatus suitable for operation from the mains or independent power source, are chargeable to purchase tax at the rate of 66⅔ per cent. unless they fall within a class chargeable at 100 per cent. when that rate continues to be or becomes chargeable. With regard to the Whitsun period holidays all hours worked on the days recognised as national holidays or prescribed by local working rules are to be paid for at the rate of time-and-a-half. No wages are payable for any of the days observed as holidays when no work is performed.

### Henley's in War-Time.

An impressive record of the contribution to the national effort during the years 1939-45, made by W. T. Henley's Telegraph Works Co., Ltd., is contained in an excellently produced and admirably illustrated brochure, which, owing to paper restrictions preventing wider circulation, is being issued privately to those who collaborated with the company in the enterprises described therein. In spite of destruction by fire, high explosive bombs, flying bombs and rockets, at works, warehouses and offices, and other difficulties, Henley's met the varied demands made upon their extensive resources for special cables, equipment and devices to combat the submarine and mine menace to our shipping and to enable the Services to achieve victory, as well as cables for the grid and new power stations. The achievements of associated companies are also outlined.

### Equipment for New Film Studios

Mercury-arc rectifier plant is among a comprehensive range of equipment being supplied by the General Electric Co., Ltd., to Alliance Film Studios, Ltd., for their Riverside, Twickenham and Southall studios. The mercury arc rectifier plant, which is to be used in the Riverside Studios, comprises two 500 kW equipments


*The stand of Langley (London) Ltd. at the Birmingham Section of the British Industries Fair, where applications of mica to electrical engineering were shown*

and will provide a 240/120 V, three-wire d.c. output, the incoming supply from the Hammersmith Corporation being 11 000 V, three-phase 50 cycles. The company is also supplying the high tension switchgear and d.c. output control gear. Among the other equipment supplied are 150 2 kW studio spotlights, 32 500 W spotlights, 12 broadside floodlights, 12 fully collapsible winch type geared stands and eight 5 kW focusing spotlights. In addition, the company is to supply their new 150 A, double negative, H.I. arc lamps and 2½ kW compact source studio floodlights.

**Engineering and Metalcraft Exhibition**

The Engineering and Metalcraft Exhibition, the first of the "Britain's Best" series which will be held in London during 1947 and 1948, opened at the Royal Horticultural Hall on Monday. Although small—only 65 firms are represented—the exhibition has been designed to cover a wide range of the light industries and, in addition to small machine tools and works auxiliaries, there are specialised electrical appliances ranging from dry-shavers to wave-guides and radar scanning systems. Foreign buyers in London for the B.I.F., the organisers reported, had displayed interest in the equipment shown, much of which is available for immediate export. The exhibition is open daily from 9.30 a.m. to 8.30 p.m. until Friday, May 23. In November of this year, a second in the series will be held at the Horticultural Hall.

**Trade Publications Received**

A new catalogue issued by the Vactite Wire Co., Ltd., 24, Queen Anne's Gate, Westminster, S.W.1, giving details of their resistance wires and tapes and molybdenum wires, tapes and rods.

New price list, No. 978, from Siemens Electric Lamps and Supplies, Ltd., 38 and 39, Upper Thames Street, London, E.C.4, dealing with industrial infra-red drying lamps and reflectors.

An illustrated catalogue and price list from the General Electric Co., Ltd., Magnet House, Kingsway, London, giving details of their glassware and fancy shades for electric lighting.

Battery price list, No. 667, issued by Siemens Electric Lamps and Supplies, Ltd., 38 and 39, Upper Thames Street, London, E.C.4, giving details and prices of batteries for radio sets, hearing aids, pocket torches, cycle lamps and dry cells for general purposes.

# The National Register

AN account of the work of the National Register of Electrical Installation Contractors, with the names of the members of the Registration Board, was given in our issue of March 7, and in the report of the Board for 1946, presented at the annual meeting held at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London, on Monday, March 12, it was disclosed that of 238 applications for registration received during the year, 139 were accepted, 43 were declined, seven were withdrawn, and temporary registration was granted in two cases, one of the applicants withdrawing subsequently; ten names were reinstated, and 399 names were removed from the Register for various reasons, 221 certificate holders having failed to renew registrations and 160 having resigned. The number on the register at December 31, 1946, was 1 202.

The Executive Committee expressed their indebtedness to Mr. F. W. Purse, the honorary director, for the work he was doing and the enthusiasm he had exhibited for the cause of registration, and the chairman, Mr. P. V. Hunter, said the work of the Register had greatly benefited from the efforts of Mr. Purse since his appointment. The establishment of the Register's official review, "Registration," was largely his work.

It was reported that Mr. H. C. Hazel, the Register's first engineering inspector, had been compelled to resign on account of ill-health, and the Board recorded their high appreciation of his long and excellent service to the National Register. Mr. J. C. Nicholson had been appointed to fill the vacancy.

Tributes to the work of Mr. Hazel were paid by Mr. H. J. Cash and the Chairman, who spoke of the zeal and tact Mr. Hazel had displayed in overcoming the resentment shown against inspection in the early days when an inspector's lot was not a happy one.

Mr. P. V. Hunter was re-elected chairman for the ensuing year, and Mr. E. A. Mills, borough electrical engineer at Hackney, was elected vice-chairman. Mr. D. B. Irving was re-elected hon. treasurer. Mr. E. A. Mills and Mr. W. A. Smith, who were due to retire, were re-elected to the Executive Committee, and the Chairman spoke of the valuable services both had rendered. Mr. Smith, although living in Scotland, he said, was a regular attendant at the meetings of the Committee. They regretted his absence through indisposition that day and hoped he would soon be restored to health.

It was resolved to continue the customary donations of £10 10s. to the I.E.E. Benevolent Fund and £10 10s. to the Electrical Industries' Benevolent Fund.

# Electricity Supply

**Manchester.**—Extensions to the 33 kV system, involving an estimated expenditure of £160 270, for feeders, sub-station plant and buildings, are proposed.

**Cheltenham.**—Estimating that a surplus of approximately £10 000 will be available for rebates to consumers, the Corporation has not yet decided how to allocate this sum among various classes of consumers.

**Sheffield.**—Mains extensions, costing £13 762, are proposed. A B.T-H. 55 MVA, 12.5 per cent. 33 kV oil-immersed copper shielded reactor is to be installed at the Neepsend station, at a cost of £10 080.

**Glasgow.**—The Corporation has agreed to allow the construction of a single chimney to a height of 256 ft., in lieu of two 206 ft. chimneys, at the new Braehead power station, subject to the condition that the chimney will be kept adequately marked and lighted.

**Middlesbrough.**—A proposal by the Borough Electrical Engineer for the electrical wiring of houses through one meter has been approved by the Town Council. Application has been made for sanction to borrow £43 000 for works on the Thorntree estate. The saving per house will be £3 and the total saving in the Council's housing programme over a period of seven years £16 500.

**St. Pancras.**—In view of the possible early completion of static sub-stations at Holly Lodge and St. Alban's Road and the present heavy d.c. load in the area, provision is being made for an early changeover. The work is estimated to cost £8 300 for cables, £1 495 for services and modifications to cut-outs, and £3 920 for conversion of consumers' apparatus, installations, etc.

**Generation of Electricity.**—Official returns rendered to the Commissioners show that 3 387 million units were generated in Great Britain during the month of April, 1947, as compared with the revised figure of 3 057 million units in the corresponding month of 1946, an increase of 330 million units or 10.8 per cent. During the first four months of 1947 the total units generated by authorised undertakers numbered 15 722 million units, as compared with 14 482 million units for the same period of 1946, an increase of 1 240 million units or 8.6 per cent. The total units sent out from the generating stations of authorised undertakers during April (i.e., units generated less units consumed in the stations by auxiliary plant and for lighting, etc.), was 3 195 million, compared with 2 882 million units in April, 1946, an increase of 313 million units or 10.9 per cent. During the first four months the total units sent out was 14 851 million units, compared with 13 679 million units for the same period of 1946; an increase of 1 172 million units or 8.6 per cent.

## *Diesel-Electric Sets*

IN connection with the Ministry of Supply sanction to the allocation of material for the production of Diesel-electric sets, referred to in our issue of April 4, Davey Paxman and Co., Ltd., of Colchester, held a reception at the Savoy Hotel, London, on May 8, when Mr. E. P. Paxman explained the position as it affects his company. Release has been authorised of the material needed for plant aggregating 300 000 kVA and this will be used for the manufacture of sets with ratings between 50 and 330 kVA. Adequate supplies of the fuel oil on which to run the sets are being assured, said Mr. Paxman, by the Ministry of Fuel.

The arrangements are, it will be appreciated, intended to encourage works managements to instal private generating plant up to, say, a third of their demand and so relieve load on the public mains by a like amount. Also operating in the scheme are Associated British Oil Engines Ltd., in association with the Brush Electrical Engineering Co., Ltd., who have been allocated material for the manufacture of plant aggregating 100 000 kVA, in standard units of 55 kW.

We understand from the Ministry of Supply that the manufacture of heavy plant with take precedence over the building of the Diesel-electric sets, and materials for the latter will be allocated only after the demands of the heavy plant makers have been met. Manufacturers have agreed to accept the Ministry's guidance in the placing of sets to ensure that the buyers are engaged in work of national importance and that the sets will be used continuously and not merely as stand-by-plant. Firms wishing to purchase sets should communicate with the regional controllers of the Ministry dealing with their products, who will endorse the orders if the conditions are observed. Official endorsement of orders applies also to imported plant. Hire purchase can be arranged, if desired.

# Electricity Bill in Committee

## £700 Million for Expansion — Fixing Tariffs

ALLEGATIONS that under the Electricity Bill the consumer would be penalised and lose the protection he now enjoys were made by Opposition speakers during discussions in Standing Committee.

Continuing consideration of Part III of the Bill, which deals with financial provisions, members further examined Clause 32, defining the general financial arrangements between the Central Authority and the Area Boards, and Col. Clarke claimed that the Boards should be self-supporting over a period and preserve some measure of competition.

### PROTECTION OF CONSUMERS

Mr. Shinwell, Minister of Fuel and Power, replied that they could not divorce the Boards from the operations of the Central Authority. If they did, they would defeat the very purpose of the scheme itself. It would be sufficient safeguard to the Boards and to consumers, he claimed, that the chairmen, in rotation, were to sit on the Central Authority as full members and a have a say in shaping policy. It was impossible at this stage to relate the nature of the administration for which the Authority would be responsible.

When Clause 33, dealing with the fixing and variation of tariffs was reached, the Government was urged to allow more freedom to Area Boards to fix their tariffs without first consulting the Central Authority. To this, Mr. Gaitskell, Parliamentary Secretary to the Ministry of Fuel, objected that it was the Government's view that the Central Authority should exercise its supervision with a light hand and allow the Area Boards the greatest possible amount of freedom. Giving an example of where it might be necessary for that Authority to intervene, Mr. Gaitskell said an Area Board might be charging a very different price from that charged by another Board for any particular class of industrial consumer.

### TARIFF VARIATIONS

The Opposition later urged that the Central Authority should not be able to fix tariffs without getting the approval of the Electricity Commissioners, so that there would be an independent scrutiny, but Mr. Gaitskell said it would be a mistake to tie down the Central Authority in this way. He agreed, however, to amend the Bill at a later stage to make it plain that the Central Authority might have different tariffs for different Area Boards.

Col. Crosthwaite-Eyre then moved a series of amendments designed to set a limit to the temporary borrowing of the Central Authority, declaring that the Bill as it stood asked the Committee to approve a " blank cheque " for the Authority.

Mr. Glenvil Hall, Financial Secretary to the Treasury, said that the Treasury was not in favour of limiting the sum. Flexibility was the main thing. Already there was an overall limit in the Bill of £700 000 000 covering the issue of stock—apart from compensation stock—and temporary borrowing, which has been based on the industry's own estimate of expenditure over the next five years.

Mr. Shinwell, after saying that it was too difficult to estimate as to how far the Authority should go in its temporary borrowing, promised to try to find words to write into the Bill that the Treasury should be consulted about the amount of the Authority's overdraft with some form of agreement specifically signed by the Treasury. The amendments were withdrawn.

### BORROWING POWERS

An amendment to reduce the overall borrowing powers of the Authority from £700 000 000 to £400 000 000 was put by Sir Arnold Gridley, who pointed out that the sum was equal to all that the industry had spent in the last sixty years and to be justified would mean that the industry must double its income.

Mr. Gaitskell, rejecting the amendment, said that the industry had before it its greatest period of expansion. The amendment was withdrawn.

The Government also rejected amendments to define the liabilities of the Area Boards in respect of stock, borrowed money, etc., as between them and the Central Authority. On the question of Treasury guarantees for stock issues by the Authority, Mr. Glenvil Hall would not accept an amendment that all such issues should be guaranteed, and said that the Treasury must have the right to lay down the lines and conditions necessary for its guarantee. He added that the issues would " almost in every case " be given such a guarantee.

Mr. Hall assured the Committee that the compensation stock would be freely negotiable and there was no intention of imposing restrictions on its transfer—such as those imposed on the compensation stock in the Coal Bill. Only in special circumstances and for technical reasons would there be a refusal of transfer.

# 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:—

**Blackpool,** May 19.—Supply, delivery and erection of two 20 MVA and one 10 MVA 33/6.6 kV transformers, with on-load tap-changing equipment; and delivery, jointing and laying of various lengths of cable. Specifications from Borough Electrical Engineer, Shannon Street, Blackpool.

**Manchester,** May 20.—Supply, delivery and erection at Stuart Street generating station of ventilating plant in turbine and boiler houses. Specification from Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2; deposit, £1 1s.

**Manchester,** May 20.—Supply, delivery and placing in position, during a two-year period, of static transformers, sizes 500—2 000 kVA. Specification from Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2; deposit £1 1s.

**Newmarket,** May 23.—Supply of 36 specially reinforced concrete lighting columns and 36 lanterns suitable for Class B lighting. Tenders to Clerk of the Council, Stratford House, Newmarket.

**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.

**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.

**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.

**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, Carliol House, Newcastle-on-Tyne, 1; deposit, £2 2s.

## *Bankside Deputation*

FOUR Labour M.P.s, representing between 40 and 50 Government supporters who are opposed to the scheme for erecting a power station at Bankside, were on Tuesday received by the Prime Minister. The deputation, it is reported, submitted to Mr. Attlee the arguments against the scheme which have already been emphasised by the L.C.C. and the other local authorities immediately concerned. The deputation emphasised not merely the æsthetic objections to the scheme but also the effect which it would have upon the future planning of the south bank of the Thames by creating a "dead" area round the power station. The Prime Minister promised to give the matter his full consideration.

On the same day, the London County Council, acting on the recommendation of its Town Planning Committee, expressed "strong opposition" to the proposal, and urged that the decision of the Minister of Town and Country Planning should be reversed.

# Company News

WATFORD ELECTRIC AND MANUFACTURING CO., LTD.—Net prft., 1946, £24 110, agst. £25 198

BRITISH THERMOSTAT CO., LTD.—Fin. div. 11% on ord. (same), plus bonus of 5% (nil), mkg. 23½% (18½%).

MERSEY RAILWAY CO.—Net revenue for 1946 £112 821 (£109 976). To deb. int. £56 143 (same), Pref. div. £19 472 (same). Ord. div. 2⅜% (2½%), fwd. £6 335 (£2 671).

MIDLAND ELECTRIC MANUFACTURING CO., LTD.—Div. on Ord. 20% (15), plus cash bonus 15% (same), mkg. 35%, less tax (30). Trdg. prfts. 1946 were £121 046 (£116 752). Net prft. after taxn. £59 066 (£61 948).

SOUTH WALES ELECTRIC POWER CO.—Net rev. for 1946, plus credit recvd. from C.E.B., £709 814 (£636 036), less dep. £240 000 (same), tax £65 000 (£20 000), defd. reprs. nil (£50 000) and deb. int., etc., lvg. £204 166 (£127 068); fin. 4%, mkg. 6% (same); fwd. £285 787 (£201 621).

MONTREAL LIGHT HEAT AND POWER CO.—Consd. acct. 1946 shows invest. rev. $3 545 160 ($4 155 683), incldg. $58 750 prem. on prefd. stk. redeemed. To exes. $134 998, taxes $1 264 277, prior yr.'s adjusts. (net) $14 164, net income $2 160 048 ($2 417 660). Divs. $2 244 516 (same), deficiency transfrd. to surplus acct. $84 467 (cred. blce. $173 143).

NEWMAN INDUSTRIES, LTD.—Net prft. 1946 after dirs.' fees, pensions, deprecn. and obsolsce., £82 830 (£82 608), repaymt. E.P.T. nil (£2 326), blce. brt. fwd. £22 619 (£20 366), mkg. £105 449 (£105 300). Deduct tax £34 000 (£51 981), pref. div. £4 760 (£5 963), prefd. ord. div. £1 980 (£1 800), ord. div. 12½% (same), plus bonus 2½% (same), mkg. 22½% (same), £28 608 (£22 936), fwd. £36 101 (£22 630).

BABCOCK AND WILCOX, LTD.—Fin. div. of 7% and bonus of 3% on ord., mkg. 15% less tax for 1946, an increase of 2½% on 1945 payment. Prft. for yr. £766 109, plus prov. for Civil Defence and A.R.P., not reqd. £13 380, less prov. for obsolescence £100 000. Prft. for 1945 was £649 956, plus E.P.T. refund of £33 879, tgr. with spec. divs. from subs. of £172 940 net. An alloen. of £175 000 was made to gen. res. in 1945. Warrants payable June 9.

ENFIELD CABLES, LTD.—Prft., 1946. £160 772 (£151 839), invest. inc. £13 672 (£18 413). To deprecn. £35 959 (£33 298), dirs.' fees £300 (£450), A.R.P. £831 (£2 470), tax £83 000 (£74 000), lvg. net prft. £54 354 (£60 034). To res. £25 000 (nil), final ord. div. 3¾% (6¼%), mkg. 7½% (12½%), fwd. £4 408 (£16 304). Floating assets £1 313 644 (£1 092 669), curr. liabs. and provs. £764 673 (£480 626), includg. bank overdraft £152 965 (nil); res. and surplus £204 408 (£191 304).

ELECTRICAL DISTRIBUTION OF YORKSHIRE, LTD.—Sales of electricity, etc., 1946, £1 100 140 (£995 602). Deduct. exes. £729 601 (£646 652), lvg. £370 539 (£348 950), plus other income £28 423 (£23 574), mkg. £398 962 (£372 524). To tax £124 926 (£129 685), int. and bank charges £18 490 (£17 132), dirs.' remun. £3 000 (£2 000), lvg. net prft. £252 546 (£223 707). To deprecn. and res. fund £115 000 (same), tax res. £22 000 (nil), ord. div. 9% (same), fwd. £58 000 (£60 006).

CANADIAN MARCONI, LTD.—Trdg. prft., 1946, $103 715 ($641 139), invest. income $57 757 ($17 442), prft. from sale Can. bds. $14 801 (nil), transfer from gen. res. $150 000 (nil), less exes. of re-estab. plant facilities $132 647 (nil), lvg. net credit blce. $193 624 ($658 581). To deprecn., fees, exes., remun. and legal exes. $219 573 ($347 976), lvg. net loss $25 947 (net prft. $197 605). Deduct loss from earned surplus of $775 813, leaves surplus fwd. $749 865. Curr. liabs. $2 582 246 $2 331 448), but curr. assets $4 761 589 ($4 799 920).

BRITISH INSULATED CALLENDER'S CABLES, LTD.—Fin. div. ord. 6%, mkg. with intm. 10% actual for 18 mos. ended Dec. 31. Trading prft. for 18 mos. is stated as £1 584 170, to which is added int. and divs. on invests. £651 806 and prft. on realisn. of invests. £69 580, mkg. total £2 305 556. Deprecn. £486 442, dirs.' fees £47 988, N.D.C. and overseas taxn. £98 751 and U.K. inc.-tax £781 598. Pref. and ord. intm. £294 088. Proposed ord. fin. £304 933. After providing £100 000 towards future taxn. liabs. carry-forward £191 756.

A. REYROLLE AND CO., LTD.—Tdg. prft. for 1946, £322 054 (£295 110), plus other income £17 962 (£16 787), mkg. £340 016 (£311 897). To deprecn. £68 092 (£65 743), renewals provn. £10 000 (same), staff superannuation £26 668 (£22 278), dirs.' fees £1 600 (same), int. £12 250 (£5 575), taxn. £100 000 (£110 000), gen. res. £25 000 (nil), devpt. expend. £20 000 (£21 509), pref. div. £3 946 (£3 767), fin. ord. div. 7½%, mkg. 12½% (same), fwd. £121 914 (£120 917). Current assets £3 109 773 (£2 731 939), current liabs. £1 431 409 (£1 039 504), res. and surplus £1 556 449 (£1 500 452).

HOFFMANN MANUFACTURING CO., LTD.—Full report 1946 shows trdg. prft. £144 963 (£47 104), plus other inc. £13 029

(£12 384), mkg. £157 992 (£59 488). Deduct taxn. £30 000 (nil), deprcn. £70 735 (£61 892), etc., lvg. prft. before deb. int. £24 689 (loss £32 092). After crediting E.P.T., etc., recoveries £140 000 (£100 000 transfd. frm. inc.-tax res.) and bringing fwd. £119 922 (£114 004), avail. blce. £284 611 (£181 912). To deb. int. £6 097 (£5 740), pref. div. £20 625 (£18 750), ord. div. 7½%, tax free (same), res. for spec. deprcn. and obsolesence £100 000 (nil); fwd. £120 389.

VACTRIC, LTD.—Tradg. prft. yr. ended Mar. 31, £126 588 (loss £121 852), less dirs.' fees £850 (£912), and deprecn. £24 066 (£1 070), lvg. £101 672 (loss £123 834). Add div. from subsid. co. £443 (£361). (Last time taxatn. res. not reqd. £26 061, was credited.) Deduct. taxn. £10 563 (nil), cum. skg. fnd. £7 598 (nil), pref. div. £3 485, and debit brot. in £76 513. Credit fwd. £3 956. Consd. blce. sheet shows fixed and moveable assets totalling £232 620 (£182 515), stock, work £244 381 (£146 409), debtors £301 932 (£209 238), cash £5 493 (£520). Current and deferred taxn. £23 830 (£9 309), creditors £315 435 (£161 616), bank overdraft £37 829 (£73 768). Cap. res. £107 659 (£96 847), gen. res. £8 068 (same).

BRITISH ELECTRIC TRACTION CO., LTD.—Revenue for yr. ended Mar. 31, 1947, £823 261 (£795 422), deductg. general expenses, etc., and debenture stock interest, and provdg. £305 005 for taxtn. (£316 350) there remains for appropriation (subject to audit) £365 992 (£337 562), for the previous year. The directors recommend the payment of the following fin. divs., less tax, for the year ended Mar. 31, 1947: 5% on parteptg. pref. stock (making, with int. div. 3% already paid, 8% for yr.); 4% on prefd. ord. stock (making with int. div. 4% already paid, 8% for yr.); 35% on the defd. ord. stock (making with int. div. of 15% already paid, 50% for yr.); and leaving £58 819 to be transferred to undivided profits acct.

LANCASHIRE ELECTRIC LIGHT AND POWER CO., LTD.—During 1946, announced Sir Joseph Nall (chairman) at the annual general meeting, the total output from the company's generating stations amounted to 1 086 million units, an increase of 35 million units over the previous year. The maximum demand, at 230 728 kW, was an increase of 7 039 kW over the previous record. Work on the extension of Kearsley power station continued throughout the year, but had since been seriously retarded, and the original programme, which was already 12 months in arrear at the end of 1946, would now suffer a further serious delay. According to the official figures, Sir Joseph went on, the company-owned power stations in North-West England topped the list in all comparable headings of efficiency figures. Their stations had been maintained at a high level of efficiency, but it was inevitable that sections of plant would have to be withdrawn for heavy repairs in the near future.

TELEGRAPH CONSTRUCTION AND MAINTENANCE CO., LTD.—Speaking at the recent annual meeting, Lord Colgrain (chairman) said that the company had developed new lines of manufacture in plastics and certain high-grade magnetic metals, and the order book was now most satisfactory in every branch. Owing to an acute shortage of fine wire drawing facilities, they had recently acquired a controlling interest in a factory specialising in this kind of work, and for the same reason were installing a plant for the drawing of fine wire to meet their own demands. Referring to the sellers' market and the fantastic prices which, he declared, were in existence today, the Chairman said they could not expect the situation to continue indefinitely, and when changes came it would be important for a factory to make those things which it could produce most efficiently and be able to sell in competition with others. Mass production had never been the aim of their company, he said, and the majority of their products required very special technique and careful attention in manufacture.

# Metal Prices

| | | Monday, Price | Inc. | May 12 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* (60/40)— | | | | |
| Rod basis | „ | 1s. 2¼d. | — | — |
| Wire | „ | 1s. 6½d. | — | — |
| *Iron and Steel*— | | | | |
| Pig Iron (E. Coast Hematite No. 1) | per ton | £8 19 0 | — | — |
| Galvanised Steel Wire (Cable Armouring) basis 0.104 in. | „ | £34 5 0 | — | — |
| Mild Steel Tape (Cable Armouring) basis 0.04 in.) | „ | £21 15 0 | — | — |
| *Lead Pig*— | | | | |
| English | „ | £91 10 0 | — | — |
| Foreign and Colonial | „ | £90 0 0 | — | — |
| *Tin*— | | | | |
| Ingot (minimum of 99.9% purity) | „ | £440 10 0 | — | — |
| Wire, basis | per lb. | 5s. 6¾d. | — | — |
| *Aluminium Ingots* | per ton | £80 0 0 | — | — |
| *Spelter* | | £70 0 0 | — | — |
| *Mercury* (spot) | per bott. | £17 13 6 | — | £3 6 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.

# 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.*

DRAPER ELECTRICAL INDUSTRIES, LTD., London, W.—March 19. £500 deb., to J. F. Draper, London, general charge.

FARM AND GARDEN ELECTRIFICATION, LTD. (formerly ALLAN MONKHOUSE, LTD.), Southall.—March 18, deb., to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *——. December 31, 1944.

REDIFFUSION, LTD., London, S.W.—March 22, Trust Deed dated March 21, 1947, securing £250 000 and premiums varying up to 3 per cent. created and issued by Midham Property Co., Ltd.; charged on Carlton House, Regent Street, S.W., and fittings, etc. *£72 679. June 6, 1946.

REEDS ELECTRICAL (SOUTHALL), LTD.—March 21. £3 000 charge, to Miss B. Baxter, Harrow-on-the-Hill; charged on 74 and 76, The Green, Southall. *Nil. November 2, 1946.

FRANKLIN ELECTRIC CO., LTD., London, W.—March 24, mort. and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 98, Charlotte Street, W.1, with machinery, fixtures, etc., and general charge. *Nil. November 4, 1946.

SCIENTIFIC RADIO AND INSTRUMENTS, LTD., Luton.—March 25, £4 000 debs.; general charge. *——. September 20, 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.*

BRACEWELL'S (NELSON), LTD., Crowther Street Works, Nelson, Lancs, electrical engineers. £19 6s. 3d. February 28.

LACEY, A. L. (male), 5, Ladbroke Walk, Notting Hill, W., electrical engineer. £21 14s. 6d. February 20.

TARBOX, Fredk. Alfred, 14, Hale Drive, Mill Hill, Middx., electrician. £23 7s. 8d. January 28.

MILLICHAP, J. B. (male), 24, Dartmouth Road, Paignton, Devon, radio merchant. £44 17s. 2d. February 27.

NEW DAWN TRADING CO. (a firm), 59-59a, Dartmouth Road, Forest Hill, Kent, battery makers. £39 11s. 3d. February 18.

INCE MORRIS (a firm), 12a, High Street, Urmston, Lancs, electrical engineers. £22 1s. 6d. February 20.

MONTRONI, H. (male), 7, Market Arcade, Farnworth, Lancs, radio and electrical engineer. £18 12s. 4d. February 25.

ATTRACTA ELECTRIC CO., LTD., R/O, 29, Corsica Street, Highbury, Middx, electrical manufacturers. £24 18s. 11d. and £113 4s. 10d. February 17.

CLOUT, Albert Edwin, 139, Goldhawk Road, W.12, and MOSS, Ronald David, 32, Aldbourne Road, Shepherd's Bush, radio mechanics. (Trading as PHŒNIX RADIO CO.) £31 1s. 6d. February 5.

GRAINGE, Joseph Bernard, 6, Main Street, Bempton, Yorks, electrical engineer. £50 5s. 8d. February 4.

# Coming Events

### Friday, May 16 (To-day)

WOMEN'S ENGINEERING SOCIETY.—London. "Women in Post-War Engineering." *7 p.m.*

### Saturday, May 17

I.E.E., N. MIDLAND STUDENTS' SECTION.—Leeds. Annual General Meeting and Film Show. *2.30 p.m.*

### Sunday, May 18

BRITISH KINEMATOGRAPH SOCIETY.—London. "Sound Reproducing Equipment," by H. J. Odell. *11 a.m.*

### Monday, May 19

BRITISH INSTITUTION OF RADIO ENGINEERS.—Bournemouth. At the Tollard Royal Hotel. Radio Convention, until May 23.

I.E.E.—London. Convention on Automatic Regulators and Servo Mechanisms, until May 22.

### Tuesday, May 20

I.E.E., N. IRELAND CENTRE.—Belfast. Annual General Meeting. "Radiolocation." by Dr. E. C. S. Megaw. *6.45 p.m.*

### Wednesday, May 21

I.E.E., SOUTHERN CENTRE.—Haslemere. At the Admiralty Signal Establishment. "The Development and Study of a Practical Spaced-Loop Radio Direction-Finder for High Frequencies," by W. Ross. *7 p.m.*

### Thursday, May 22

I.E.E., SOUTHERN CENTRE.—Haslemere. At the Admiralty Signal Establishment. "Frequency Modulation," by K. R. Sturley. *5.45 p.m.*

### Friday, May 23

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.*

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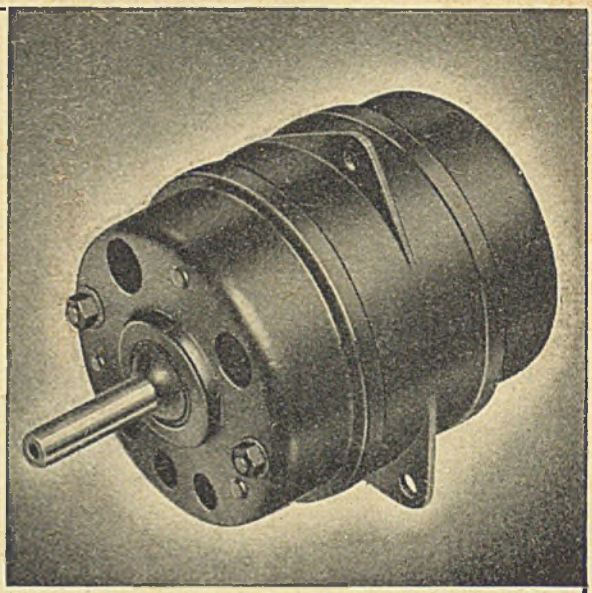

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| H.P. | Overall Length | Body Diameter | Approx. Weight |
|---|---|---|---|
| 1/6 | 10 7/32 in. | 6 9/16 in. | 24 lbs. |
| ¼ | 10 15/32 in. | 6 9/16 in. | 26 lbs. |
| ½ | 11 25/32 in. | 6 9/16 in. | 36 lbs. |

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