

All's not well with output in this factory. Operatives, plant and organization are right but some factor is wrong. Something is putting a damper on production.

It could be bad ventilation.

Unless an efficient ventilation system is installed the effects of excessive heat and bad ventilation cannot be avoided. Workers' energy will be sapped, enthusiasm damped and increased production made impossible.

Not only will an efficient system of ventilation help to increase war-time production but it will add immeasurably to health and output in the postwar years too.





CONSULT THE G. C. ON VENTILATION

with **GENALEX**

Gen. 15

March 9, 1945





Igranic Magnetic Speci alities have been tried and proved in some of the largest industrial plants in this country. They are built to withstand years of arduous

Igranic Magnetic devices include : Magnetic Brakes Magnetic Clutches Lifting Magnets Magnetic Separators Magnetic Solenoids, etc.

Illustration above shows Igranic Lifting Magnet, Below, Igranic Type "M" Magnetic Brake.

Write for Detailed Leaflets

IGRANIC ELECTRIC COLTP LONDON & BEDFORD

A

ELECTRICAL REVIEW

ł

1 THE VALUE OF CONTRAST) Even the raising of water temperature must work against the clock-especially to those who have to work against time in obtaining ample supplies of Hot Water. We do not decry the virtues of the Coal Range in providing employment for otherwise idle hands. We simply contrast it with a Heatrae. LEADERS IN ELECTRIC WATER HEATING ILATRAE PHONE : NORWICH 25131 GRAMS : HEATRAE, NORWICH HEATRAE LTD., NORWICH TERMINALS TAC WE MAKE ELECTRIC WELDING MACHINES SPOT, SEAM AND BUTT FOR WIRELESS WELDERS IDE RANGE OF AND SIMILAR SIZES IN STOCK CONNECTIONS 35 years' experience SSCOURTNEY& Co. Ltd Automatic or Non-ASHBROOK ROAD, LONDON, N.I9 Automatic With or without Electric Control The guickest and most economical method of Welding Oil Drums, Bars, Tyres, Wheel Rims, Tubes and Angles. r Rings II kVA Spot Welder the specific quirements of ur customore The WESTMINSTER ENG. Co. Ltd. Victoria Road, Willesden Junction, N.W.10 Alternators Motors, and Dynamos, from all Transformers Rewound and Re-constructed. "Westminster" Brush Holders. Process Arc Lamps Telegrams : "Regency, Phone, London." MCL and REPETITION LTD. Pool Lane . Langley . Birmingham. Telephone: Willesden 1700-1

March 9, 1945

Still as

Don't miss the boat

Still available

To sell a lamp is almost equivalent to recommending it. Therefore, if you sell inferior lamps now you should not be surprised if your customers "leave you behind" when the war is over and they



2

can pick and choose. Sell Kye—the lamp that is worth recommending because it is reliable. Kye always was a best-seller—and it always has been best to sell, for goodwill.

FOR GOODWILL AND SALES



ENCTOR METER

EAD

2

8

REYROLLE

98

10.95

0

LAG NFD

ORDINARY OR TROPICAL PROJECTING, FLUSH, OR CONTROLLER-TYPE

4

ELECTRICAL REVIEW

March 9, 1945



ELECTRICAL REVIEW

RECTIFIERS FOR TRACTION AND INDUSTRIAL SERVICE USED THROUGHOUT THE WORLD STEEL-TANK PUMPLESS AIR-COOLED TYPE Some of the LARGEST STEEL-TANK RECTIFIER TER-COOLED INSTALLATIONS /DE IN THE WORLD are of **BTH MANUFACTURE** No other manufacturer has such a wide experience in the application of GLASS-BULB TYPE Mercury Arc Rectifiers of ALL TYPES SPECIFY BTH RUGBY THE BRITISH THOMSON HOUSTON COMPANY LIMITED, RUGBY, ENGLAND A3513

5

AI TYPE INDUCTION

MOTORS

0

March 9, 1945

125 H.P. 490 r.p.m. 2750 Volts. Haulage

Motor.

250 H.P. 290 r.p.m. 400 Volts, Rolling Mill Drive,

Specify the INDUCTION MOTOR for ALL RATINGS. Speeds and Voltages and ensure troublefree running.

300 H.P. 420 r.p.m. 2900 Volts. Colliery Fan Drive.

SOLID YOKES MASSIVE BEARINGS SUBSTANTIAL SHAFTS SPIGOTED END BRACKETS · FULLY PROTECTED · FREE VENTILATION FLAME PROOF SLIP RING COVERS (IF REQUIRED) · MICA INSULATION PEDESTAL BEARINGS, END SHIELD BEARINGS OR PEDESTAL-ON-BRACKET BEARINGS SLIP RING, SQUIRREL CAGE OR HIGH TORQUE BEDPLATES OR SOLEPLATES ALL ENCLOSURES ALL DRIVES BSS 168 - 169 or 226.



185 H P 715 r p.m. 2750 Volt Squirrel Cage Motor

CT 301

AI

INCREASE PRODUCTION BY Consulting METROVICK'S ILLUMINATING ENGINEERS STURT. Flue Di



straction Plant

THE CLEANEST WAY TO CLEAN BOILER FLUES EXTRACTS ALL DUST AND DIRT REDUCES THE LABOUR INVOLVED

Many units are operating successfully in power stations, gasworks, and power plants of factories engaged on essential war work.

May we send you particulars?

STURTEVANT ENGINEERING CO. LTD. 25.Worcester Road, Sutton, Surrey.

TELEPHONE : VIGILANT 2275

March 9, 1945

Unusual Undertakings

by the Tank People.



YET another unusual installation by Braithwaites are these water treatment tanks erected in Iraq. Two batteries of tanks, carried on steel structures at different levels, provide primary and secondary sedimentation. They play an essential part in the adequate purification of heavily silted water in a semi-tropical location.

Tanks for all storage needs are fully described in the latest Braithwaite brochure. You are invited to apply for a copy.



PRESSED STEEL TANKS

BRAITHWAITE & CO. ENGINEERS LTD., 45 KINGS HOUSE, HAYMARKET, LONDON, S.W.1 · TEL. ; WHItehall 3993

π

993

March 9, 1945

SIEMENS TELECOMMUNICATION EQUIPMENT

for service in all parts of the world

Contractors for the supply and installation of complete Automatic and Manual Telephone Exchanges for Public and Private Service. Automatic and Manual Trunk Exchanges, all types of Telephone Cables for Trunk and Local Service, and Carrier-Current and Repeater Equipment for Telephone Lines.

Siemens Telecommunication Equipment is giving thoroughly efficient service in all parts of the World.

PRIVATE TELEPHONE SYSTEMS PUBLIC TELEPHONE EXCHANGES CARRIER - CURRENT EQUIPMENT TELEPHONE INSTRUMENTS OF ALL TYPES PROTECTIVE APPARATUS RELAYS . . . TELEPHONE CABLES CARRIER - CURRENT CABLES LOADING COILS CELLS & BATTERIES

9

Dry, Fluid & Inert

SIEMENS BROTHERS & C. LTP

SETABLISHED 1858

Telephone I WOOLWICH 2020

March 9, 1945

G.G.C. FLAMEPROOF SWITCHES AND SWITCH FUSES British Standard 542



S 510 Patent No. 457209 5 amps. 250 volts. 10,15 amp. capacities also available [S_513] Flameproof Cable sealing gland and armour clamp (Patent No. 471210)

S 515 Key for cover bolts

Designed for use in all places where there is risk of inflammable atmosphere.

Certified by H.M. Mines Dept. and the Home Office. Certificate No. FLP825 Groups I and II. Tested and approved for Group III. Test report No. P36.

Adut. of The General Electric Co. Ltd., Head Office, Magnet House, Kingsway, London, W.C.2

The MINEX

This popular small portable fire is one of the models which we plan to put into production again as soon as conditions allow ... to meet the more urgent demands of your customers for efficient radiant heating.

FIRST FOREMOST HOTTEST



RADIANT ELECTRIC



FERRANTI LTD., Moston, Manchester, 10. London Office: Kern House, Kitgenzy, W.C.2.

March 9, 1945



1945

ż

Ē



Selectivity & Simplicity

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. MILTON COURT · WESTCOTT · DORKING · SURREY PHONE-DORKING 3241 (10 LINES) TELEGRAMS: HENLETEL OORKING

13

March 9, 1945

t a -1

HEENAN TWINTUBE ECONOMISERS

AND THE INDUSTRIAL POWER PLANT

Three of the important constructional features which keep Heenan Twintube Economisers still pre-eminent

Straight Self-Cleaning Gas Passages

Easy Inspection of Water Tubes

Economy of Space

SENIOR ECONOMISERS, LTP II, SOUTHAMPTON ROW, LONDON, W.C.I



Thirty years of high speed progress in low speed drives

Nottingham, Peterborough, Sheffield, Wolverhampton.

Birmingham, Bristol, Dundee, Glasgow, London, Manchester,

MOTORS

March 9, 1945

DESIGNED AND MANUFACTURED BY SPECIALISTS WITH OVER 35 YEARS EXPERIENCE XXXXX still stands as the unequalled name for ... mality ELECTRIC HEATING APPLIANCES ... - KETTLES · FIRES IRONS . TOASTERS COFFEE PERCOLATORS, etc. PREMIER ELECTRIC HEATERS LTD · BIRMINGHAM 9 RP-372

16

1948

PN DESIGN-TOTALLY ENCLO

All Newman Motors are totally enclosed against dust, dirt and moisture. Ball-bearings provided with greasegun lubrication. Three Points which will save you many man-hours of maintenance during their long trouble-free life. Delivery from stock.

Head Sales Office : 32 VICTORIA ST., LONDON, S.W.I.

I OTALLY ENCLOSED - FAN COOLED N, S.W.I. Abbey 2023

z,



18

45

19



LONDON LEEDS MANCHESTER GLASGOW BIRMINGHAM NEWCASTLE CARDIFF DUBLIN



GLOVERS II kV Transmission Lines

W. T. GLOVER & CO. LTD. TRAFFORD PARK, MANCHESTER 17

NALDERS LONG-SCALE B'S INSTRUMENTS GRADE



The Wattmeter shown is typical of N.C.S. Long Scale Induction Instruments for the measurement of alternating currents, Ammeters and Voltmeters being sold at the same prices as moving iron types for equivalent scale lengths. Sizes range from $2\frac{1}{2}$ " to 20" diameter dials, every instrument being strong, accurate, efficient and well finished, its performance fully guaranteed by Nalders' experience and reputation.

Write for details and prices

NALDER BROS. & THOMPSON LTD. DALSTON LANE WORKS, LONDON, E.8

Telephone : CLIssold 2365 (3 lines)

Telegrams : "Occlude Hack, London "



28

Make use of Time, let not advantage slip; Fair flowers that are not gather'd in their prime Rot and consume themselves in little time SHAKESPEARE (Venus and Adonis)

Time and time again ...

mighty pens have been applied to the importance of using time in season.

Correct time-keeping is the best means to the wisest use, of time. May we offer the reminder that the Ferranti Clock gives precisely accurate time year after year.



FERRANTI LTD.Hollinwood, Lancs. London: Kern House, Kingsway,W.C.2.



E L E C T R O T I N N I N G

The Modern Process, using Stannate Tin Solution, produces strictly controlled coatings, predetermined and uniform in thickness, even on articles of irregular shape.

of irregular shape. Deposits of reasonable thickness may be built up, which are not possible with a tin chloride bath.

The solution also permits of a faster speed of deposition.



145



Single Phase Transformers for 31.5 mVA 3-phase 115/10.5 Kv 50 cycles each fitted with fully insulated off current tapping switch

Also manufacturers of :--

STEAM TURBINES, TURBO-ALTERNATORS, D.C. GENERATORS, TURBO-BLOWERS, TURBO-COMPRESSORS, SURFACE CONDENSING PLANT, GEARING SEARCHLIGHT REFLECTORS, ETC., ETC.



NEWCASTLE-ON-TYNE, 6

London Office: 56 VICTORIA STREET, S.W.I

VITAL TECHNICAL PROBLEMS

We have solved them for Government departments and others. Can we assist you in your post-war production plans? Our staff of technical experts will at all times be happy to give unbiased advice on any and every Die Casting problem involving the use of ALUMINIUM-BRONZE. ALUMINIUM ALLOYS, BRASS and WHITEMETAL.

THE

Non-Ferrous DIE CASTING COLID

Nonferdica Works, North Circular Road Cricklewood, London, N.W.2 Phone : GLAdstone 6377



Send for Particulars of Young Balleries for Electric and Motor Vehicles to THE YOUNG ACCUMULATOR COMPANY LIMITED Sales Office: Electric Bruss, Vietoria Embankment, W.C.2 In Association with Gramston Parkinson Limited



BRANDON ELECTRICAL ENG. CO. (LEEDS) LTD. NANCROFT MOUNT, CHAPEL LANE ARMLEY, LEEDS 12 Telephone - 37058

5 Likts

-

n

VICE

Ø.

E



Half a century of research and experience in design and manufacture of Low Tension Switchgear, Switchfusegear, Distribution Boards, Switchplugs, Sockets and Plugs, enables us to guarantee you the highest quality equipment whether for control of domestic appliances or to deal with the most severe conditions applying in the modern factory.

WRITE FOR LIST 137 Wm. SANDERS & Co. (WEDNESBURY) Ltd., FALCON ELECTRICAL WORKS, WEDNESBURY, ENGLAND

27

On the road to Victory

AS THE ROAD TO VICTORY OFENS ORCES 10000 (S. THE **BS, THE SHIPS, ALL** DEPEND O

Regd. Trade Mar No's. 566 535 4-7

requirements, C.M.A. Cable their unfailing reliabili



British insulated Cables Ltd.

Callender's Cable & Construction Co. Ltd. Connollys (Blackley)

Ĺtd. The Craigpark Electric Cable Co. Ltd.

MEMBERS OF THE CABLE MAKERS Crompton Parkinson Ltd. (Derby Cables Ltd.

The Enlield Cable Works Ltd. Edison Swan Cables Ltd W. T. Glover & Co. Ltd Greengate & Irwell Rubber Co. Ltd.

Advt. of the Cable Makers' Association, High Holborn House, 52-54 High Holborn, London, W.C.I.

W. T. Henley's Tele-graph Works Co. Ltd.

ohnson & Phillips Ltd

The India Rubber, Gutta-Percha & Tele-graph Works Co. Ltd.

(The Silvertown Co.) Liverpool Electric Cable Co. Ltd.

ASSOCIATION

The London Electric Wire Co. and Smiths Ltd. The Macintosh Cable Co. Ltd. The Metropolitan Electric Cable & Construction Co. Ltd. Pirelli-General Cable Works Ltd. (General Electric Co. Ltd.)

St. Helens Cable & Rubber Co. Ltd.

Siemens Brothers & Co. Ltd. (Siemens Electric Lamps and Supplies Ltd.)

Standard Telephone & Cables Ltd

Union Cable Co. Ltd

Phone Holborn 7633

3.14



Forder Lines of States



The 16 gauge Lectro-Shear will cut any irregular shape in sheet metal. Manimum radius 3/4 of an inch. Are you ready to get away quickly into peacetime production ? Has your plant the fastest and most efficient tools ? These are the questions which demand urgent answers. — The answer to many of your plant problems will be found in the wide range of Black & Decker Portable Electric Tools with their ample power to secure maximum output with minimum operator fatigue.

Plan NOW — and plan to use B & D Portable Electric Tools.

Inicker and better with Black & Decker

PORTABLE ELECTRIC TOOLS FOR ALL INDUSTRIES

BLACK & DECKER LTD HARMONDSWORTH MIDDX 'PHONE: WEST DRAYTON 2681 6 'GRAMS' BLACDECK,'' WEST DRAYTON BRANCH SERVICE STATIONS LONDON, BIRMINGHAM, BRISTOL, GLASGOW, LEEDS, MANCHESTER, NOTTINGHAM 30



.740

RI

March 9, 1945

No series

Who's huggable?

THE human waist is a matter of taste. Some prefer the Sylph-like form, others the lines of Two-ton Tessie. But to the worker who has got to hang. on hour after hour to the waist of a small power tool squeezing it gently every few seconds, there are definite advantages in slimness. A half inch extra in the "spread" of the grasp may seem nothing at 7 or 8 ack emma. But by ten o'clock a man will have cramp in his fingers, a droop in his wrist and a sinking feeling in his tum. It only remains to add (said the lecturer) that nobody yet has made a small power tool with as slim, elegant and huggable a waist as that prince of power tool manufacturers . . . (H'mm) . . .

DESOUTTER Specialists in Lightweight, Pneumatic & Electric Portable Tools DESOUTTER BROS LTD., (Dept R), The Hyde, Hendon, London, N.W.9, Telephone: Colindale 6346-7-8-9. 'n

ELECTRICAL REVIEW

a

ANGENT

March 9, 1945

T

1

03

0

SOUND SIGNALS LUMINOUS GALL SYSTEMS STAFF LOCATORS MINING SIGNALS FIRE. BURGLAR & BANK RAID ALARMS TELEPHONES RELAYS WATCHMAN'S CLOCKS ELECTRIC IMPULSE AND SYNCHRONOUS CLOCKS STRIKING, CHIMING AND TOLLING MECHANISM LIQUID - LEVEL INDICATING RECORDING & ALARM APPARATUS IDLE-MACHINE & OUTPUT RECORDERS PROCESS TIMERS SPECIAL

PIONEERS

in the Electrical Industry, the pre-war pre-eminence of GENTS' of Leicester will not be forgotten when Peace is once more proclaimed and Industry demands the products they manufacture. GENTS'

APPARATUS. ETC



GENT & CO. LTD., Faraday Works, LEICESTER ALSO LONDON . NEWCASTLE-ON-TYNE

11

What price a million homes?

he cost of post-war building will largely depend upon the cost of each component. And the cost of each component will depend upon the way in which it is produced. Only the New Craftsmanship of large scale production organised upon the most efficient lines can combine low cost and quantity



with the quality which the public will demand.

M.E.M. Switch and Fuse Gear has shown how this can be done. In the largest and most self-contained factory specialising in such gear M.E.M. had, up to the war, progressively reduced costs and prices and at the same time improved quality. This steady increase in production efficiency goes on and M.E.M. are ready to pass its benefits on as a contribution to the rebuilding of Britain after the war.



SWITCHGEAR MOTOR STARTERS • FUSEGEAR ELECTRIC FIRES

MIDLAND ELECTRIC MANUFACTURING CO LTD., TYSELEY, BIRMINGHAM, 11 London Showrooms and Stores: 21-22 Rathbone Place, London, W.I • Manchester Showrooms and Stores. 48-50 Chapel Street, Salford, 3

March 9, 1945



QUEENSWAY, PONDERS END, MIDDX.
RME



ON PATROL

ON TRADE ROUTES W

ON PLEASURE BENT

ROYAL EDISWAN "LAMPS

Fluorescent Tubes provide pleasing modern schemes for the lighting of ships



THE EDISON SWAN ELECTRIC CO. LTD.

155 Charing Cross Road, London, W.C.2 L S7

"Sterling"

has served the

Electrical Industry

throughout the world

for

50 years

MADE BY CHEMISTS

SERVICED BY ENGINEERS



Telephone : TRAFFORD PARK 2231 Tel. Address : "DIELECTRIC MANCHESTER " London Office-Phone : STREATHAM 7389. London Stores-Phone : HOP 3791

1, 1945

ER

調



COMPONENT PARTS OF THE STANDARD SELENIUM RECTIFIER

No. 1 100

8

000

THE BEST IN SERVICE

Standard Telephones and Cables Limited New SouthGATE, LONDON, N. 14

.

00

Ð

10

ELECTRICAL REVIEW

March 9, 1945

supplies

58

LTD.

LTD.



LECTRA HOUSE

1943

ubi

FI

ELECTRICAL REVIEW

39

Built by B.E.T.

• Grid' transformer.

B.E.T. have supplied over 3,000,000 kVA of transformers to the C.E.B. Large and small users of transformers find B.E.T.'s exceptional experience and technical resources to be invaluable in arriving at efficient and reliable designs.

British Electric Transformer

Company Limited

CTORIA EMBANKMENT, LONDON,

ELECTRICAL REVIEW

March 9, 1945

March ?



3-PHASE MOTORS



Squirrel cage, totally enclosed, surface cooled $\frac{1}{6}$ H.P. to 5 H.P. at almost any speed.

In the long range of NECO motors this type is one in priority demand for present and post-war industrial application.

Please write for full specification.

THE NORMAND ELECTRICAL CO. LTD. NORTH STREET - CLAPHAM COMMON LONDON S W 4 TEL: MACAULAY 3211-4 THIS !





THIS SORT OF THING CAN GO ON FOR EVER

A rabbit may be a dunce at some things, but he does know his multiplication. But don't be deceived. This is no family—it's the same rabbit every time. Study each one (through a magnifying glass if you like) and you'll find they're all exactly alike. You get the same thing among Tru-Wel electrically welded steel tubes. They are mass-produced at speed, million after million. Every length receives the same examination and tests for precision. Tru-Wel Tubes come to you ready for your job, all identical in dimension, strength, and concentricity,



according to your orders, so that manipulation provides absolutely uniform results. Yes—this sort of thing will go on for ever.

MADE BY TUBE PRODUCTS LTD

A MEMBER OF THE TUBE INVESTMENTS GROUP

ELECTRICAL REVIEW

March 9, 1945

BABCOCK & WILCOX LTD. MANUFACTURE COMPLETE STEAM RAISING PLANTS OF EVERY DESCRIPTION

FOR LAND AND MARINE SERVICE

Water Tube Boilers. Superheaters. Economisers. Air Heaters. Water Wall Furnaces. Travelling Grate Stokers. Spreader Stokers. Complete Equipment for Pulverised Fuel Plants. Oil and Gas Burning. Waste Heat Utilisation. Bagasse, Black Liquor and other Special Fuels.

42

Soot Blowers for Manual or Automatic Operation. Pipework. Valves. Attemperators. Coal and Ash Handling Plant. Hydrojet Ashing System. Fuller-Kinyon Transport System. Cranes and Transporters. Charging Machines. Wagon Tipplers. Steel Buildings. Fusion Welded Drums.

PRESSURE VESSELS OF EVERY DESCRIPTION.

WORKS : RENFREW & DUMBARTON, SCOTLAND & REGENTS PARK, N.S.W., AUSTRALIA



Head Office :---BABCOCK & WILCOX, LTD. BABCOCK HOUSE, FARRINGDON STREET,

LONDON, E.C.4.

TELEPHONE : CENTRAL 3282.

Branch Offices, Agents or Representatives in all principal cities at home and abroad.

ELECTRIC	CAL R EVIEW
March 9, 1945 Contents :—	Managing Editor : Hugh S. Pocock, M.I.E.E. Technical Editor : Commercial Editor : C. O. Brettelle, M.I.E.E. J. H. Cosens
Editorial. — The Severn Scheme Cordite Production Industrial Electric Locomotives Suspension Insulators. By A. G. Beech, B.Eng., A.M.I.E.E. Unusual Cable Fault. By R. S. Bennett, A.M.I.E.E. Future Generating Plant. By "Manufacturer" Forthcoming Events Personal and Social Correspondence. Power Station Damage	PageContents continued :Page331Commerce and Industry351333Lighting and Interior Design354338Moulding Thermo-Plastics355339System Maintenance357339Kitchen Planning359340Synchronous Machine Losses360Electricity Supply361341Financial Section363342New Books368343News from France369344Contract Information370347Classified Advantagements71

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.I Telegraphic Address : "Ageekay, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (35 lines). Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.

Index to Advertisers

Annual Subscription, Post free : British Isles, £2 7s. 8d. ; Canada, £2 3s. 4d. ; Elsewhere, £2 5s. 6d. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."



Views on the News

This illustration shows a W. & G. Domestic Appliance Connector, one of many types of insulated Connectors supplied with and without earthing attachments and also with Switches, both single and double pole.

80

A wide and comprehensive range of Electrical Accessories is available to consumers for National Service.

WARD& GOLDSTONE LTD. PENDLETON, MANCHESTER. 6 ESTABLISHED OVER HALF A CENTURY

ELECTRICAL REVIEW

March 9, 1945

Vol. C

EARTH LEAKAGE INDICATORS

A Leakage Indicator is available for every system, including :---

- Type AS. for Trolley Bus systems with insulated negatives.
- Scaled direct in ohms.
- Type HS. for three-phase with earthed neutral.
 - A leakage of th ampere clearly shewn and yet cannot be damaged by the heaviest fault current.
- Current Transformer slips on Earth Conductor.





WRITE FOR CATALOGUE SHEET 340

TYPE HS.

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

Manufacturers of all kinds of indicating and recording electrical instruments. **Photometry** experts is



Vol. CXXXVI. No. 3511.

MARCH 9, 1945.

9d. WEEKLY

The Severn Scheme

Economics of Tidal Power

A NY idea that tidal power would necessarily provide a cheap source of electrical energy if properly tackled by engineers will be dispelled by a study of the new Report on the Severn Barrage Scheme, particulars of which were given in our last issue. Its technical problems offer no serious obstacles, but the investigating panel of engineers has not had an easy task in establishing an economic case in regard to the early future.

The difference between conditions now and twelve years ago when the previous Barrage Report was published is shown by the present estimate of £47 million (including transmission) for an unregulated output of electricity. This exceeds by more than one-quarter the whole cost anticipated for the earlier scheme, which included a storage reservoir and ancillary station to furnish a supply as the load might require. Pumped storage would now, however, swell capital costs by 40 per cent., making tidal power more expensive than the steam equivalent. The bearing of lower rates of interest and greater speed of construction was discussed by us last week.

Effects on Grid Operation

Under the present proposals, the electricity generated at the Barrage would be dumped on to the grid as and when available and, since for 3,760 hours in the year the amount produced would be negligible, there would be no saving in kW capacity of coal-fired stations, so that the overall cost of tidal power would have to compare with that of the running component only of the coal cost. In 1933 with coal at not much more than one-third of the average price paid to-day in the areas to be served, the loss of tidal energy in pumping, about 27 per cent., was less important, but the disposal of unregulated kW would not have been practicable. As matters stand to-day the number of kW that can be taken by the grid needs to be limited to 20 per cent. of the aggregate maximum demand on it and some complications are likely to be introduced into the parallel operation of steam stations and into system regulation. The last will presumably be lessened by the adoption of a higher transmission voltage than would have been feasible in 1933. For the purposes of the Barrage, 220 kV is as high as economic considerations permit, although for general supply the adoption of 264 kV would be in line with standardisation trends.

Long-Term Proposal

The signatories to the present Report have framed their estimates conservatively on 1944 prices. They have, however, paid due regard to the essentially long-term nature of the scheme. Thus, while a financial life of 80 years has been taken for civil engineering works, on which the major part of the expenditure would be incurred, these should be in good condition at the end of the period and the total costs of tidal power, which are almost entirely capital charges, would then be correspondingly less. Moreover, construction would make negligible demands on electrical and mechanical engineering resources in the earlier stages, when they might all be required for other purposes. While such

matters as the value to the nation of an average annual saving of close on a million tons of coal and of a large generating station on the Severn in wartime were outside the scope of the engineering inquiry they provide examples of general advantages that reinforce the claims of the scheme for early Ministerial action.

WHEN the names of the Fuel Advisory members of the Fuel and Council Power Advisory Council appeared we remarked upon the unaccountable omission of any representative of the electricity supply industry. In December, replying to a Parliamentary question on the subject, Major Lloyd George said the Council "had deliberately been constituted as a small body, not representative of any particular interests. It would, therefore, have been inappropriate to have consulted organisations of any fuel producers or consumers about the membership." This may have explained but did not necessarily justify the constitution of the Council and this view seems to have been taken by the Conjoint Conference of Public Utility Associations. This body has drawn the attention of the Minister to its Public Utilities Committee which has "advised " the Ministry in the past on coal questions.

Radio Re-diffusion

IN 1940 the I.M.E.A. Council had under consideration the question of relaying radio program-

mes by means of electricity supply mains and it suggested that electricity undertakers should seek powers to operate such services themselves. Recently members of the Association have been approached by private companies seeking rights to install relay systems, and the Council advises them not to enter into any new obligations with re-diffusion companies. If and when legislation on the subject of wired broadcasting is introduced the Council will press for the inclusion of a clause giving undertakers the necessary powers.

Ability to Export It is very necessary to dispel any impression abroad that it will be many years before Great

Britain is able to satisfy the requirements of overseas customers. No doubt our industrial system will be hard pressed in meeting accrued home demands but it will still have to look after export trade if this

country is to live. In reply to an inquiry from our ambassador in Brazil the Department of Overseas Trade has assured him (and the assurance has been repeated in the journal of the Sao Paulo British Chamber of Commerce) that during the war Great Britain's industrial capacity has greatly increased and when it can be turned over to peacetime production we shall be able to export on an appreciably greater scale than ever before. There is a warning that the change-over cannot be immediate and that some raw materials may be scarce but it is hoped that inquiries will be made to enable the requirements to be gauged.

Splendid LITTLE by little the great contribution made by the electrical industry to war needs, apart from its

regular production, which has been of vital importance, is being revealed. The extent of this " extraneous " work has been colossal in the case of some of our leading companies. For instance, Sir George Nelson last week referred to the English Electric Co.'s production of large bombers and tanks. There is a very interesting story behind the company's entry into aircraft production which may be told one day. Altogether the company has produced equipment additional to its normal turnover to the value of over £60 million and for a very meagre financial return, a patriotic achievement of which it may be proud.

Stray Losses garding the relationship

between knowledge and measurement is far from being satisfied in present methods of evaluating stray losses in synchronous machinery. Additional importance is attached to stray losses on load by the large proportion they bear to to total losses with hydrogen cooling, which may reduce the calculable windage and fan losses to one-tenth of those incurred with air cooling. The co-ordination of information on the subject with additions from his own experience which Mr. P. Robinson presented in his I.E.E. paper last week, together with the further data elicited during the discussion, makes an important step forward towards accurate predetermination of stray losses with a view to instituting a more suitable procedure than that of B.S. 269/1927 for obtaining the measure of operating efficiency.

c+ 9. 1%

il the De

Parlo h

tati dan

12 22

poort

27 27

1072 Tr

AU DE

¢ TEN CO

the set too

the require

ten mak-

TOTAL OF

1745 5

id to b

SILA B

TE I TT

Selare

The later

清 出 改

四百四

stat 62

7. UL

ing ai

stall

百百日

prasi

Cordite Production

Electrical Plant in an Explosives Factory

THIS article deals with the electrical aspects of cordite manufacturing processes which we saw recently in a large factory in this country. Cordite consists of a mixture of nitro-glycerine, nitro-cellulose and a binding agent, which is gelatinised by heat and pressure and extruded into various sizes according to requirements. To effect this the following components are actually produced at the factory: sulphuric acid, nitric acid, nitro-cellulose and nitro-glycerine. delivered by Holmes blowers. Each blower has "Texrope" transmission from a 20-HP, 725-RPM totally enclosed s.c. motor which is served by an oil-immersed star-delta starter. The products of this combustion pass through a cooler and a filter and on to convertors equipped with vanadium catalysts. They then pass on to an atmospheric cooler from which the fume is pumped through absorption columns. The Mather & Platt pumps are at the floor level and their



long directvery coupling spindles operate within tubes connected to the acid The tubes are tanks. long enough to accommodate acid to the level of the acid in the tank, so that there is no fear of acid spilling, and the pumps are in consequence glandless. Each pump will handle 3,720 gal. of acid per hour and each motor is a 72-HP, 1,440-RPM totally enclosed framecooled s.c. machine

Above: The very long transmission shafts of the sulphuric-acid glandless pumps operate in tubes connected to the acid tanks Right: The tank-farm equipment usually includes motor-driven pumps and sometimes agitators

For the production of sulphuric acid the raw material, powdered sulphur, is shovelled into hoppers which feed a coal-fired equipment in which the sulphur is melted. From this the liquid material is transferred to a combustion chamber by vertical sub-

merged steam-jacketed pumps, each of which will deal with 300 lb. per hour and is driven through reduction gear by a 1-HP, 1,400-RPM squirrel-cage totally enclosed framecooled motor served by a totally enclosed direct-on oil-immersed starter.

In the combustion chamber the molten sulphur is burnt with a free supply of air served by an oil-immersed star-delta starter.

A THE A ST & A

In the absorption columns the fume is absorbed in sulphuric acid to form oleum (super concentrated acid) which is passed through a nest of water-cooled pipes to storage tanks. The cooling water for these pipes is supplied by 30-gal. per minute Mather & Platt centrifugal pumps, each

ELECTRICAL REVIEW

directly coupled to a 2-HP, 940-RPM s.c. frame-cooled totally enclosed motor served by a direct-on oil-immersed starter. From the storage tanks the acid is passed on to tank farms by means of special vertical"Hypo-Synchronous" motor served by oil-immersed stator and liquid rotor resistance starting equipment.

The weak acid so produced is concentrated by distillation in stills to which it gravitates

from high - level tanks to which it has been pumped by means of motor - driven La Bour pumps. The acid is fumed off by

The pulp is kept in a state of continuous agitation by means of pumps which circulate the pulp through the bottoms of the tanks

the application of steam at the bottom of the still and is drawn off by steam ejectors. It then passes through absorption columns and condensers and thence to the storage tank farms, *via* coolers. The two acids. sulphuric and nitric. are mixed for the production of both

spindle pumps similar to those just described. In each tank farm there is a number of tanks within a large brick-lined wall, and the farm equipment usually includes motordriven pumps and sometimes agitators.

nitro-cellulose and nitro-glycerine in special tanks equipped with motor-driven stirrers.

Nitric acid is produced by the introduction of compressed ammonia gas and compressed air into an enclosed compartment in the presence of a platinum catalyst. The action of the air and ammonia causes the catalyst to become

The vertical centrifuge extractors (rear) and the horizontal-screen concentrators both operate on the water-extraction principle

white hot, which results in components of the air and ammonia combining to form nitric

acid fume which is passed through an absorption tower where it is absorbed by water to form weak nitric acid. The ammonia pressure is obtained by heating prior to mixing, while the air is compressed by means of two Belliss & Morcom 1,685-cu. ft. per min. two-stage compressors. each directly driven by a 410-HP, 360-RPM





break contactor starter for each motor is push-button controlled.

The production of nitro-glycerine is brought about by mixing pure glycerine with the mixed acids by a continuous nitration process. The nitric acid combines with the glyc-rine to form nitro-glycerine and the sulphuric acid and excess nitric

9,1941

STIC

rotor m

0000000

1000

1000 the lot

2-6-

T

fire! (

Pitteria.

State and (sere a

St Hit

Line and (Lein) RETE 1 1222 10

5 27

min.

he i

5.87 TH

의 는

of about two to one. The scrolls are put into earthenware vats in the nitrating house, in which the paper is treated with nitric acid to form nitro-cellulose. The scrolls are then carried in special aluminium trays by means of electric trucks to the vat house in which all traces of acid are removed.

The scrolls are next passed on to the pulping and blending house in which they are first treated on beaters which are very similar to those which may be seen in modern paper-making factories. The beaters tear up the scrolls by revolving knives

Nitric acid in the Above : concentration pots is agitated continuously by motor-driven stirrers on top of the pots Right : Agitation of the pulp in the intermediate house is by means of cone stirrers at the tops of the wooden vats

acid are washed off to leave the pure glycerine. Because of the highly explosive character of these processes по pumping is involved, the whole of the plant being laid out so that the flow from beginning to end is by gravitation.

The other major com-

ponent of cordite, *i.e.*, nitro-cellulose, has a paper base. The paper is received in rolls and is first dealt with on scrolling machines which produce scrolls with alternate layers of flat and corrugated paper. Each scrolling machine is driven by a 1-HP, 930-RPM motor with V-rope transmission with a reduction ratio

on the lawn-mower principle and the result is nitro-cellulose pulp with the consistency of cream. Each beater is driven by a 60-HP, 596-RPM slip-ring motor under star-delta control, and there is V-rope transmission with a speed-reduction ratio of about three to one. Water is fed to the beaters from







ELECTRICAL REVIEW

March 9, 1945

which the pulp is removed by 10-HP directly motor-driven pumps. The pulp is passed into vertical tanks in which it is kept in a state of continuous agitation by pumps which circulate the pulp through the bottoms of the tanks. These pumps are 25-HP, 585-RPM directly motor - driven equipments under star-delta control.

Similar pumps then pass the pulp through grit extractors and concentrators to blending tanks. Both the

grit extractors and the concentrators operate on the water-extraction principle, the grit arrestors being 10-HP, 720-RPM directly motor-driven equipments, with direct-on control, while the concentrators are horizontal screening drums directly driven via centrifugal clutches by 5-HP, 720-RPM motors with star-delta control. The blending tanks are equipped with circulating pumps at the bottom similar to those described in the case of the earlier tanks. The pulp is next passed on to a pulp store in which it is agitated in vertical cylinders and thence Each stirrer is driven by a 12-HP, 1,450-RPM motor with about a 25 to 1 speed-reduction ratio by means of a Croft reduction box.

Acid recovered from the nitration processes in the production of both nitro-cellulose and nitro-glycerine is separated and reconcentrated in a de-nitration house by distillation methods in special stills. Steam is passed in at the bottom of the stills and the recovered mixed acid is delivered at the top. The still is filled with quartz packing to offer as large a surface area as possible. The mixed acid percolates down through the

quartz and the steam rises through the quartz, causing the nitric acid to fume off at the top of the still and the sulphuric acid to drop to the bottom of the still where it is collected. The nitric acid passes through primary and secondary condensers and an absorption column, and the residue is ejected to the atmosphere. The weak sulphuric acid is conveyed by La Bour pumps to high-level tanks in the concentration building, and it flows by gravity through steam - heated dephlegmators which partly bring up the concentration, and thence to cast-iron gas-heated pots to complete the con-

The paste is transferred from the mixer (rear) to a roller-conveyor feeding a sheeting machine (front)

to an intermediate house in which it is agitated in lead-lined wooden vats before being passed on to meet the nitro-glycerine in a mixing house where the binding agent is also introduced. Agitation of the pulp in the intermediate house is by means of cone stirrers at the tops of the wooden vats. centration. The gas furnaces are fired by producer gas from an adjacent plant in which combustion is maintained by motordriven fans. The acid in the pots is agitated continuously by means of 4-HP, 1,430-RPM direct-on started motor-driven stirrers with transmission via about 50 to 1 ratio speed-





The prepared paper scrolls are first treated in beaters which are very

similar to those which may be seen in modern paper-making factories; 60-HP drive on right

336

ch 9, 1945



NAME AND POST OFFICE ADDRESS OF the case in

1 I CALLER p. color and solution in N milor 加加 Straniel in states in RC1 21 1 100 6 2 6 1 1 2000 Will Owner St. ----------なこれない 10 data a) passes in 7 and some nere. The m La Bour M evel tanks : anon bai lows by gr steam - ba ators whi. og op the m and the on gasha: plete the or are fired : ent plant : d by DOIF ts is agilar 1,438.231 tirrers -

alio speci

reducing gear units, and the fans for the producer plant are directly driven by 2-HP, 1.430-RPM motors with direct-on starting.

March 9, 1945

Actually the nitro-glycerine and the nitrocellulose meet in a spray annexe to the mixing house where the mixture is first dealt with in a paste mixer which is served by a 3-HP motor with a combined V-belt and gear transmission scheme to give an actual overall reduction from 1,430 to 116 RPM. The paste is transferred from the also transported to the site of the drving houses; these wagons are allowed to remain in the open.

Hot air created in the drying rooms by blowing air through steam heated grills is delivered through a trunking system with suitable connecting manifolds and canvas connections to the wagons and right through the wagons to water troughs at the rear of the wagons. There are two drying houses and the fans are directly driven by 5-HP,

950-RPM motors. The dried paste is next dealt with in a rolling and square cutting house to which, after being removed from the trays and weighed, it is fed through a trap door to the building, so that the greatest care is exercised in its handling. In the rolling mills the paste

In the rolling mills the paste is repeatedly folded and passed through the rolls, during which process the material changes to cordite

is repeatedly folded and passed through the rolls under hand control, and during this operation the character of the material changes until it becomes cordite. Each rolling mill is directly driven by a 25-HP, 575-RPM motor. A number of the driving motors for these rolling mills, and their control equipment, are

mixer to a roller conveyor feeding a sheeting machine by means of a 2-HP, 1,425-RPM motor-driven diaphragm pump with about

20 to 1 ratio speedreduction V-belt transmission. While the paste is on the conveyor water is removed from it by means of a 12-HP, 950-RPM directly coupled motor-driven * vacuum

The rolling-mill motors and their control equipment are an excellent example of the principle of the segregation of the electrical equipment

In the sheeting pump. machine the paste is reduced to the required thickness by a pair of rolls and cut to the required length by a guillotine, so that sheets of the paste in convenient

sizes for handling are delivered for further treatment. They are taken first to a maturing ground and then in specially constructed wagons to drying houses. The paste sheets are dried in special wagons in which they are

an excellent example of the principle of the segregation of electrical apparatus from the process machinery which is followed closely

throughout those parts of the factory where the fire hazard is severe. The motors are in a double line in a room between the rolling mill buildings proper, and in each case the shaft is carried within a sealing gland bearing



in the wall. The starting equipment (stardelta) is remotely operated from the mills by lever mechanism through the walls. In each case there is auxiliary belt transmission from the motor-to-mill shaft to a pump delivering cooling water to the mill rolls.

After the rolling process the cordite sheets are cut into squares on the guillotine principle on a machine driven by a 2-HP motor, with transmission via a Moss gear with an actual reduction of 960 to 55 RPM. The squares are built into cubes in which form they are pressed into " cheeses " in hydraulic presses. These presses are operated from an accumulator water system which is served by a $7\frac{1}{2}$ -HP, 1,425-RPM directly coupled vertical motor-driven pump. Extruding the "cheeses" to the required

shape and size is the next operation which is effected by self-contained motor-driven oil hydraulic "machines. The extruded rods are bunched and wound on coiling wheels from which they are unreeled and cut into the required lengths for boxing. Finally the lengths of cordite are blended by feeding one end of a short conveyor with small quantities from different boxes and reboxing them, one box at a time, at the other end.

Except where otherwise stated practically all the motors were supplied by Laurence, Scott & Electromotors, Ltd., and nearly all the starters by Allen West & Co., Ltd. As we indicated earlier, all the smaller motors up to, say, 20 HP are s.c. equipments, the smaller of which are direct-on started, while the larger ones are star-delta controlled.

Industrial Electric Locomotives

HE wide variety of conditions for which electric locomotives can cater in industrial by the English Electric Co., Ltd. One of these locos is a standard gauge locomotive of the centre-cab type weighing 13¹/₂ tons used for sunderland Corporation power station. It is fitted with two nose-suspended axle-hung

tracks in the main road underground and weighs 6 tons. It is provided with two nose-suspended axle-hung traction motors arranged for seriesparallel control for operation from overhead contact wires at 250 V with insulated negative. The controller is fitted with a dead-man's handle arranged to cut off power by opening

> Non-flameproof locomotive for underground use (above) and coal haulage locomotive at power station

the main circuit-breaker if released. Since the mine is non-gassy, the equip-ment is not flameproof. In order to facilitate lowering the locomotive down the shaft, it is provided with a removable cab, and the conduit and wiring can be easily divided. For both locomotives, the controller is arranged to provide rheostatic braking addi-

tional to the screw-down handbrake In the mining locomotive, the hand brake can also he operated by a hand lever. The characteristics of the locomotives are as follows Sunderland Weight 131 tons, of 1ge, 550; max. tractive effort, 6 000 lb; HP at max. tractive effort, 68 speed a max. tractive effort, 44 MPH. I.C. Weight, 5,700 lb; HP at max, tractive effort, 2,700 lb; HP at max, tractive for a speed a max. tractive effort, 44 MPH. effort, 62; speed at max. tractive effort, 81 MPH.

traction motors connected permanently in series for operation from an overhead contact wire at 550 V with earth return. The other loco is used by Imperial Chemical Industries, Ltd., and was a repeat of one supplied to the company in 1930, but embodies a number of modifications introduced as a result of the operating experience gained with the earlier locomotive. It operates on 2 ft. 6 in. gauge





\$ 9, 1945

Endle posts " antiber ettrofet = colles size d und ou a ching. End mind by inte type with m TES LINE DESIGN (he b(he tal) saled man ed to lass 14, 14 2 West & Gal the states at C. Statutes I the second se

Dives



econotice by well of and call ball cannot caller

ELECTRICAL REVIEW

Suspension Insulators

A Simple Method of Finding Their Characteristics

THERE is no direct mathematical method of solving the problem of the suspension-

March 9, 1945

By A. G. Beech, B.Eng., A.M.I.E.E. construction of a simple piece of apparatus for solving without calculation.

insulator string in terms of the number of units in the string.

The effect of the shunt capacitances is to cause a concentration of stress on the first unit of the string, since it has to transmit the sum of all the shunt capacitance currents in addition to the direct capacitance current of the string (Fig. 1).

So marked is this effect that little advantage is gained by putting one or two extra units



Fig. 1.—Distribution of capacitance currents in insulator string

into the string with a view to improving the potential distribution. The author has carried out a large number of measurements with a "Hipot" live-line testing stick which indicate quite clearly stress concentration on the first unit, but an accurate picture of the potential distribution along the string cannot be obtained by this means as the current drawn by the testing stick itself is not small compared with the actual capacitance current flowing down the string. Thus, although useful comparisons can be made, enabling good and faulty strings to be identified whilst a line is in service, the method does not enable the true characteristic of a string of "n" units to be established by laboratory tests on actual strings.

Solving by Calculation

A useful method was given by H. J. Booth in the *Electrical Review* of September 15th, 1944. The following method is, however, also feasible, and in addition suggests the As all the quantities involved are substantially pure capacitances, the string and its associated shunt capacitances may be replaced by a network of resistances of values proportional to the various reactances, and then solved by the application of Kirchoff's Laws. This, however, means solving as many simultaneous equations as there are units in the string which, while possible for strings of three or four units, becomes unwieldy and time-wasting for eleven or twelve.

The problem is easily solved, however, by assembling a set of resistances to form a model of the string, applying a voltage across it and measuring the various p.d.'s by any suitable method—an indicating voltmeter for preference, as micrometer accuracy is not required. (Fig. 2) Many undertakings already possess a piece of apparatus for the determination of shortcircuit kVA which could easily be adapted to make the measurement.

Selection of Values

The capacitance of the average suspension insulator unit is about 30 $\mu\mu$ F. A value for the shunt capacitance of each cap may be



Fig. 2. — Equivalent resistance circuit for measuring voltages

obtained by considering it as a more or less isolated and approximately spherical mass of metal. The radius is approximately 4 cm. and the capacitance is, therefore, 4 electrostatic units (= $4 \cdot 5 \ \mu\mu$ F.). The proximity of the earthed metal of the tower has little effect on this value with normal clearances.

339

This is borne out by the fact that measurements made with the "Hipot" stick are substantially the same whether the string is in service on the tower or hanging in the laboratory in an isolated position well away from earthed metal. The conclusion is thus reached, that the shunt capacitances are substantially equal and approximately one-seventh of the capacitances of the units themselves. Hence in the model $R_1 = R_2 = R_3$, etc. = 7 R.

Radio resistances are quite suitable for

Unusual Cable Fault

Measures Taken to Relieve Stress By R. S. Bennett,

A.M.I.E.E., A.M.I.Mech.E.

FEW years ago two large substations were interconnected to transmit a maximum

arc furnace load of 15,000 kVA at 6.6 kV by means of six 3 by 0.25 sq. in. 11-kV paperinsulated lead-covered and served cables installed in cast-iron pipes. A fault recently occurred at the back of the wiped gland on one of the joints.

The distance between substations is 1,100 yd., of which 633 yd. is under a straight road carrying heavy traffic. Manholes in which joints are made occur at distances of 213, 174, 96 and 150 yd. in the straight run. The cables are supported by wooden cleats each erected a yard apart on upright stakes on each side of the joints in the manholes. Each joint weighs 65 lb. Cables and joints are covered with water during wet weather. Recording charts taken periodically in the manholes show a maximum temperature variation at a slow rate of 10 to 40 deg. C. under load conditions.

Inspection of other manholes in the same route showed cracks at the back of the wiped glands on both sides of the joints, and in one manhole there was distinct evidence of rotation of two joints. The cracks, which were not evident on the previous monthly inspection, extended approximately 180 deg. round the cable and quite clearly indicated that the lead was drawn-out before being severed. In several cases there was clear evidence of compression of the cable between the ends of the cast-iron pipes and cleats and joints, as shown by a slight curvature of the short cable lengths and by rucks in the lead just before the cracks. The joints were solidly built up, of sound construction and had been made without the use of excessive heat.

The structure of the lead on the inner surface of the cracks showed this to be of the Vibration tests were intercrystalline type. then made on the cables with a pick-up and cathode-ray oscillograph and also by means of a vibrograph. The tests showed a vibration with an amplitude of 0.2 mm. with

constructing the model circuit, but the values should be checked by measurement before use. A high-resistance voltmeter should be used, and the current through the model circuit adjusted so as to be large compared with the voltmeter current.

Having determined the percentage of the total line-to-earth voltage which exists across the first unit, the maximum safe working voltage for the whole string can be fixed if the flashover characteristics and desirable safety factor for individual units are known.

heavy traffic passing along the roadway. Further tests revealed

a slight axial movement of the cables. Although the cable joints were well supported the joints had sagged, causing tensile stress and a strain in the lead sheath. There was definite evidence of movement of . the cables due to traffic vibration and temperature variations causing tensile stress in the lead. The final fractures were fatigue failures.

The manholes were made considerably larger; the joints were re-made and supported in cradles with a spare loop of cable on each side in order to produce the equivalent of an expansion member and so relieve the stress set up at the wiped gland. If the cast-iron pipes had been sufficiently large the cables would have been de-rated by installing those of 0.4 sq. in. conductor section. Where long straight runs of cable in cast-iron or earthenware ducts are necessary, it is recommended that a loop or bend be inserted before the joints and that the cables be considerably de-rated.

Preliminary tests on arc furnace installations, taken with a special transient recorder of Standard Telephones & Cables make, have shown occasional single-phase voltage transients of a minimum value of five times normal voltage. The frequency of the transients is very irregular. Further tests are being made to ascertain the exact peak transient voltage and frequency of the transients. The tests will prove whether or no cables for arc furnace duty should be insulated for appreciably higher voltage than the normal.

Portuguese Telephone Plans

Mr. H. A. Hincks, general manager of the Anglo-Portuguese Telephone Co., stated recently Anglo-Portuguese relepione Co., stated recently that his company proposed to spend well over \$1,000,000 in the first five post-war years on installations in Lisbon and Oporto. This sum would be needed to catch up with wartime arrears and provide for normal developments.— Reuter.

11

N B

100

ta ata

ein 1 sizzi

1

1000

0.000

e tille

No in the local division of the local divisi

in the

10

behr 1

13805

15

1250

Future Generating Plant

Doubtful Adequacy of Central Board's Provision

By "Manufacturer"

THE recent disconnections by supply authorities of certain consumers, have been officially ascribed to a shortage of power station plant. The coal situation, although difficult, has not been the cause of the trouble. In the recently issued Thirteenth Report (for 1940) of the Central Electricity Board it is stated (page 3) "that adherence to the peace-time programme . . . for the instal-lation of additional plant to be ready for operation by the winter of 1942, would . . result in a substantially greater margin of spare plant in 1942 than could be commercially (my italics) justified; in consequence the Board had arranged for certain of the plant included in the 1942 programme to be postponed."

This was really the decision made in the previous year as a result of a preliminary examination undertaken on the outbreak of war. Fortunately the 1940 and later reports indicate that other than *commercial* considerations were taken into account later on. The result has been that, with the exception of the recent minor trouble, the electricity supply industry has been able to meet all war demands and deserves all the compliments it has received. But for the unfortunate miscalculation at the beginning of the war (when men and materials were available), the difficulties this winter would not have arisen.

On What Are Estimates Based?

These difficulties prompt an examination of the proposals of the Central Electricity Board for the future as set out in its reports. As security reasons apparently no longer prevent the publication of statistics, the public have the right to sufficient information to enable it to form a judgment as to the adequacy of the Board's proposals, or rather of those of the Government, which in the role of Production Executive is the final authority. As this sufficient information has not yet been published, one has to do one's best with the data available. It would be interesting to know whether the Board's estimates for post-war demands are based upon commercial considerations envisaging a post-war slump (as in 1921) or upon the basis of the Government's full-employment policy.

The first thing to be done in an endeavour to come to a conclusion is to estimate the maximum demand in, say, four years' time. Up to the end of last year the maximum demand seems to have been approximately

8.4 million kW.* The chief engineer of the Central Electricity Board was reported in the Press on January 3rd as stating that this load was "just about the breaking point." The Board's Eleventh Report (for 1938) gave the maximum demand at the end of 1938 as 8 million kW and showed that the maximum demand had increased very regularly at the rate of 0.75 million kW a year over the four years ended December 31st, 1938. In that year there were, roughly, 14.5 million wage-earners aged 16 to 64, of whom about 1.7 million were unemployed. Sir William Beveridge ("Full Employment," page 351) has calculated, on the assumption that 97 per cent. of wage-earners are employed, that the national output would increase 11 per cent. over that actually reached in 1938.

Probable Demand in 1948

It would, I submit, be reasonable and conservative to base our calculation upon the following premises: That peace-time production (and maximum demand) will start at the figure reached at the end of 1938; that the annual increase in the first four years of peace will be not less than it was during the four years ended 1938; that the Government implements its declared policy of full employment, which will increase production (and hence the use of electricity and its maximum demand) by 11 per cent.; that the load factor will be something between that of 1938 (36 per cent.) and that of 1943 (48 per cent.), say, 42 per cent.

It follows from the above that the maximum demand at the end of the year 1948 would be 10.5 million kW. Let us now see how far the Board's programme will cover this prospective demand. The Sixteenth Report states that the total installed generating plant at the end of 1943 was about 11 million kW and that extensions had been authorised (by the Government) of 1.4 million kW to be in service by the autumn of 1948. Against this, 0.6 million kW will have reached the end of its useful life by that date, now taken as the increased period of twentyfive years (as compared with twenty years previously). This means that by the end of 1948 the total of installed useful plant will be 11.8 million kW. This represents a reserve for outages of 11 per cent. which seems very

* Since the beginning of 1945, the maximum demand has increased to 8.7 million kW (*Electrical Review*, February 16th, 1945, p. 229), which reinforces the argument of this article.

low, having regard to past experience and the high average age of the plant at that date.

Possibly the Board has increased its programme over and above that stated in the Sixteenth Report. The B.E.A.M.A. Journal, December, 1944 (page 410), states that 1.5 million kW of new plant will be installed by the end of 1947 and over 3 million kW to cover the period up to the winter of 1948. The details given show a total of only 2.4 million (not 3 million) kW of which 0.9million awaited further Government release at the date of the announcement. The programme given in the B.E.A.M.A. Journal does not seem to mean very much more than that in the Board's Sixteenth Report, and an authoritative statement would be very welcome. In any case, the assumptions made in this article that the development and the use of electricity in this country after the war will be only at the same rate as they were previous to the war (modified only by full employment) is extremely conservative. It is to be hoped, therefore, that the actual programme which will be followed will be limited only by the manufacturing capacity of the country, represented by the existing factories with appropriate extensions. Nothing less will be sufficient.

Forthcoming Events

Friday, March 9th.—Cardiff.—South Wales. Institute of Engineers, 6.30 p.m. I.E.E. Cardiff Students' Section. "Carrier Telephony," by S. J. Mayo (in place of W. P. Warren who was ariginally to have submitted the supervised sector. originally to have submitted the paper).

Saturday, March 10th. — London. — Con-naught Rooms, W.C.2, 12.30 for 1 p.m. Asso-ciation of Supervising Electrical Engineers. Annual luncheon.

Leeds .- Electricity Department Offices, Whitehall Road, 2.30 p.m. I.E.E. North Midland Students' Section. Problems afternoon.

Monday, March 12th. — Newcastle-on-Tyne. -Neville Hall, 6.15 p.m. I.E.E. North-astern Centre. "Operation, Maintenance Eastern Centre. and Testing of Overhead Lines and Associated Outdoor Equipment on AC Systems," by R. C. Hatton and Dr. J. McCombe.

Cardiff.-South Wales Institute of Engineers, 5 p.m. I.E.E. Western Centre. Terminations," by D. B. Irving. Cable

Tuesday, March 13th. — London. — Institu-tion of Electrical Engineers, 5.30 p.m. Radio Section. Discussion on "Colour Television," to be opened by L. C. Jesty.

Manchester. — Engineers' Club, 6 p.m. "Operational Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter. Glasgow.—Royal Technical College, 6.15

I.E.E. Scottish Centre. Modern p.m.

Submarine Cable Telephony and the Use of Submerged Repeaters," by R. J. Halsey. *Liverpool.*—Corporation Electricity Show-rooms, Whitechapel, 2.30 p.m. Illuminating Engineering Society. "Review of Light and Lighting Progress," by W. J. Jones.

Wednesday, March 14th.—London.—Institu-tion of Electrical Engineers, 5.30 p.m. Trans-mission Section. "Operational Control of Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter.

Birmingham.—Chamber of Commerce, New Street, 6.30 p.m. A.S.E.E. Birmingham Branch. "Electric Furnaces," by J. H. Marsh. Sheffield.—At Metallurgical Club, West Street, 7 p.m. Junior Institution of Engineers (Sheffield

Section). Visit of Major-General K. C. Appleyard, who is to read his presidential address. Afterwards the T.V.A. film will be shown. *Newcastle-on-Tyne.* — Neville Hall, 6 p.m. British Institution of Radio Engineers. "Pro-

posals for Television and Broadcasting Trans-mission Systems," by W. A. Beatty.

Thursday, March 15th. — Newcastle-on-Tyne. —Neville Hall, 6.30 p.m. I.E.E. North-Eastern Centre and Students' Section. Popular lecture, illustrated by films, on "Some Hydro-electric Possibilities and Achievements," by electric Possi W. A. Hatch.

Swansea.-At 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. Address by J. Morgan, chairman of the Western Centre.

Friday, March 16th. — London. — Con-naught Rooms, W.C.2, 12.15 for 12.45 p.m. E.D.A. annual luncheon at which the principal guest will be Sir Stafford Cripps, K.C., the Minister of Aircraft Production.

London.—Institution of Electrical Engineers, 5.30 p.m. Measurements Section. "Tem-perature Compensation of Indicating and Recording Instruments," by Dr. G. F. Tagg.

Saturday, March 17th. — Manchester Engineers' Club, 3 p.m. A.S.E.E. Manchester Branch. "Velocity Testing," by J. F. Bridge.

Monday, March 19th.-Birmingham.-Grand Hotel, 6 p.m. (tea, 5.30) Birmingham Electric Club. Annual general meeting, followed by a talk on "Distribution," by D. P. Sayers.

Bradford. — Technical College, 6.45 p.m. adford Engineering Society. "Production Bradford Engineering Society. "Production Technique of Industrial Plastic Mouldings," by E. M. Elliott.

Nottingham.—Corporation Gas Showrooms, Parliament Street. Nottingham Society of Engineers. "Electronics in the Engineering Engineers. "Electronics in Industry," by Dr. W. Wilson.

Tuesday, March 20th. — London. — Institu-tion of Electrical Engineers, 5.30 p.m. Radio Section. Discussion on "Apprenticeship and Trainee Systems in the Radio Industry," to be

opened by Dr. J. Greig. London.—Lighting Service Bureau, Sayoy Hill, W.C.2, 6.15 p.m. Association of Super-vising Electrical Engineers. "Estimating and

Vising Electrical Engineers. "Estimating and its Relation to the Economics of Electrical Contracting," by W. H. Brooks. *Leeds.*—Great Northern Hotel, Wellington Street, 6 p.m. I.E.E. North Midland Centre. "Operational Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter. *Luton.*—Town Hall, 7.30 p.m. Luton Electrical Society. Discussion on the booklet "Electrical Installations" (Post-War Building Studies No. 11). a résumé of which will be eiven Studies No. 11), a résumé of which will be given by A. F. Plummer.

PERSONAL and SOCIAL

News of Men and Women of the Industry

WE offer our heartiest congratulations to Mr. J. E. Kingsbury who celebrated his ninetieth birthday on February 27th. Mr. Kingsbury is well known throughout the Kingsbury is well known throughout the industry, particularly for his work in telephone communications. He was at one time general manager of the Western Electric Co., Ltd., and was responsible for the construction of the company's Woolwich works. In 1910 he became a director, on its inception, of the Damard Lacquer Co., Ltd., the predecessor of Bakelite, Ltd., of which company he is now deputy chairman. Mr. Kingsbury was hon. treasurer of the I.E.E. from 1915 to 1919.

Major C. W. Pass, B.Sc., A. M.I.E.E., R.E. M.E. has been mentioned in dispatches for gallant and distinguished service in North-West Europe. Major Pass, who before the war was on the staff of the Southampton Corporation Elec-tricity Department, commanded a R.E.M.E. workshop which landed in Normandy early in the invasion.

Captain F. A. Lovell, Royal Engineers, has been mentioned in dispatches for exceptional duties performed in Italy in connection with the reconstruction of power stations and other electrical work. He was for a number of years with the Northmet Power Company and later became consumers' engineer with the Bethnal Green Borough Council Electricity Department having entered the service of the Council at its inception. He was in the service of the B.B.C. before entering the Forces.

Mr. N. Hunter, A.M.I.E.E. borough electrical engineer of Morley, has been appointed general manager and engineer of Stockton-on-Tees Corporation Electricity Department in succession to Mr. S. G.



Mr. N. Hunter

Corporations, the York-shire Electric Power Co., and the Sheerness and District Electricity Supply Co., and was deputy borough electrical engineer at Whitehaven before being appointed borough electrical engineer at Morley.

Accrington Corporation Electricity Committee has recommended that the salary of the borough electrical engineer, Mr. A. Goward, shall be in-creased to a maximum of £1,000 as from April Ist.

Mr. W. H. Higginbotham has been elected chairman of Edgar Allen & Co., Ltd., in succession to the late Mr. C. K. Everitt.

Mr. H. L. Satchell has been appointed manager of the Rugby works of the British Thomson-Houston Co., Ltd., and took up his duties on March 1st. He succeeds Mr. A. P. Young, O.B.E., M.I.E.E., who has just retired from the company.

Mr. Young received his technical education at the Finsbury Technical College and joined



Mr. A. P. Young

Mr. H. L. Satchell

the B.T.H. Co., in 1901 as a meter tester. Except for a break of nearly two years (1906-1908), when he was working in the U.S.A. with the General Electric Co. of New York, he has been in continuous service with the B.T.H. Co. He was appointed engineer to the Coventry works in 1915 and engineer and manager there in 1921 and manager of the Rugby works in 1929. Among books which he has written are "Magnetos" and "Elements of Electro "Magnetos" and "Elements of Electro-technics," "Automobile Electrical Equipment," "Forward from Chaos," "Plan and Serve," "Man at the Cross Roads" and "The Pro-

duction Front and You." Mr. Satchell was educated at Rugby School, served in various branches of the armed forces during the last war, and took up an apprentice-ship with the company in 1920. He was awarded a B.T.H. Fellowship and proceeded to the General Electric Co., U.S.A., in December, 1922, for one year. On his return to Rugby he became technical assistant to the head of the winding department. In 1929 he was appointed planning engineer; in 1940, assistant manager;

and on January 1st this year associate manager. To mark Mr. Young's retirement presentations were made to him on February 23rd by Mr. H. N. Sporborg, chairman of the company. They comprised an illuminated address and a cheque from employees of the company and a brief case from the B.T.H. (Rugby) Foremen's Association.

Speaking at a dinner given by the directors of Dorman & Smith, Ltd., to the staff at the Midland Hotel, Manchester, Mr. Thomas Atherton, Companion I.E.E., managing director, were very promising. Mr. R. Barrell, depart-mental foreman, toasting the health of the directors, referred to the recent marriage of one director, Mr. B. L. Cooper, and welcomed both Mr. and Mrs. Cooper to the function.

1547 17.00 10 120 100 A IM at the

12 52

C H 12.22

100 ale

in the last of the 短有

日本の 1 3 Ter ater.

Master F. Bala in-in

100

-10 a la superior de la s

「日本」

町四日町山田町町

Mr. Atherton, responding, said he thought it an excellent idea that they met outside the works occasionally. Others present at the dinner included Major R. Amberton, M.I.E.E., Mr. J. Noel Haworth, A.C.A., and Mr. Bruck L. Cooper (directors) and their wives. An excellent programme of entertainment was provided.

Mr. H. C. Lamb, the former city electrical engineer and general manager at Manchester, has been elected an honorary member of the Incorporated Municipal Electrical Association of which he was president in 1939.

Sir William Walker has again been appointed chairman of the National Joint Board of Employers and Members of Staff (Electricity Supply Industry) for the ensuing year, a position which he has held since the establishment of the N.J.B. in 1920. Mr. G. E. Moore, president of the E.P.E.A., is the new vice-chairman.

Mr. E. H. Taylor, of the West Midlands Joint Electricity Authority's Ironbridge station, is recommended by Bradford Electricity Committee for appointment as station superintendent.

Commander A. F. Armitage, R.N., director and general manager of the Hoffmann Manufacturing Co., Ltd., has been appointed managing director. Mr. C. Pryke, who joined the company in July, 1901, and has been a director and comptroller, is retiring from his executive position at his own request, but is retaining his seat on the board and has been appointed vice-chairman of the company. Mr. W. L. Hubbard returns to the company and has been appointed commercial manager.

Colonel F. Reid, staff engineer, Post Office Engineering Department, has been appointed Deputy Regional Director, Post Office, North-Eastern Region, in succession to Mr. L. G. Semple, who is being lent to the Allied Control Commission.

The British Radio Industry Council last Friday entertained at dinner at the Dorchester Hotel the delegates from overseas attending the Conference of Commonwealth Broadcasting and leading officials of the B.B.C. Mr. F. B. Duncan, chairman of the Radio Industry Council presided.

Mr. D. Kingsbury, M.I.E.E., has been nominated for the presidency of the Birmingham Electric Club for 1945-46, with Mr. F. W. Lawton, M.I.E.E., M.I.Mech.E., as senior vice-president and Mr. N. M. Hill as junior vice-president. The annual report for the past year states that the membership of the club continues to grow rapidly and at December 31st totalled 498.

The successful presentation by the Lancashire Electric Power Co.'s Dramatic Society of "Gas Light," a Victorian thriller by Patrick Hamilton, to full houses at the Queen's Hall, Manchester, on February 22nd and 23rd completely justified the choice of a difficult and unusual play. "Gas Light" makes heavy demands on a small cast but in the able hands of the producer, Mr. I. L. Thomas, the players did exceedingly well and Mr. J. Lee was responsible for the skilful handling of the lighting effects. At the conclusion of the performance Mr. Stuart M. Rix (secretary of the L.E.P.) announced that the L.E.P. Comforts Fund would receive £15 as a result of the Society's efforts.

Obituary

Sir Duncan Wilson.—We regret to report the death on March 1st of Sir Duncan Wilson, C.V.O., C.B.E., who was Chief Inspector of Factories from 1932 to 1940 when he retired. He had been on the Home Office factory inspectorate for thirty-six years. Sir Duncan took an active part in many measures for the improvement of industrial conditions and among other things was chairman of the 1940 Factory Lighting Committee and of the National Industrial Electric Lighting Service set up by certain sections of the electrical industry.

Mr. G. H. E. Muller.—The death occurred recently at Martock, Somerset, of Mr. Godfrey Henry E. Muller, A.M.I.E.E., F.R.S.A., who until his retirement a few years ago was chief electrical engineer of the Malta Electricity Department. Towards the end of the last century he went to Malta on the engineering staff of the Brush Electrical Engineering Co., Ltd., and when the plant had been installed and the distribution system completed he remained to continue its operation and development. He was keenly interested in the furtherance of technical education in the island.

P/O L. C. Margetts.—We regret to learn that Pilot Officer L. C. Margetts, of Edinburgh, the East Scottish sales representative of J. H. Tucker & Co., Ltd., who was reported missing after a bombing raid on Germany on May 4th, 1944, is now officially presumed by the Air Ministry to have lost his life on that occasion.

Mr. Harcourt Johnstone.—We regret to report the death on March 1st of the Rt. Hon. Harcourt Johnstone, M.P., Secretary of the Department of Overseas Trade since 1940. He was fortynine.

I.E.E. Scholarships

THE Council of the Institution of Electrical Engineers will this year consider the award of three research scholarships and grants, and seven scholarships for undergraduates and students to attend universities and technical colleges. These awards will be made subject to the regulations laid down by the Ministry of Labour and National Service regarding the candidates' ages at the commencement of their courses. Full particulars may be obtained from the secretary of the I.E.E., Savoy Place, Victoria Embankment, London, W.C.2. The closing date for receiving applications is April 15th.

Analysis by X-ray Diffraction

THE X-ray Analysis Group of the Institute of Physics is holding its 1945 Conference on April 12th and 13th at the Royal Institution London, under the chairmanship of Sir Lawrence Bragg. The programme includes a lecture by Prof. J. D. Bernal on "The Future of X-ray Analysis," and a series of papers on new and improved 'methods. Discussions are to be included on the equipment of a laboratory for X-ray analysis, the interpretation of X-ray diffraction by optical principles, and the proposal to convert X-ray wavelengths to absolute values. Further particulars may be obtained from Dr. H. Lipson, F.Inst.P. (hon. secretary of the Group), Crystallographic Laboratory, Free School Lane, Cambridge.

69, 1945

et to tagen to

Daga Vier of largering of

where he starts

C DEC LOS in Se Deer DALICO (a la

DALLING D

of the 150

edición Volco Anticz XX (p. 1

to black and

A of Mr. Gotte

E. F.R.S.L m

tion and via or

Malia Ferra

e ead of the on the second

al I ---- R (I

had been made

Comiest y CRE II Lots

a the forthe

to learn to an of Etinher

maname of). I

ाक्यात्व कार्य

-tall co valor

sumed in the At

a hi casa

W: TET IT

e Rr. Hoe. Harow

10. He was ferr

kreradous u

by the Mass

ce regarding 3

e obtained the

Place, Vicus

. The dos April 15th The dow

faction.

i the Institut

Conference or

al Institutier Sir Lawrear a lecture h

ure of X-ra-

00 089 201

are to be

labora-

on of X-mi

d the pro-

to absolut

e obtained secretary

aboratory.

ISU

in un island

Tatalo is

CORRESPONDENCE

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

Three-Part Grid Tariff

WITH the termination of the existing grid tariffs, interest centres on the form of the next tariff to be fixed by the Central Electricity Board. One of the chief objections to the present form is the extra kW charges which an undertaking has to pay for a peak period due to a cold spell or other causes of comparatively short duration. Normally an independently operated undertaking could cope with such a demand with a very small addition to its generating costs, which would be covered by the additional revenue from consumers. The additional revenue arises chiefly from the kWh charge



Comparison of present and suggested tariffs

consequent upon increased consumption and does not cover the additional kW charge imposed under the tariff. The tariff is, therefore, a burden on the undertaking and creates a windfall for the Central Electricity Board.

Generating costs may be divided into three parts, viz. :- Fixed costs, comprising interest and depreciation, rents, rates, insurances, management and fuel banking losses; " variable fixed " costs, made up of a proportion of salaries and wages, oil, water and stores and repairs and maintenance, depending on the demand on the undertaking; and running costs, *i.e.*, fuel (other than banking losses), and the remaining proportion of salaries and wages, oil, water and stores and repairs and maintenance.

Fixed costs and variable fixed costs are approximately in the proportion of £3 and $\pounds 0.2$ per kW (based on pre-war figures). Under independent operation, the fixed charges depend upon the plant installed and increase with any additions, after allowing for plant scrapped. To base the charges on the estimated plant requirements over a period of years would not, however, be practicable. It is suggested, therefore, that the fixed charge should be based on the average of the four highest demands during the calendar year, summer as well as winter, and the variable fixed charge should be based on the highest maximum demand for the calendar year.

The accompanying typical curve shows that the suggested tariff is not subject to such unwarranted variations as the present form of tariff, which may adversely affect the finances of an undertaking. It would thus enable undertakings to estimate their future costs for energy with a fair degree of accuracy and to fix their own tariffs accordingly. At the same time, by basing the variable kW on the maximum demand for the year, the C.E.B. would be assured of some extra revenue to meet its additional costs arising out of a peak demand. A. WALMSLEY.

Bedford.

Standard Voltage

N your issue of February 23rd, Captain J. M. Donaldson stated the case for 240 V for domestic supplies. As the argument is concerned with a maximum increase of 40 V, plus percentage tolerance, I feel that to be complete it might be found useful to mention that in a given case of domestic voltage variation, the associated industrial power supply will, up to a point, be affected by $\sqrt{3}$ times this variation.

Edgware, Middx. H. F. OESTERREICHER.

Meter Readers' Status

THOROUGHLY agree with the sugges-tion in "Views on the News" of March 2nd that there is a good case for raising the status of the meter readers, who are regarded by the consumer as the link between the supply authority and himself.

Besides the actual reading of the meter, the reader's duties comprise the examination of meters, testing for stoppage, seeing whether there is any overloading or slowing-up process in operation, and in general ensuring that the installation is in order. He has in addition to make sure that there is no wilful misuse of the supply, and to be in a position to answer any technical questions concerning the supply and installation that the consumer may put to him. He is responsible to the head clerk of the consumers' department for correct readings as well as to the meter superintendent for the accurate working of the meters. Despite these many responsibilities, he is the lowest paid man in the service.

345

In my opinion the status and salary of the meter reader should be raised to that of inspector, especially in large industrial areas, such men being recruited as far as possible from the ranks of the electrical trade.

London, N.W.6. A. E. IZANT.

Heating Buildings

THE author of the article bearing the above title in your issue of March 2nd, states that an addition of 40 per cent. of the heat requirement is necessary when the building is occupied only $5\frac{1}{2}$ days per week. I have been responsible for many years past for the design and installation of many hundreds of low-temperature electrical heating installations, and I have yet to add anything to the calculated heat loss. At the same time the warming-up period in normal winter conditions averages two hours with a maximum of three hours—not six hours as the article states.

The installation for one large single-storey school building (dating from 1938) has a loading of over 300 kW and operates five days per week under time-switch control. It was designed on calculated heat losses only and the warming-up period is two hours before occupation, producing full comfort conditions.

One of the largest outlets for electric tubular heating is church buildings, generally for only one day per week. This would not be the case if the "not recommended" column of table 4 in the article in question were adhered to—even these buildings do not require more than 2 to 3 hr. for warming-up.

I appreciate that the figures in respect of pre-heating additions are taken from the I.H.V.E. Booklet, but your contributor is unusual as an electrical engineer in acknowledging them as practicable in respect of electric space heating.

Welwyn Garden City. C. B. CLELAND.

Registration of Contractors

N your last issue Mr. Thomas Atherton advocated the registration of electrical contractors (and their authorisation by supply authorities) coupled with the better and more regular inspection of domestic installations by supply authorities. As an electrical contractor of some twenty years' standing I would like to assure him that whilst registration might be a good thing, authorisation of contractors by supply authorities is certainly a very bad thing.

If registration of electrical contractors takes place, then it must be a legislative registration, and supply authorities—many of whom run their own wiring departments—would have to conform to the terms of registration, and it will take some of them all their time to do that without having to wet nurse contractors. There are many good and efficient electrical departments of supply authorities, just as there are many good and efficient contractors. Registration of either of these categories would be a useful formality, but let there be no confused thinking as to the function of supply authorities; their job is to supply electricity at the lowest economical rates and not to express their views as to who should and should not carry on business as electrical contractors.

London, E.C.4. J. MORTIMER HAWKINS, Managing Director, MORTIMER, GALL & CO., LTD.

Switches in the Neutral

THE complaint of Mr. Thomas Atherton is not a new one, and indeed if a proper examination were made, 'thousands of switches would be found in the neutral. I am safe in stating that nine out of ten electrical installations are unsatisfactory due to the operations of unskilled people. Mr. Atherton's suggestions are logical but it will be difficult, if not impossible, to carry them into effect, so long as vested and other interests remain. My views on this matter have been fully expressed very many times but unfortunately I am only one of a few voices who have cried out in the wilderness without being heard.

Glasgow.

ALEX. MILNE.

Frequency Modulation

THE limitations, advantages and present applications of frequency modulation in radio communication are discussed in a paper read by MR. K. R. STURLEY (B.B.C., formerly Marconi's Co.) before the Radio Section of the Institution of Electrical Engineers. The first portion of the paper is concerned with the production of a frequency-modulated signal; direct and indirect (integrated phase modulation) methods are examined with particular reference to the variable-reactance valve modulator with automatic mean-frequency correction and also the indirect transposed-sideband modulator. Measuring and monitoring equipment is also described.

The second portion of the paper indicates the essential features of an appropriate receiver, the amplitude limiter and frequency-to-amplitude convertor being examined in detail. Also included are sub-sections dealing with tuning indicators, frequency-deviation compression and distortion, including interference.

Possible future developments are indicated; frequency modulation has already begun to establish itself in point-to-point and mobile telephone communication; it is also likely to be employed in high-fidelity audio-broadcasting, television and duplex transmission and there appears to be a wide sphere of usefulness for narrow modulation-frequency-band (3 kc/s) telephony of high modulation index (maximum frequency deviation plus or minus 15 kc/s). The paper concludes with a bibliography of

The paper concludes with a bibliography of 62 references to the literature of the subject and to 31 British and U.S. patent specifications

Power Station Damage

Air-raid Experiences of the London Power Company

EARING in mind the importance of the large river-side power stations at Battersea and Deptford, their prominent positions and their characteristic buildings, it is not surprising that they have been targets for attack from the air. With extensions completed during the war and involving the

Both Battersea and Deptford received their first bombing on September 8th, 1940. At Battersea, an h.e. bomb penetrated the roof of the 66-kV switch-house and exploded amongst the oil switches, causing fire and structural damage, as well as damage to the main switchgear. The fire was quickly dealt with, and due

to fireproof partitions between switchgear sections, the damage was confined to one of them. The station was running again in twelve hours with reduced output. At the same time, another bomb fell just outside the boiler house, but thanks to all the windows having been previously bricked up the boiler house control room situated on the second floor was undamaged. A few minutes later an in-



ford East stations is respectively 222,000 kW and 145,000 kW. The company's other stations at Willesden(131,750kW), Grove Road (80,250 kW) and Bow (51,500 kW) have also had their full share of the enemy's attention. an ash grading plant was demolished, whilst

cendiary bomb on the main control room roof had to be dealt with, while a delayed action bomb in the coal store exploded some hours afterwards. At Deptford on the same night,

Above : Serious damage was done to the main control panels by a bomb which fell on the switchhouse at Battersea

Right : Damage to tur-bine and condenser plant at Willesden

erection of new boilerhouse, turbine-house and switch-house, in addition to 100,000 kW of turbo-alternator complementary and boiler plant, the Battersea station now has an installed capacity of 343,000 kW while that of the Dept-

ford West and Dept-

9, 1345

1 100 AND Riteringo A of Glores an int Core is te futore i 1 5 20 nioi nio to ats of the later

TA HARDE or Diverse なるもちょう

Vertal

Terra Mary I take I Letterick the state 10 man men 全 胜北 「加之田」 ----d when man and the se ----VOICE NOT IN and the second second Lin the

ulation

5 10 100 minister | and it is not a publics the same 1000

pio anda

なから the list of 副算 (G id) tor tor



three delayed action bombs necessitated the shutting down of a large section of the plant.

Battersea was visited again the following night, stores buildings being struck and other damage caused by blast and splinters from bombs on adjacent property. As a result of voltage surges set up by bomb damage to cables elsewhere on the system, a 66-kV joint situated in the cable tunnel under the river exploded, the resulting fire seriously damaged



The coal conveyor at Deptford West was put out of commission for seven weeks

another feeder and seven auxiliary cables. On September 10th and 11th, an administrative block containing offices, a recreation room and a Home Guard room at Deptford were demolished, and two 66-kV feeders with their associated transformers were severely damaged.

On the afternoon of September 14th, another three bombs fell on the Battersea site, one entering the switch-house. Relays and instruments were completely wrecked, and very serious damage was done to the main control panels and control wiring. But for the fact that there was a standby control room which had been provided as an A.R.P. measure in the new "B" station, the whole of Battersea would have been immobilised for a very long time. As it was, the station was in service again within sixty-three hours.

Up to this time the Bow, Grove Road and Willesden stations had been immune, but on September 16th an electrical fault, due to bomb damage elsewhere, caused a switch at the Bow station to explode, throwing burning oil up on to the wood-lined roof. The George Medal was earned on this occasion by a member of the staff who clambered up to the

roof beams and succeeded in putting out the fire. Bow was damaged again a month later when the cooling towers and circulating water system were hit. A bank of important cables supported on the external face of the turbine house were saved from damage by the reinforced concrete screen wall.

At the end of September, and again on October 4th, 1940, the Willesden station was hit. On the first occasion 6.6-kV main switchgear, generator and control cables were extensively affected, while on the second occasion an h.e. bomb exploded below floor level in the turbine house close to a 20,000-kW turbo-alternator. The condenser waterhead was smashed into many pieces, the condenser flange badly distorted, and considerable damage done to the tubes. The exhaust casing of the turbine was cracked and a great deal of condensate, oil, town main and fire main pipework destroyed. The work of restoration occupied about seven months.

The Battersea and Deptford stations continued to receive attention from the enemy during September and October, 1940. At Battersea, an oil bomb caused a fire which destroyed valuable

records and stores, and a fortnight later offices used by the Civil Engineering Department were completely gutted by fire. An important section of the railborne coal conveying installation suffered damage in another incident.

The company's most tragic experience occurred at Deptford when a solitary aircraft dive-bombed the station in daylight, dropping one bomb which killed seventeen men and injured twenty others. The explosion also demolished a 400-V distribution board in the Deptford West boiler house, reducing the station load until auxiliary power supply could be re-established. Shortly after this incident, a heavy bomb put about one-sixth of the main 22-kV switchgear out of commission, but due to the duplication of the switchgear, output was but little affected.

1945

in this

Road La

to be loss

time by

CORE I

- Born

tion is

is read

Files No

0725 che

eteral la

N CH S

a mila

pianity, m

2 841

ings bit is

to Ma the

the seal

the offer

20.000 be content

maded in

: Dim

233

dine to the

t min pin De voi e

i ibui eo

11 22

nets press tales, 14 hoto fatad

ine ofer

Deputati

a inpital

brinkt

upon: ay and

i nee al losia di

und in the lucing life

2 57

自己

From November 17th, 1940 (when a bomb fell close to the new extension at Battersea without doing a great deal of damage) there were no incidents at any of the power stations until March, 1941, when unimportant damage occurred at Battersea, Bow and Deptford. In April, however, came two heavy raids. Grove Road station received direct hits on one of the boiler houses, which was completely devastated. The first bomb demolished fans, economiser, framing and casing of one boiler unit, and left piping, fittings, gangways, ladders, etc., completely wrecked and interlocked in chaotic confusion. The adjacent unit also suffered damage. The second bomb mainly affected the upper portions of two further boiler units, but the economiser of one of them was severely damaged. In all eight boilers were put out of action, either by direct damage or because of damage to pipework and auxiliary plant, and three

In the second big raid of April, 1941, the office block at Bow was completely demolished and minor damage caused to plant, cables and other buildings, while at Deptford h.e. bombs damaged jetty cranes and equipment, as well as stores, laboratory and offices. No further damage was sustained until January 20th, 1943, when Deptford was bombed and machine-gunned by low flying aircraft in daylight, one bomb putting the conveyor out of commission for seven weeks. Further minor damage occurred at Battersea and Grove Road early in 1944.

Electrical Machinery Traders

ELECTRICAL REVIEW

Disposal of Surplus Government Plant

THE first general trade meeting of the recently constituted Electrical Machinery Traders' Association took place in London last week. It was well attended by representatives from all parts of the country. The chairman, Mr. W. E. Lawton (Industrial Electrical Co., Ltd.) presided and was supported by the vice-chairman, Mr. E. J. Ferguson (Britannia Manufacturing Co., Ltd.) and the treasurer, Mr. H. W. Cole (Milo Engineering Works) with Mr. J. T. Morgan as secretary and the members of Council who represent the sixteen founder firms.

The purpose of the gathering was to invite all "stockists and/or factors of electrical machinery and associated equipment, who provide adequate facilities for servicing and repairing the range of equipment in which they normally trade, to apply for membership of the Association "with the objects, *inter alia*, of creating a fully representative organisation to secure State and industrial recognition of this particular trade's functions; to submit comprehensive representations to and negotiate with Government Departments, local authorities and other *bona fide* trade associations concerning methods for the immediate post-war distribution and disposal of surplus new and used electrical machinery; also to prescribe conditions governing the offer and sale of electrical machinery which does not carry the manufacturers' normal guarantee, requiring it to be sold either with a guarantee of serviceability and performance, or a true statement of its maker's original description, rating and details with a correct statement of its general condition.

Mr. Lawton outlined the events that led up to the formation of the Association, remarking that independence could be carried too far and appealing for co-operation to secure collective representation so that status could be acquired to enable legal agreements to be entered into. He had personally negotiated with Sir Andrew Duncan (Minister of Supply) and Mr. V. Watlington (B.E.A.M.A.) with respect to the Government scheme to dispose of surplus equipment through a company to be formed for fixing prices and regulating distribution, claiming for the Association the right to a collective voice on aspects of the plan which affected its members. Other subjects that were receiving active consideration included trading in electrical machinery by supply authorities and regulations for the installation of machinery, while there appeared to be a revival of interest in fair trading policies. Membership of the Association was intended to be as wide as possible and it was desired to develop its national character. While the headquarters would be in London, periodic meetings would also take place in Manchester and Glasgow.

Mr. Ferguson outlined the articles of association and further aspirations, and Mr. Cole (treasurer) said that the membership fee and yearly subscription would be ten guineas each; membership would be for firms, not individuals, and each member firm would have one vote.

Various members of Council replied to points made in the subsequent general discussion, indicating that most of the questions raised had already been taken into consideration by the Association, including the similarity of some of the objects of the E.M.T.A. and the Electrical Contractors' Association, close co-operation between them being desired.

The proceedings terminated in a resolution, passed unanimously, welcoming and endorsing the action taken and according the utmost support to the Association.

Seaweed Processing

The power plant, processing tanks and electrical equipment for the seaweed processing factory at North Boisdale, South Uist, have been installed. Other factories may be built and a survey of the potential supply of seaweed round the Hebrides is to be made this summer.

Views on the News

Reflections on Current Topics

AST week's report in the Electrical Review that Stoke Newington had been told that only 1,000 of its first 3,000 temporary houses could be fitted with electric cookers, will naturally cause some questioning. I am told by the Ministry of Health that all the London authorities have been similarly informed. London is a special case on account of the urgency of its housing problem and it was found that to ensure speedy availability two-thirds of the houses would have to have gas cookers which are apparently in greater supply than electric cookers. Given the circumstances the decision seems to be reasonable, but the position should not have been allowed to develop.

The Ministry of Works was warned by the *Electrical Review* and others that its decision to order cookers on a two to one basis in favour of gas was a wrong one. The tide is flowing towards electric cooking and other applications and it should have been appreciated that the pre-war ratio of gas to electric cookers was no guide to the public desire. Insistence upon gas cookers, moreover, is uneconomical for all the houses are to have electric lighting. This means a duplication of services, a thing which the Ministries of Health and Works ostensibly frowned upon in their "Temporary Accommodation" memorandum, but avoided settling definitely by the use of ambiguous wording.

I mentioned last week the optimism of Cleethorpes in providing for illuminations this year "if circumstances permit." The G.E.C. refuses to remain in the "fell clutch of circumstance" and has boldly fixed a date—November 17th—for a victory luncheon to those attending a joint meeting that day of the A.S.E.E. and the Institution of Engineers-in-Charge.

Some idea of how war has affected electricity supply in Holland was given me the other day by Dr. N. A. Halbertsma, of the Philips organisation, who has been on a visit to this country. Some of the power stations in liberated Holland are still out of action either through war damage or lack of fuel. Emergency plant has been brought into use in many localities but much of this is of low efficiency and unsuitable for continuous operation. In most towns the supply is so severely rationed that only one 25-W lamp may be used. Individuals exceeding their allowance are liable to be summarily cut off but there have been instances in which this has happened and a kindly neighbour has come to the rescue with a flex extension. If anybody wants to use a radio set it must take the place of the light. Electric cooking has long been a thing of the past and the use of a vacuum cleaner is an event. The gas industry has naturally suffered too; it is available for essential cooking for very limited periods. Dr. Halbertsma says that all this has

Dr. Halbertsma says that all this has brought home to the people the indispensability of electricity in modern life; they feel the deprivation more than almost any other wartime disability.

People who want large rooms generally have to acquire large houses with too many small apartments, for small houses, small rooms is the rule. It's the same with cookers. If two hotplates and a grill-boiler are desired the cooker has to be a large one, although variety not quantity is what is required. In this case however the size of the oven governs the situation; there isn't room for three plates on the top of a small cooker. The solution seems likely to lie in the separate hotplate unit—if there is room for it in the kitchen.

What may almost be regarded as the first step towards a uniform national tariff is being taken by the I.M.E.A. It has recommended its members to adopt a uniform charge for the lighting of telephone kiosks after the war and the annual figure of 30s. per kiosk is suggested. This charge is based on the use of a 25-W lamp; for larger lamps the amount would be proportionately increased.

Young housewives in the North-west are not likely to be content with old-fashioned methods after the war. This is clearly demonstrated by the replies sent to a questionnaire recently circulated in the area. Not only are electrical appliances shown to be very popular, but some very novel suggestions are made. One writer puts forward the idea of a cooker that could become a refrigerator by turning a knob. Whether the descrip-tion of this as "Utopian" is an apt one is open to doubt; the possibly inconvenient results of a forgetful turn of the knob in the wrong direction are worth reflecting upon. Unlooked for consequences, in families where there are children, might also attend another suggestion. The idea is to have a chute delivering dirty washing from the bathroom to the wash-house.-REFLECTOR.

San and a superior of the supe

11

61

a de la de l

12

st a

19

100

245

日本は

「「「「「「「」」」」」

COMMERCE and INDUSTRY

Placing of Post-War Orders.

Supply Undertakings' Contracts

N a circular letter to authorised electricity undertakings last month the Electricity Commissioners suggested that these bodies should consider how far they could proceed to place orders immediately for essential equipment such as meters, switchgear, transformers, etc., which they were likely to need during the first twelve or eighteen months after the end of the war in Europe.

The Commissioners said that they were advised that firms in certain areas were more likely to be in a position to give deliveries within a reasonable time. The areas specified were identical with the "development areas" scheduled to the new Distribution of Industry Bill (*Electrical Review*, March 2nd, p. 311). Undertakings are now informed that "in view of certain questions which have been raised, the Commissioners desire it to be clearly understood that the letter was not intended to imply that the undertakers should divert orders from their ordinary suppliers if those suppliers are in a position to give delivery within a reasonable period."

Contracting Industry Order

In agreement with representatives of both sides of the electrical contracting industry the Minister of Labour and National Service has made an Order, incorporating into the Essential Work (Electrical Contracting Industry) Order, 1942, provisions corresponding with those contained in the Essential Work (General Provisions) Order, 1944. The new Order, the Essential Work (Electrical Contracting Industry) Order, 1945, came into force on March 1st.

The purpose of the new Order is to improve the method of dealing with cases of persons dismissed on the ground of serious misconduct, by making it possible, where the Local Appeal Board has found that dismissal was not justified on grounds of serious misconduct but reinstatement is nevertheless not directed, for the worker to be given a right to guaranteed wages under the Order for the period between the date of dismissal and the date on which the final decision is communicated to the parties concerned. Two minor amendments of a technical character are also made. One relates to the calculation of the net guaranteed wage payable to a successful appellant who has been in other employment since he was provisionally dismissed for serious misconduct; the other defines what is meant by the exclusion from the Order of members of the Armed Forces of the Crown.

Electrical Equipment for Houses

In the House of Commons last week Mr. Bossom asked the Minister of Labour whether women who had been doing electrical work in our aircraft, tanks, etc., but were no longer required, were being directed into making electrical equipment required for post-war housing schemes.

Mr. Bevin said that there were very heavy and urgent demands for electricians in munitions

Queen Sees Electric Kitchens.

work at present, and workers who had been engaged on electrical work in munitions were in general still required for such work. Subject to the overriding demands for war production, however, he would do what he could to supply labour for the manufacture of electrical equipment required in post-war housing schemes.

The Queen Visits E.D.A. Kitchens

Her Majesty the Queen paid a visit last week to the model all-electric kitchens which the British Electrical Development Association now has on view at the Building Centre, Maddox Street, London, W.1. She was received by



The Queen inspecting one of the new cookers at the E.D.A. display of model kitchens

Lord Brabazon, president of E.D.A., and Lord Lytton, a past president, and was accompanied round the exhibition by Mr. Clarence Parker, chairman of E.D.A., Mr. V. W. Dale, general manager and secretary, and Mr. F. A. Yerbury, director of the Building Centre. Miss H. Minoprio, Miss E. M. Eaves and Miss R. Oliver of the E.D.A. staff, pointed out the special features of the apparatus.

Her Majesty was particularly interested in the fact that the kitchens were planned for lowpriced homes and that they would be available for people with quite small incomes. The utility room with its washing machine and drying cupboard she considered most practical and thought it a good idea that the electrical facilities provided made it unnecessary to have a special washing day. Every house, she said, ought to have a refrigerator. The new horizontal type of cooker met with Her Majesty's approval and she said that the thermostatic control of the oven "sounded almost too good to be true," adding "we could do with that at Buckingham Palace" when she was shown the hotcupboard for keeping plates and food hot. A convector heater and a reflector type radiator fitted on the wall appealed to her and she was much impressed by the advantages of fluorescent lighting.

Because of its popularity the exhibition is to remain open until March 17th, after which it is to tour the Provinces.

Control of Metals

The Minister of Supply has made the Control of Iron and Steel (No. 39) Order, 1945, which came into force on February 26th. The Order extends the list of iron and steel products of which limited quantities may be acquired by any person without licence and also increases the quantities. It also permits stockholding merchants to acquire, without licence, limited quantities of wire and certain wire products, and any person to acquire, without licence, any quantity of cemented carbide hard metal. The Non-Ferrous Metals (No. 16) Order,

The Non-Ferrous Metals (No. 16) Order, 1945, which came into force on the same day, raises the maximum price of black hot-rolled copper wire rods not less than $\frac{1}{4}$ in. nor more than $\frac{1}{44}$ in. in diameter from £65 15s. to £66 10s. per ton.

Copies of the two Orders (S.R. & O. 1945 Nos. 190 and 203 respectively) may be obtained from the Stationery Office, Kingsway, W.C.2, or through any bookseller, price Id. each.

Government Surplus Machine Tools

The Machine Tool Control announces that the new arrangements designed to facilitate the disposal of Government surplus machine tools (*i.e.*, those not in the possession of contractors) in the interests of industrial reequipment will come into operation on March 15th. From that date stock records giving a brief specification, price and location of every Government machine tool which becomes available for disposal by the Control will be maintained in each of the Machine Tool Control Offices in Birmingham, Bristol, Glasgow, Leeds and Manchester, as well as in London. These records will be open for inspection between 10 a.m. and 4 p.m. from Monday to Friday in each week, so that purchasers may ascertain what machines are available. Permits may then be obtained to inspect machines where they are stored.

Sales will be on a cash basis and each machine will be sold as inspected by purchaser and loaded on his vehicle at store. Purchasers will be required to give an undertaking that machines will be used in their business in the United Kingdom, and purchases of used machines for stock or resale will not be permitted. It is recognised that many purchasers will decide in specific instances that a machine tool merchant can render them a service by selecting and inspecting suitable machines. Every transaction will be directly between the Ministry of Supply and the user and the price will be the same March 9, 1945

whether or not he decides to use the services of a merchant in this way. The Ministry proposes to enter into agreements with merchants for this purpose, and a list of merchants holding such agreements will be available at each Machine Tool Control Regional Office.

These arrangements do not apply to Government owned machine tools in the possession of contractors. These contractors should address any inquiries relating to such machines to the Department with which they hold an agreement.

Australian Plant Contracts

Details are given in *Tenders* (Melbourne) of contracts which have recently been placed for generating and boiler plant. These include a 50,000-kW turbo-alternator (Metropolitan-Vickers) and boilers (International Combustion) for the Pyrmont power station of the Sydney County Council. A 50,000-kW Parsons turbo-alternator is to be installed at the White Bay power station of the New South Wales Railways and additional boiler plant is to be ordered later. The Tamworth Municipal Council has accepted tenders for two Parsons 5,000-kW turbo-alternators and two John Thompson 60,000-lb. per hr. boilers.

Wigan Inquiry Decision

In December last Mr. A. D. Erskine, O.B.E., of the Electricity Commission, and Mr. A. R. Dent, of the Ministry of Town and Country Planning, held an enquiry at Wigan into an appeal by the Lancashire Electric Power Co. under Section 10 of the Town and Country Planning Act. It was stated that in granting permission for the erection of a low-voltage overhead line for the supply of electricity to Beechwood Colliery, Harrock Hill, Wrightington, the Wigan Rural District Council imposed a condition that it should be for the period of the war, after which the main would have to be placed underground. It is now announced that the company has been granted permission for a period extending to December 31st, 1947.

Copper Classification

The revision by the Copper Development Association of its Publication No. 36 is timely. This concise classification in tabular form includes data on the composition and mechanical properties as 'well as the principal uses of copper and its more important alloys. The information given in 18 tables ranges from various grades of copper employed for making rods, plates, sheets, strip, tubes, wire and other electrical purposes through the brasses and bronzes (manganese, aluminium and phosphor) to nickel silvers and welding-rod materials. A very great deal of essential material is presented in a small compass.

Apprentice Training

To ensure that its apprentices should be given a thorough grounding in engineering knowledge South Wales Switchgear, Ltd., instituted a training scheme about eight months ago. All apprentices, whether trade or engineering, have three months at a school, under the supervision of a former Government training instructor, where they receive instruction in

ELECTRICAL REVIEW

March 9, 1945

measuring instruments, reading drawings, marking out, the proper use of tools, etc. Many of the apprentices are are given one day off a week to attend Cardiff Technical College or the Treforest School of Mines.

St. Helens Electrical Exhibition

51

An exhibition of all-electric kitchens and a display of post-war electrical appliances, organised by the St. Helens Corporation Electricity Department was opened at the Electricity Showrooms on February 12th by the Mayor. The chief speaker, Mr. V. W. Dale, general manager and secretary of the British Electrical Development Association, while emphasising the almost complete occu-

The E.D.A. Type 2 all-electric kitchen at the St. Helens exhibition

pation of the electrical industry with war production, said that the industry and supply authorities were planning for a great expansion in the domestic field. The main features of the

and utility room, the E.D.A. type 1 dining kitchen and utility room, the E.D.A. type 2 working kitchen and the Poplar kitchen unit, together with a display of post-war prototype appliances.

Following the opening ceremony, the gathering was conducted round the exhibition by the engineer and manager, Mr. P. Bregazzi, and his staff. During the remainder of the week visits were paid by representatives of neighbouring supply authorities, women's organisations, etc., and on February 17th the exhibition was opened to the general public, approximately 3,000 people visiting it during the first week. The exhibition will be open for about a month, after which it will be retained for a further short period for private inspection by senior school children and neighbouring supply authorities.

Ulster Electricians' Wage Claims

The Northern Ireland Arbitration Tribunal recently heard a claim by the Electrical Trades Union that electricians employed by Harland & Wolff, Ltd., at the Pollock Dock, Belfast, and at Londonderby on ship repair work should be paid an hourly rate of 2s. 2d. plus $\frac{3}{2}$ d. per hour ship repair allowance. The Tribunal found that the claim had not how such this bar. found that the claim had not been established and also rejected a claim on behalf of electricians of the firm in Belfast for " a substantial increase " in the marking-off allowance paid to them.

Increased Exports

Further details of British exports last year published in the *Board of Trade Journal* show that there was a rise of two-fifths in shipments of machinery (as measured by weight) compared with 1943, exports last year being the highest

since 1940. The biggest increases over 1943 were in electrical machinery and machine tools, exports of the former being twice and of the latter two and a half times those in 1943 and both exceeded the 1938 figures. The rise in each case was due to additional shipments to Russia. By weight, electrical machinery exports were as follows : 1938, 44,600 tons ; 1943, 28,500 tons ; and 1944, 57,800 tons.

The value of exports of electrical goods rose last year almost to the pre-war level, but allow-

ing for wartime price rises the volume index for this group was only just over half the 1938 figure. Shipments in 1944, as well as in previous wartime years, included substantial supplies to Allied Governments.

New South Shields Factory

A large factory, being built by the Government at South Shields, is to be let to Wright & Weaire, Ltd., engineers and scientific instrument makers, of Tottenham, N.17. The company will manufacture electrical equipment including radio transformers and condensers.

Trade Announcement

The address of Newalls Insulation Co., Ltd., is now Washington, Co. Durham, not Washington Station.

TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from February 28th:— COOPER-STEWART. No. 624,385, Class 9. Electric induction apparatus for electrifying wire fences.—Cooper-Stewart Engineering Co., Ltd. 136,137, Long Acre London, W.C.2.

Ltd., 136-137, Long Acre, London, W.C.2. AEROPLAS. No. 630,618, Class 9. Insulated cables and insulated wire.—Aerialite, Ltd., Castle Works, Back Grosvenor Street, Staly-

AMBASSADOR. No. 631,702, Class 9. Radio receiving and transmitting apparatus, radio-gramophones and gramophones; and parts (not included in other classes) of all such goods. -R. N. Fitton, Ltd., Radio Works, Hutchinson Lane, Brighouse, Yorks.



merchie ats held . ic at ea .90 to Gora to solo her -

tracts Melhoer

-----Metror station Sec. S plant at

id me i ISION There of

usi Lu Vigan m

ad i.

at in en

a low: Felectrico ID, Winsson

the penn

ion

Dersies

cipal 375

allors ire and a

北市 CLAIDS FOR 16 0.755

stall :

(त्रमाश्टर)

gear, Li gear, Li gebt mok.

Under D

I ITULI

uction

I WO PER

Lighting and Interior Design

Advantages of Built-in Fittings

THE relationship between interior design in buildings and their artificial illumination is discussed in a paper by DR. J. W. T. WALSH (National Physical Laboratory) read at a joint meeting of the Illuminating Engineering Society and the Royal Institute of British Architects in London on February 27th.

The author does not claim to advocate anything novel, but suggests that there is a real danger in familiarity. Not, in this case, the proverbial contempt but a too facile acceptance of a method or, shall we say, a formula or set of figures without that appreciation of their basis which is necessary to ensure that they will always be correctly used, and which may even sometimes give them an unexpected and valuable significance.

"Foot and Candle Disease"

Dr. Walsh believes the jibe that most illumination engineers suffer from "foot and candle disease" has not been entirely unjustified. So in this paper he does not use the term; instead he thinks of the light output from lamps and how it can best be used to light the interior of a building. Light output is measured in lumens, and illumination is nothing but the arrival of some of those lumens at some surface or other. He considers it a pity that the simple connection between the light output of a lamp and the illumination of an object has been so obscured by the employment of two units having names from which the connection is entirely absent. Let us reform; 1/sq. ft. is not much more cumbersome that ft.c. and its employment in this paper demonstrates how simply it lends itself to any discussion of lighting principles.

The effect of room dimensions on the performance of a lighting system can be conveniently studied by means of the tables used for estimating illumination by the well-known lumen method, sometimes called the coefficient-of-utilisation method. The definition of this "coefficient" may be stated quite simply as "that fraction of the lumens from the lamp which gets to the working plane." If half of them get there the c. of u. is 0.5, if two-thirds of them fall by the wayside it is 0.33, and so on.

The author proceeds to show how these tables will well repay examination and even some analysis, pointing out the difficulty of securing adequate mounting height in the modern house owing to the prevalence of low ceilings. He strongly advocates mounting units as close to the ceiling as possible, even suggesting for the serious consideration of architects the provision of a recess in the ceilings, at any rate of living rooms and, possibly, bedrooms as well, for the accommodation of the upper part of a fitting for the general lighting of the room. Fittings for use in this way would probably need to be specially designed, while in dwellings and in other rooms where the ceiling-height is not over, say, about 15 ft., the best form of mounting for discharge tubes is within a few inches of the ceiling, without any kind of shade or reflector whatever. The sockets at the ends should have matt-white outer covers and dark patches or excressences on the ceiling should be strenuously avoided.

The mention of special provision by the architect for mounting a lighting unit *in* the ceiling of a room leads naturally to consideration of schemes in which all or most of the lighting is from sources placed within compartments specially provided for them in the structure itself. In many cases, the most effective arrangement is some form of artificial window.

In conclusion, the author expressed the hope that well-designed built-in lighting may be a common feature of building practice in the immediate future. It has a great deal to recommend it, and probably only a little further study is all that is required to convince both architects and illuminating engineers of its tremendous possibilities. Emphasis should, however, be placed on the qualification " well-designed."

Location of Underground Services

THE Institution of Civil Engineers, with the Institution of Municipal and County Engineers, has appointed a joint committee to draw up notes for the use of engineers on the best location of underground services.

The chairman of the committee will be Mr. W. H. Morgan, county engineer, Middlesex, and among the ten members who will include city and borough engineers and other engineers who have specialised in water supply, sewage disposal and main drainage, electricity and gas supplies and Post Office services, will be Mr. J. W. Leach (Central London Electricity, Ltd.) and Mr. R. M. Chamney (staff engineer, Transmission and Lines Branch, G.P.O.). Members representing electricity and gas supplies and Post Office services have been nominated by or in consultation with the Institution of Electrical Engineers, the Institution of Gas Engineers and the Chief Engineer, G.P.O. respectively.

The committee will welcome any notes or suggestions and these should be addressed to the Secretary, Joint Committee, c/o Secretary, the Institution of Civil Engineers, Great George Street, Westminster, London, S.W.1

9,1545

S INCOM S

1 1000 N

For the loss

d'a the

a En

the set i

Non I

the state

- 15/ 3

S & Refer

25 27 2

The out

State of

1 1000

Here V

1220

and with a

CHE IN THE

sine im

10700

i mit i

to lite and

al Sorie

and in

T CALL

ar with

Bas

d 68

日本日本日

100

Sector

Moulding Thermo-Plastics

New Extrusion Method

A N extrusion method of moulding thermoplastics developed by the Metropolitan-Vickers Electrical Co., Ltd., consists in forcing the material by means of a screw into a closed mould, a suitable nozzle being formed on the end of the extruder barrel to which the mould is clamped. It has so far been confined to polythene, which is a solid polymer of ethylene, but may possibly be utilised for other substances.

The essential difference between this method and compression, transfer and injection systems is that the moulding is done at low pressure, between 200 and 400 lb. per

sq. in., which can easily be regulated to suit a great variety of articles without limit to their size since the screw will deliver plastic continuously so long as it is kept fed with the molten material.





Fig. I .- Injection detail shown schematically

The principle is illustrated in Fig. 1 in which A is the forcing screw and B its associated barrel, which is heated by coil C. The hopper D contains the material to be moulded and is re-filled from container E while F is the mould, M a typical moulding and G is the driving motor which is capable of speed regulation. When the mould is full it is important to maintain the pressure inside during the cooling period in order to make up for the contraction of the material, especially if the moulding is large and bulky. A small clearance is provided between the screw and the barrel for mechanical reasons and also to allow for the necessary slip of the material when the mould has been filled, otherwise the pressures in the barrel and mould would become excessive. To assist the material to enter the screw it is desirable to provide a roller feed (Fig. 2, A) driven by screw B by means of spur gearing; a gear wheel is shown mounted on the screw shaft at K in Fig. 1.

It is usual to heat the material in the container until it is plastic and to fill the hopper D by opening the valve V, but in certain cases it may be possible to use container E merely for raising the temperature of the powder, and to arrange for the remainder of the heating to be done inside the barrel by the work done on the material in churning it up, supplemented by heating coil C. Features of these machines, for which

Features of these machines, for which several patent applications have been entered, are that, owing to the relatively low moulding pressure, it is possible accurately to position flimsy inserts and insulated wires in the moulding. When moulding polythene the screw gets rid of any bubbles that happen to be in the material, ejecting them at the hopper, which is a valuable asset in the case of mouldings used for electrical purposes; it is probably due to the gradually increasing pressure imposed on the material during its passage along the screw. Very large mouldings can be made by a small machine of relatively low initial and running cost and occupying small floor area. Owing to the low pressure employed the moulds may be of

very light construction of brass or low grade steel.

A typical machine manufactured by David Bridge & Co., Ltd., Rochdale, is driven by a Metropolitan-Vickers variable-speed motor through a double reduction gear box. The forcing screw is of high tensile steel mounted in large sleeve type bearings and is provided with a suitable ball race for taking the end

thrust, the whole assembly being easy to dismantle and reassemble for cleaning in the event of a change in the type of plastic used. The hopper, barrel and container for the raw material are heated electrically by elements of Metropolitan-Vickers manufacture. To adjust the loading to the required temperature each heating element is con-



Figs. 2 and 3.—Detail of roller feed and automatic nozzle

nected in series with a Sun-Vic energy regulator which controls the current without external loss of power. A table in front of the machine nozzle to which the mould is secured is adjustable vertically and also horizontally in the plane of the screw axis in order to accommodate any size of mould. In addition, the top of the table is horizontally movable with respect to its base and is

provided with a quick motion device actuated by a hand lever for pressing the mould on to the nozzle and maintaining it in that position during the moulding process.

There are two main forms of nozzle. With the plain type (Fig. 1) the machine has to be started after the mould has been clamped on to it and stopped before the mould is removed. With the automatic nozzle (Fig. 3) the machine can be run continuously. It comprises a poppet valve having a hollow stem with circumferential holes adjacent to the valve seat, which opens

as soon as the mould is pressed against it and closes again immediately the mould is removed.

As it is desirable to be able to operate the valve manually in order to remove a cold cob of plastic that may have formed at the nozzle during the operation of the machine, or to empty the machine prior to a shut down period, a hand lever arranged to work in conjunction with an eccentric spindle is provided.

Pre-heating the mould before the moulding operation may be done in a variety of ways and a machine with an electric oven on top of a bin in which the moulding powder can be stored is illustrated. Cooling of the mould can conveniently be done by blowing air on to it, or the mould could be jacketed Moulding machines manufactured by David Bridge & Co., Ltd.; a typical machine with variable-speed motor is seen on the left and a model with electric oven and special storage bin is illustrated above

and hot water or steam heated and water cooled.

With a 3-nozzle machine one operator would be in charge of all moulding operations. He would operate the nozzles in rotation and would fill only one mould at a time so as to avoid any fall in pressure which would occur if two or more moulds were filled simultaneously. A second operator would be employed on dismantling and reassembling the moulds.

This method of moulding should be regarded as supplementary to, rather than as competitive with, the present well-known methods of handling plastics.

Radio-Frequency Heating

▲ BOUT eighty members at the February meeting of the Coventry Electric Club listened to a lecture on radio-frequency heating by MR. E. T. NORRIS (Ferranti, Ltd.) who explained the fundamental considerations. He said that the method was unique by virtue of the homogeneous generation of heat throughout the material being treated, which in many cases was vital, and not practicable in any other way.

Although there was a *prima facie* case for the use of high-frequency AC heating when older methods seemed unsuitable, detailed examination of each case individually was advisable to determine whether it could be economically justified.
na i

1 100

altr al

ŧ.

四日

System Maintenance

Transmission Section Members Exchange Experiences

THE advantage of pooling operating experience is especially apparent in regard to the maintenance of transmission systems. On these the vast majority of faults are transient, but many are at remote points and may consequently result in disproportionately long interruptions in supply and the more practical experience that is brought to bear on the subject the better.

The object of maintenance is the prevention of faults. This is often overlooked by those in authority, and, as Mr. C. F. Bolton (Central Electricity Board) stated during the discussion on the recent I.E.E. Transmission Section paper by Mr. R. C. Hatton and Dr. J. McCombe of the Yorkshire Electric Power Co. (*Electrical Review*, February 16th), the man who repairs faults quickly is often thought more of than one who is successful in preventing them. Nevertheless a careful analysis of such faults as inevitably do occur, even minor ones, is essential to improvement. In records made for the purpose of comparison, the size of system should be taken into account, as Mr. H. Willott Taylor (Edmundsons) insisted, by relating the number of line faults per annum to mileage.

Not the least important aspect of such discussions is the opportunities they give designers to ascertain the results of their work under widely differing local conditions. This was brought out by Mr. J. N. Beaumont (London Power Co.) in his aphorism that the criterion of design is not what the designer thinks of it to-day, but what the maintenance engineer will think of it to-morrow.

Training and Supervision

Much depends upon the selection of men of the right temperament for maintenance work and this applies to safety as well as efficiency. The greatest safety precaution is the training of personnel to observe the safety precautions, as Mr. Bolton neatly expressed it. He, like many other speakers, favoured the general adoption of the permitto-work card given in B.S. 1086. The card of the London Power Co. is almost identical it was stated, but includes the further stipulation that only a " authorised " person shall have keys giving access to high-voltage apparatus, which he must prove to be dead in the presence of the " competent " person before work on it can be started. Two fatal accidents were recalled by the Section chairman, Mr. H. W. Grimmitt, as caused by lack of electrical though not of mechanical knowledge.

• Glass insulators that had been in successful

operation for over eight years were mentioned by Mr. Willott Taylor. Generally he has found single-piece insulators to give less trouble than the two-piece kind. Incidentally he regards the use of unearthed lines as constituting a big step forward in reducing maintenance costs. An objection of the authors to glass insulators is that they are easily damaged by stones and, unlike porcelain, cannot carry the normal line pressure until the maintenance men arrive. As a point in their favour, Major T. Rich mentioned that any damage is easily visible from the ground. On the other hand the risk of their disintegration due to slight imperceptible cracks with possible risk to men working on the line was referred to by With a view to obviating Mr. Bolton. cleaning difficulties, it was stated, the Y.E.P. intends to experiment with stabilised glaze.

Guarding Against Corrosion

Little advantage has been experienced by Mr. H. F. Marsh (Mid Lincolnshire Co.) from wrapping with bitumenised tape the core of steel-cored copper conductors, as this increased the life only from seven to nine years for 0.04 sq. in. (copper equivalent) lines, and he is replacing the steel by cadmium. Many years successful use of cadmium copper lines, without failures due to the "key," was reported by Mr. B. H. G. Rogers (Mid-Southern Utilities). A suggestion that manufacturers might help to protect steel-cored aluminium from corrosion by greasing before despatch was made by Mr. J. S. Forrest (C.E.B.).

Troubles with core joints and clamps were said by the authors to arise from mechanical rather than electrical causes, but Mr. J. R. Harding (Pirelli-General) drew attention to the need to avoid disturbing the natural lay of aluminium wires when fitting the cones, which should be firmly compacted before assembly, so as to ensure adequate conductivity with large fault currents. Mr. C. O. Boyse (Callender's) suggested that the sag of a line should be determined with a fairly heavy wind and ice loading up to the maximum stress the conductors would withstand. Breakdowns of compound-filled condenser bushings in most cases were attributed to defective methods of sealing by Mr. F. C. Walmsley (Micanite and Insulators, Ltd.), who pointed out that they had the merit of relatively low cost.

The Yorkshire Electric Power Co., the authors stated in their reply to the discussion, adopted two 2-in. gaps on lightning arrestors because of trouble (mainly from birds) with a single 3-in. gap. They have found 5 in. at 11 kV as advocated by Mr. Forrest (who also favours 9 in. for 33 kV), too big for protecting transformer windings although good enough for switchgear. Mr. R. A. W. Connor (Luton) is also a believer in small gaps and uses $3\frac{1}{8}$ in. for 33-kV lines. Mr. Forrest's experience also differs from that of the authors in regard to Petersen coils, which he has found to limit multi-phase flashovers to about 60 per cent. of the number anticipated. The authors also stated that great benefit had been obtained from the installation of a private telephone system.

Lift Practice

Speed and Power Consumption

CHANGES that have been made in electric lift design from time to time to solve problems created by the increasing height of buildings and their growing populations are outlined in a paper prepared by MR. L. S. ATKINSON (Waygood-Otis, Ltd.) for the Installations Section of the Institution of Electrical Engineers.

The paper is largely descriptive of equipment as generally installed to-day, indicating that of recent years the method of determining the economic number and capacity of passenger lifts needed to provide adequate service in a building has been thoroughly studied.

Lift practice in this country is similar to that in America, but the height of buildings here does not justify the high car speeds that are required for "skyscrapers." The highest speed for passenger lifts in this country is about 600 ft. per minute in the case of goods lifts; it seldom exceeds 200 ft. For passenger service in small blocks of flats a car speed of 100 ft. per minute is usually sufficient, but it is undesirable for small office buildings of not more than four floors because of its psychological effect. Therefore for the busier buildings of four floors a car speed of 200 ft. is recommended, 300 ft. for 5 to 6 floors, up to 400 ft. for 7 to 10 floors, up to 500 ft. for 10 to 12 floors and for over 12 floors the speed should not be less than 500 ft. The

cost of the installation increases with the speed. Equipment and methods of control are described. The author believes that future development will undoubtedly be in extension of the use and simplification of variable-voltage control which is said to have proved itself for quality of performance. Typical approximate power consumption curves are included. Consumption may vary considerably in practice from calculated figures because of the many changeable influences that affect operation.

Radio interference from electric lifts is caused by high-frequency waves set up by sudden changes in the current in the operating circuits, by commutation and switching. The interference can be either mains-borne or re-radiated from the wiring connected to its source, the latter predominating. Most of the interference can be suppressed by connecting suitable inductors and condensers in the supply circuit to the controller. Motors having commutators sometimes require individual treatment, and the connection of a condenser suppressor across the brushes is usually effective. Another likely source of interference is re-radiation from the travelling flexible cable between the lift car and the half-way terminal box in the lift well; this can be suppressed by inserting inductors in the circuits of the flexible cable. The connection of condensers across safety devices is, however, to be deprecated, because the failure of a condenser may create an unsafe condition.

Radio Valves Standardisation Problems

A T a meeting of the Radio Section of the Institution of Electrical Engineers on February 20th, MR. A. H. COOPER, B.Sc., opened a discussion on technical aspects of valve standardisation. He said that even without increased stringency in the required performance, operating conditions had often been chosen in such a way as to impair interchangeability of valves, mainly by depending upon parameters which the valve maker found it uneconomical to test or to control. For valve standardisation to work it was necessary for valve and circuit engineers to agree not only what valves were needed, but also what were reasonable ways of using them. If standardisation was not to act as a brake on progress, this " code of practice" must be kept alive and ahead of users' needs.

In the discussion which followed it was stated that at one time there were between 2,000 and 3,000 different types in use in the Services and to check further complications a committee had been formed to examine all requests for new designs to see if they could not be met by existing types. The fact that 300 sanctions for new types had since been granted was a measure of development.

Several speakers underlined the danger that standardisation might act as a brake on progress, but it was pointed out that this difficulty would not arise if agreement were restricted to types performing established functions. One speaker thought that about ten types could be standardised at once and that these should be sold at a lower price. Valves outside this group could then compete for a place on the standard list on their merits. Other speakers held that the initial list could not contain fewer than about 50 to 100 types.

A specific proposal for valve standardisation which had appeared recently in the technical Press was criticised in detail and it was generally agreed that there was need for wider discussion between valve manufacturers and receiver designers to ensure that the types finally decided upon would be acceptable to all concerned. This was particularly necessary in the case of multiple types where the interests of the set designer and the valve manufacturer were to some extent opposed. Standardisation of valves presented no insuperable difficulties and it was disclosed that a committee appointed by the British Radio Valve Manufacturer's Association was already working on the question of standardising physical dimensions.

Several speakers called for an extension of standardisation to what may be called the secondary parameters of the valve. Against this it was argued that there was an economic limit to the number of tests which could be employed in each case and that in general only those characteristics related to the function for which a valve was intended could be controlled. 1345

hon h har a har a

21

COMEL 15

HID STORE

EL TELEP

TES STOL

Sers' me

340 STAT

eraniei u

he dane :

tie on you

. One see

is group at standard a beld the i wer that a standard a be the term

nder cases actimum finally are

all cours in the ce scy of the

ions of w

ointal in .

quality

ettingii e called 3

live. Again an econich could general es function "

Kitchen Planning N.W. England Inquiry Results

REPLIES to a questionnaire on kitchen planning circulated by fifty-two electricity supply authorities primarily to ascertain the views of young women are analysed in a report published by the British Electrical Development Association (North-West England and North Wales Area). Of the 3,976 replies received 3,241 (81.5 per cent.) were from people living in flats and small houses with three or fewer bedrooms (Group A), the remaining 735 being from those in larger houses (Group B).

being from those in larger houses (Group B). The various types of electrical apparatus in order of popularity were given by Group A as: Cooker, water heater, washing machine, refrigerator and wash boiler. In Group B the positions of the washing machine and refrigerator were reversed. Opinion was almost equally divided as to preference for built-in or movable appliances, while if a small refrigerator could be produced for "about £18" 44 per cent. would be prepared to buy one for cash and 49 per cent. on hire-purchase.

The voting was two to one against the need for a coal-fired range. For the conventional type of cooker with oven underneath the hotplates the replies showed: Group A, 66 per cent. Group B, 49 per cent. The table-height type with oven alongside the hot-plates received 25 per cent. of the votes from Group A and 45 per cent. from Group B. Nearly 85 per cent. were in favour of over-sink water heaters.

The answers relating to home laundering showed that in Group A 77 and in Group B 51 per cent, wanted to do all laundry at home; in Group A 20 per cent, and in Group B 46 per cent. wanted to wash "smalls" only at home. These replies emphasised the need for a separate wash-house, or utility room, with facilities and room for labour-saving devices.

Suggestions for improvements to cookers included glass inspection panel in cooker door (310), better heat control of oven, frequently coupled with request for oven thermostat (265), removable oven elements and fewer projections inside (233), high-speed boiling plates (144), larger hot-cupboards (71), simmering device for one boiling plate (32), castors to facilitate moving (21), cream or white oven interiors (19), and drop-down oven doors (6). Other suggestions included: Oven doors capable of being hung on either side; automatic light inside oven; pedal operated oven door; alarm clock to indicate when dishes are cooked. Almost 2,000 of the replies were unreservedly in favour of an electrically heated drying cabinet.

Based on these replies the E.D.A. Area Committee makes a number of recommendations. It concludes that future homes should have working kitchens of ample size, with sufficient window space to ensure good daylight; areas of less than 110 sq. ft. will not be acceptable. Equipment should include an electric cooker of the conventional type, a sink (preferably of stainless steel) with draining board, an electric water heater, space for a 3- to 4- cu. ft. refrigerator, and preferably two lighting points, to give good light over the sink. A coal-fired cooking range is not necessary, but some form of electric heating should be provided.

Domestic Appliances Estimates of Next Ten Years' Demand

BROADSHEET (28 pp.) on "Household Appliances" has been issued by P.E.P. (Political and Economic Planning, 16, Queen Anne's Gate, S.W.1). It summarises and describes the scope of a full report which has been submitted to the Board of Trade and is to be published later in the year. It is hoped that this report will be of practical value to manufacturers and designers of domestic appliances and to those responsible for the installation of domestic equipment as well as to the public.

The first section is a brief survey of household activities to indicate what sort of equipment is needed and then the factors affecting demand are dealt with—house construction, gas and electricity supply, income levels, household expenditure, prices and domestic education. The design of appliances is then briefly put and although the balance is evenly held between coal, gas and electricity there is a tendency to generalise (perhaps unavoidable in a summary) which is not always fair to electricity.

to generalise (perhaps unavoidable in a summary) which is not always fair to electricity. An estimate is made of the possible post-war demand for appliances. It is thought that in the first ten post-war years about 15 million cookers may be required (including the replacement of all existing cookers). Of these 5 million will be required for new houses—1 million solid fuel, 1-2 million electric and 2-8

million gas. The ratio displayed in the last two figures is roughly that which the Ministry of Works has adopted and its validity is questionable. Electricity is allotted only 334,000 out of the 4½ million water heaters for new houses (gas 1,038,000) and 884,000 out of the total requirement of 12·12 million (gas 2,958,000). Space-heating, it is considered, will be mainly by solid-fuel appliances with gas or electric heaters for "topping up." As regards wash boilers a total demand of 6 million is anticipated. No attempt is made to apportion these between gas and electricity but

As regards wash boilers a total demand of 6 million is anticipated. No attempt is made to apportion these between gas and electricity but it is rashly said that " there seems little reason to expect the electric wash-boiler to become a serious challenge to the simple gas boiler." The 1.5 million irons required yearly will, of course, be electric and so will the vacuum cleaners the demand for which is put at between 570,000 and 750,000 a year according to circumstances.

The pre-war advantage of gas over electric refrigerators is said to have been its small size but the larger and cheaper standard electric refrigerator now contemplated will negative that advantage and an annual demand rising from 20,000 in the first year to 86,000 in the tenth year is expected. If the gas industry produces a large cabinet at a lower price it may sell as many as the electrical industry.

Synchronous Machine Losses

Uncertainty of Measurement Methods

• N March 1st the paper on "Stray Losses in Synchronous Electrical Machinery" by MR. P. RICHARDSON (*Electrical Review*, March 2nd, p. 308) was read and discussed at the Institution of Electrical Engineers. The opener was MR. W. KILNER (Metropolitan-Vickers Co.) who said that to measure stray losses he had run the machine as a synchronous condenser and measured its input by an AC bridge or wattmeter. In a large number of machines he had usually found that the extra losses on wattless load were much less than on short circuit, the reduction varying from 10 to 30 per cent, If allowance were made for the iron loss being greater on wattless loads, then the difference in loss was between 25 and 60 per cent. of the short-circuit stray loss. In a few large machines, the reverse was found to be the case. In 1931 a British manufacturer published some results of calorimetric tests on a 15,000 kW and a 30,000 kW machine showing that the load stray losses measured by such methods were practically equal to the short-circuit losses, after allowing for the increased iron loss on full load which was equivalent to saying that the load stray losses were actually higher than the short-circuit stray losses, which was contrary to his experience. During 25 years his investigations had produced such variable results that he hesitated to say we were in a position to make any recommendations to the British Standards Institution with regard to a change of method of calculating them.

Stray Field Screens

DR. R. POHL (Birmingham University) said that in the near future, with hydrogen cooling, the percentage of stray losses would be very much greater. The output went up by 25 or 30 per cent., and the stray loss would go up in the same ratio. He was grateful to the author for rescuing from the limbo of forgotten things stray field screens which he (Dr. Pohl) had designed some years ago. Although the author stated that these screens had not been used to any large extent, for quite 12 years every one of the large alternators made by the firm with which he was then connected used them and they were extremely efficient in keeping down the temperature rise of the end plate. But although the temperature rise went down, the total loss might not be reduced to anything like the same extent. Many available improvements made the machine more complicated and more expensive and, in the end, the question was whether it was all worth it.

MR. J. W. HOWARD (G.E.C.) said the stray

loss from the short-circuit test was only of interest during the time the machine was at the manufacturer's works; after the machine reached the user it had a different set of losses and a different set of temperature rises, which created difficulties for the designer. The principal stray loss which affected temperature rise of stator windings was the eddy current loss, and there was a good deal of literature on that subject. As regards the rotor, there was a tendency to exaggerate the stray losses: a great deal depended on the manner in which the machine was designed. As to core end plate losses, the author had produced a rather interesting formula but he would like to know what "skeleton" type core end-plate, mentioned in that formula, really meant.

Salient Pole Machines

MR. L. D. ANSCOMBE (B.T.H. Co.) discussed the advantages of the salient pole machine in the matter of stray losses as compared with those on turbo type alternators and said that in the salient pole machine, the end losses were comparatively unimportant. This was partly due to the reduced intensity of the magnetic field in the larger number of poles and partly because the overhang of the rotor winding and the core was very much less, and the pole end plates were less compared with rotor end caps. The stray load loss, as measured in accordance with the B.S.S., very rarely exceeded 10 per cent. of the total. As regards operating a machine as a synchronous condenser he thought there was a clear case for a revision of B.S.S. 268. The fitting of laminated poles or separate squirrel cage windings to salient-pole machines undoubtedly reduced the loss due to stator distribution harmonics. Magnetic wedges fitted in the stator slot as a means of reducing the flux and the rotor loss were subject to strong pulsating magnetic forces and could not be made of a material which would prevent shrinkage. It would be interesting to know if these wedges had proved satisfactory after being in use for a long period of time.

MR. G. F. FREEMAN said that under short circuit conditions the iron was more or less saturated and the flux could be regarded as substantially proportional to the current. Therefore one might naturally expect the stray losses to be proportional to the square of the current. But if the machine was saturated under load conditions, that assumption was not quite justified.

THE AUTHOR replied to some of the points raised in the discussion but said that he would give a detailed reply in writing. How to the test of t

March

and the year 75, of 1 nte relief. 2 nd the 1 ambridge.

incruidity Co at the perio corporatio

Elec excitends to t w Corporation hence Connel me parts of t w Cambridge the 1903, whi

Butinaton. - Pre borough e unport on step miny works. Electricity uput the work in

Durham.--Prore anamentary C words that Mr. To and Count earnes before what power s and an alte power have what may be

utter.--RATI Committe

tugon. - An no Station e Central Ele no the co station at noto-kW see With refer With refer with refer station at appointed tration of maily ac antain protrovides (f inity) D

BILBOUR CHAY SHPPLY

Glasgow Engages Consultants. London J.E.A.'s Surplus.

Billingham-on-Tees.—ELECTRICITY FOR TEM-PORARY HOUSES.—The Urban District Council proposes to install electricity for cooking, washing and lighting in 100 temporary houses.

Blackpool.-UNDERTAKING'S FINANCES.-The accounts of the Electricity Department for the past five years show an aggregate net profit of £115,575, of which £28,817 has been allocated to rate relief. Last year the total income was £481,667 and the net profit £19,214.

Cambridge. — EXTENSION OF TIME. — The Electricity Commissioners have made the Cambridge Electricity (Extension of Time) Order, 1945. This extends to December 31st next the period ended December 12th, 1944, within six months after the expiration of which the Corporation may require the Cambridge Electric Supply Co., Ltd., to sell to the Cor-poration the undertaking authorised by the Cambridge Electric Lighting Order, 1890. - Tr July 20th, 1945, within six months after which the Corporation and the Chesterton Rural District Council may respectively purchase those parts of the undertaking authorised by the Cambridge and District Electric Lighting Order, 1903, which are in their areas.

Darlington. REDUCING CONDENSATION. -The borough electrical engineer has prepared a report on steps to be taken to reduce condensation from the cooling towers at the electricity works. Application is being made to the Electricity Commissioners for sanction to put the work in hand.

Durham.-PROPOSED POWER STATION. - The Parliamentary Correspondent of The Times reports that Mr. W. S. Morrison, Minister of Town and Country Planning, is making further inquiries before coming to a decision on the burhan power station scheme. An alternative site and an alternative method of supplying the power have been suggested. The deciding factor may be the recent discovery that the foundations of the proposed site at Kepier, Durham, are not as strong as was at first thought.

Exeter.—RATE CONTRIBUTION.—The Elec-tricity Committee has decided to make a contribution of not exceeding £1,500 to the rate fund.

Glasgow.—ARRANGEMENTS FOR NEW GENER-ATING STATION.—The draft agreement between the Central Electricity Board and the Corporation for the construction of a proposed generating station at Braehead provides for the station having an ultimate capacity of not less than 200,000 kW, the first section to consist of two 50,000-kW sets.

With reference to the decision that Merz & McLellan, consulting engineers, London, should be appointed to design and supervise the con-struction of the new station, the Electricity Committee has received a letter from the firm formally accepting the appointment and making certain proposals. The suggested agreement provides for the general manager of the Electricity Department giving the consulting

engineers the benefit of his advice, assistance, and local knowledge to facilitate the efficient and expeditious carrying out of the works. In respect of these services and of the service of the staff the Corporation, the consulting engineers of will credit the Corporation with the sum of £7,500 for the first section of the station of 100,000 kW and a further sum of £5,000 if and when the capacity of the station is extended to 200,000 kW. The consulting engineers, at their own expense, are to engage Sir Alexander Gibb & Partners to assist them with the designs and specifications for the main civil engineering works. The Committee has approved the terms of the agreement.

Keighley.—HIGHER CHARGES RECOMMENDED. It is proposed to make application to the Electricity Commissioners for approval of an increase of 5 per cent. in all basic electricity charges, including standing charges, but excluding rents of meters, equipment and appliances. The increase would come into force on April 1st.

London. — J.E.A.'s ACCOUNTS. — In presenting, at the meeting of the London and Home Counties Joint Electricity Authority held on March 1st, 1945, the annual accounts of the Authority for the year ended December 31st, 1944, the vice-chairman of the Finance Committee (Alderman H. G. Coleman, J.P.) quoted the following figures:—Gross revenue surplus after charging interest and sinking fund contributions, etc., £174,580; unappro-priated balance for the year after allocating £130,000 to reserve for taxation and £22,500 London. — J.E.A.'s ACCOUNTS. — In £130,000 to reserve for taxation and £22,500 for reserve for deferred repairs to buildings, £22,080. With the unappropriated balance brought forward from previous years of £122,022 this makes a total to be carried forward of £144,102. The total capital expenditure of the Authority now amounts to £6,399,550 and loans repaid, or provision therefor, £2,731,605.

Alderman Coleman said that the authority had been involved in substantially increased costs, particularly on account of bulk supply costs, particularly on account of bulk supply which was subject to a large increased charge for coal, but had covered all its outgoings without increasing prices. The average price received during 1944 was 1.848d. per kWh. Domestic consumers on the two-part tariff paid an average price of 1.710d. per kWh. REBULDING POWER STATION.—In connection with the rebuilding of the generating station, Southwark Electricity Committee is making arrangements for the original foundation stone, which was laid in 1898, to be inserted in the wall of the new building. The Committee reports that the war damage at the generating

reports that the war damage at the generating station has amounted to £12,917.

FIXED CHARGE FOR SINGLE ROOMS.— Bermondsey Electricity Committee recommends the reduction of the standing charge of 1s. per week in the case of one-roomed flats to 6d. per week.

CONVERSION OF STREET LAMPS .- Hammersmith Works Committee recommends the conversion of 52 gas lamps in the borough to electricity.

Middlesbrough. — HOUSE WIRING. — The Town Council has approved in principle a suggestion by the borough electrical engineer that future Council houses should be wired to meet electricity needs for the next ten years.

Northern Ireland. — GOVERNMENT'S INTEN-TIONS ELUCIDATED.—Addressing a Belfast public meeting on February 29th Major Maynard-Sinclair, Minister of Finance, dispelled a widely held belief that the Government intended to take over the Corporation's generating station without adequate compensation, or none at all. The proposal, he said, was that the suggested new central authority should purchase, not the stations of Northern Ireland, but their output, re-selling the electricity to the owners of the stations for retail distribution. That was what was being done by the Central Electricity Board of Great Britain.

Preston.—STREET LIGHTING CHANGE.—The Corporation proposes to proceed with the conversion of existing street gas lamps to electricity.

Scotland.—LOCH SLOY AND TUMMEL-GARRY SCHEMES.—In the House of Commons last week Captain Shaw asked the Chancellor of the Exchequer whether permission had been granted for raising the necessary finance for the Loch Sloy and the Tummel-Garry and Gairloch Schemes. Sir John Anderson said that the question of permission did not yet arise.

Asked by Captain Shaw whether the Fishing and Amenities Committees had approved the Tummel-Garry scheme as published, Mr. T. Johnston, Secretary of State for Scotland, replied that while the Act contained no directions as to publication his original intention was to make the recommendations of the Amenity Committee and the Fisheries Committee available to the person holding a public inquiry into a Constructional Scheme and to publish the recommendations thereafter. But in view of the general interest in the matter he was giving it further consideration in consultation with the chairmen of the two committees concerned.

March 9, 1945

Stockton-on-Tees.—CABLE EXTENSION. — The Corporation is to spend nearly $\pounds 1,000$ on laying electric cable to serve 62 houses to be built by the Stockton Rural District Council.

Sunderland. — UNDERTAKING'S JUBILEE. — On Tuesday the Corporation Electricity Department celebrated its jubilee, the undertaking having begun operations on March 6th, 1895, when the Mayor switched on two arc-lamps outside the Town Hall. The Jubilee was also the occasion for the formal inauguration of plant extensions costing £750,000 which will be described in our next issue.

Turton (Lancs.).—ELECTRICITY CHOSEN.—The U.D.C. has decided that its 200 post-war bungalows shall be all-electric.

Wallasey.—RATE AID.—The Electricity Committee recommends an allocation of £5,000 in aid of the rates.

Willesden.—HOUSES TO BE ELECTRICALLY EQUIPPED.—The Council has decided that the temporary houses to be provided for the borough shall all be electrically equipped. They are likely to number between 900 and 1,000.

Holland's Power Shortage

Effects of Bombing and Lack of Fuel

WHEN we in this country are inclined to feel aggrieved at the restrictions which have had to be imposed on the use of electricity, with very occasional stoppages of supply, we should consider the plight of most of our Continental friends. In liberated Holland, for



instance, there is a shortage of everything which a civilised country expects to enjoy, quite apart from the basic necessities of food and clothing, and electric power is an outstanding example.

While destruction by bombs and shells has had serious effects it is probable that the fuel shortage is even more responsible for the drastic limitation of electricity supply. Among the larger power stations which have been destroyed are those in Geertruidenburg and in North Brabant. The station serving the province of Limburg has had its capacity reduced by about 65 per cent. The Nijmegen plant has not been seriously damaged but the shortage of fuel has practically put it out of action. This station was described in the *Electrical Review* of

Electrical Review of August 28th, 1936, as it housed a good proportion of British equipment. The illustration which we reproduce shows it to be a very handsome building.

The Eindhoven station is still operating but it now has to serve a much wider area than that of the Philips works. One consequence is that the lamp factories are now working only at night.

Report.

a press a stirre 26 57TC tothe U.S. the states and a E 日本を STAL DX 30 C. Tak TENER. and by O TEN a (nices In call and TE IDIA I I PERSONAL PROPERTY I (her north or second (Unterty into" all on spins and Not & Sec. L = bet had h tion for these of be n uses in its meters in HER & DECK 12 492555 3 FE DOTTED restrict as that a la proper è Parp ail mouth to as to that packs by

stati total to suith he don min-bard w i same egal ia, le conter lang which w i sampeirave

a A R. and the a st year and suband suband subten for an increase an efforts an efforts

ELECTRICAL REVIEW

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

English Electric Co., Ltd.—Addressing the annual meeting on March 1st, Sir George Nelson (chairman and managing director) expressed appreciation of the new Finance Bill which sought to help industry to meet some of its future problems. The large sums paid by the company in E.P.T. were a measure of its efficiency for-they had arisen from increased output and not higher prices. The company had been congratulated upon being the cheapest producer in the country in certain manufactures. They regretted that they could not increase their dividend without abandoning their normal policy of making prudent provision against the problems of the future.

They could not yet tell the whole story of their war activities, but these had been spread over a tremendous range, most of them entirely out of their normal scope. Sir George did, however, mention the company's "Centaur" and "Covenanter" tanks, Diesel locomotives, "Hampden" and "Halifax" bombers, submarine engines and electrical equipment, and A.A. gun directors. He also referred to the aircraft and marine engines of their subsidiary D. Napier & Son, Ltd. Since E.P.T. was introduced there had been manufactured at the English Electric works more than £60 million worth of apparatus over and above their normal production; for this immense effort the company would receive no other reward than a postwar credit, subject to income tax, of about 14 per cent, on the extra turnover.

Orders for their normal products were reaching them in satisfactory volume and they had taken steps to play their proper part in export trade. They found that violent competition had arisen by overseas manufacturers offering plant at prices obviously below their home prices and cost of production. This was being done to put out feelers in regard to the world level of prices and to establish themselves in our markets. This was inconsistent with such international agreements as that made at Bretton Woods for the stabilisation of currencies and showed the need for proper economic agreements between countries.

Sir George said that the company had always endeavoured to achieve stability of employment and what could be done by individual companies could only be done nationally through the same channels—hard work, harmony and efficiency. He warned against nationalisation proposals which, he contended, would not achieve that efficiency which was our greatest need if we were to be competitive.

Westinghouse Brake & Signal Co., Ltd.— Capt A. R. S. Nutting, O.B.E., M.C., who succeeded the late Lord Herbert Scott as chairman last year, stated at the company's annual meeting on February 27th that their activities remained substantial in volume and variety and orders for their normal peacetime products were increasing. The home railways had made trat efforts during the many years of curtailed supplies and the inevitable result had been to create a pent-up demand for renewals, replacements and new works.

Referring individually to the work of some of the chief members of the company's staff, he mentioned, that Major L. H. Peter, their chief engineer, was engaged upon a complete review of the technical engineering side of their business.

On the question of exports, they had already sent and were about to send, representatives abroad to renew old contacts, secure a knowledge of their needs and assess the true position in countries to which they exported substantially in the inter-war years.

He described as an outstanding success the out-working depots which were organised in several villages when the supply of labour to the factory because very difficult.

the factory because very difficult. Capt. B. H. Peter, C.B.E., managing director, said it was his tenth appearance before them as chief executive and his thirty-fourth year in the company's service. During the past ten years they had earned £1,832,000 in net profit, principally in the five years of peace. They had paid the shareholders £930,000, or 130 per cent., in total dividends and the remaining £902,000 had been spent on buildings, plant and machinery. Their great export business existing before the war had shrunk from over 50 per cent. to about 2 or 3 per cent. and one of their problems would be to recover that trade.

The Consolidated Signal Co., Ltd., whose principal asset consists of £391,112 stock of the Westinghouse Brake and Signal Co., recommends a dividend of 28 per cent. for the year ended September 30th last (against 27½ per cent. in the previous year). A preliminary statement gives the net profit as £27,226 (against £27,220). After payment of the increased ordinary dividend the carry-forward is reduced from £1,677 to £1,400.

R. B. Pullin & Co., Ltd.—The trading profit for the eleven months to September 30th last amounted to $\pm 90,373$, which compares with $\pm 131,468$ for the preceding twelve months, the net profit, before provision for taxation, being $\pm 82,420$ ($\pm 122,863$). Reserve receives $\pm 5,000$ ($\pm 6,000$) and as already reported a final dividend of $12\frac{1}{2}$ per cent. has been declared, making 171 per cent. for the eleven months, against 20 per cent. for the previous year. The carryforward is ± 958 ($\pm 1,062$).

Mather & Platt, Ltd., held their annual meeting in Manchester last week, Mr. Loris E. Mather, chairman, presiding. He explained that much of the war work which they had carried out had included their normal products. The textile machinery department had been practically closed, but they hoped that it would soon be possible to start on the many contracts for home and overseas which had already been placed provisionally with them. They were in a good position, as soon as the demand for war materials was reduced, to turn over to civil work without any great reorganisation of buildings or equipment. They had maintained a considerable number of staff in overseas offices in India and elsewhere throughout the war and recently they had been able to make contact with their French company which, though under German control, had been able to carry on without having to produce munitions. In the course of his speech the chairman referred with regret to the death of Mr. Edward Roberts who had been associated with the company and earlier companies for nearly sixty years and had been a director for twenty-nine years.

The Midland Electric Corporation for Power Distribution, Ltd., proposes to pay a final dividend of 6 per cent., again making 9 per cent. for the year. The accounts for 1944 show a profit of £169,568 (against £167,231) to which is added £49,646 brought in, making £219,214. Taxation takes £82,299 (£73,132). After payment of dividends and the transfer of £20,000 (£25,000) to reserve £48,415 is carried forward.

The Egham & Staines Electricity Co., Ltd., states that the trading balance for last year amounted to £159,044, to which is added £10,773 brought in. Income tax takes £62,591 and after providing for depreciation, preference dividend, etc., and paying an ordinary dividend of $3\frac{1}{2}$ per cent. tax free, £4,600 is carried forward. The report says that their entire interests in the Chipping Norton Electric Supply Co., Ltd., have been disposed of to the company which supplies the adjacent district. (Last September it was reported that the Chipping Norton Co. had been acquired by the Wessex Electricity Company.)

The Windsor Electrical Installation Co., Ltd., announces a trading balance for 1944 of $\xi22,251$. After provision for income tax, preference dividends, depreciation, etc., and payment of an ordinary dividend of 4 per cent. tax free, £1,037 is carried forward (£2,610 brought in).

The Slough & Datchet Electric Supply Co., Ltd., shows a trading balance of £89,579 for 1944 and £6,106 is brought in. Deductions include £34,620 for income tax; to depreciation account £25,603; reserve £2,019 and contingencies account £12,000. An ordinary dividend of $4\frac{1}{2}$ per cent. tax free is paid and £1,522 is carried forward.

The Chesham Electric Light & Power Co., Ltd., announces a trading balance for 1944 of £43,959. Income tax absorbs £16,122 and other allocations include £18,321 to depreciation and £1,000 to contingencies account. A dividend of 3 per cent. free of tax has been declared and £2,472 (£2,600) is carried forward.

The Brentford Electric Supply Co., Ltd., reports a trading balance of £33,055 for 1944. To this is added £2,341 brought in and after deducting income tax, £13,883, depreciation, etc., and paying a dividend of 5 per cent. tax free £1,169 is carried forward.

The Uxbridge & District Electric Supply Co., Ltd., records a trading balance for 1944 of \pounds 226,302, plus \pounds 6,954 brought in. From this is deducted \pounds 81,806 for income tax and after providing for depreciation, etc., and paying an ordinary dividend of $4\frac{1}{2}$ per cent. tax free \pounds 784 is carried forward.

The Notting Hill Electric Lighting Co., Ltd., announces a gross revenue for 1944 of £217,022 and a net revenue of £83,325, plus £8,738 brought in and £1.073 interest. After payment of debenture interest, etc., and £10,862 income tax there is £55,317 available, subject to any Government war damage scheme liabilities which may become due. Up to the date of the accounts five and a half years' dividend of the 6 per cent. cumulative preference shares had accrued and the directors recommend the payment of arrears up to December 31st, 1942. During the past year a further £2,700 of debenture stock was redeemed, leaving a balance of £121,800 outstanding.

The Llanelly & District Electric Supply Co., Ltd., reports a net profit of $\pm 101,839$ for 1944 against $\pm 92,144$ in the previous year, after deducting $\pm 53,913$ ($\pm 57,156$) taxation. As already announced the dividend is maintained at 6 per cent.

The Bournemouth & Poole Electricity Supply Co., Ltd., in a preliminary statement, reports a net profit for 1944 of £58,478 against £57,116 in the previous year. A final ordinary dividend of $7\frac{1}{2}$ per cent. is recommended, making $12\frac{1}{2}$ per cent. for the year (same).

The Mid-Cheshire Electricity Supply Co., Ltd., is maintaining its dividend at 8 per cent.

The South Metropolitan Electric Light & Power Co., Ltd., has again declared a dividend of 7 per cent.

The Newcastle & District Electric Lighting Co., Ltd., is repeating its dividend of 7 per cent.

Waygood-Otis, Ltd., are paying a final ordinary dividend of 15 per cent. (against $17\frac{1}{2}$ per cent.) making 25 per cent. (against $27\frac{1}{2}$ per cent.). The net profit fell from £100,782 to £81,637.

International Combustion, Ltd., reports a net profit, before taxation (including profits of subsidiaries) of £218,368 for 1943-44 (against £212,249). Taxation rose from £105,860 to £127,361. The ordinary dividend and bonus for the year are raised from 30 to $32\frac{1}{2}$ per cent. and the balance carried forward from £61,813 to £91,170. The special provision of £20,000 made last year for undue wear and tear of plant and machinery is not repeated.

Hoover, Ltd., is to pay a final dividend of 11% per cent. (same), plus a bonus of 10 per cent. (5 per cent.), making 25 per cent. (20 per cent.) for the year. The net profit was £574,967 (£452,659).

S. Guiterman & Co., Ltd., are maintaining their dividend at 10 per cent. and in addition are paying a bonus of 5 per cent., making 15 per cent. (10 per cent.). The net profit at £31,743is $\pounds 6,373$ higher.

Bruce Peebles, Ltd., report a net profit of $\pounds 42,554$ for the year ended December 31st last, as compared with $\pounds 39,737$ in 1943. A dividend of 5 per cent. and a bonus of 3 per cent. are again to be paid and $\pounds 20,000$ (same) is allocated to depreciation.

The National Gas & Oil Engine Co., Ltd., is again paying a dividend of 5 per cent. for the past year.

The India Rubber, Gutta Percha & Telegraph Works Co., Ltd.—From a net profit of £105,474 for 1933-34 (against £103,920) the company is again paying an ordinary dividend of 6 per cent. plus an additional dividend of 3 per cent.

The Coventry Gauge & Tool Co., Ltd., is again paying a dividend of $7\frac{1}{2}$ per cent. and a bonus

= He

10

-

Ident

ONE

per cell

control for squirrel-cage motors



overloads cutout in starting
 position

* correct sequence device

* all contacts renewable

 interlocked isolator in same case if required

* immediate despatch

WORKS: ASTON, BIRMINGHAM 6 Sales Headquarters: BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2

AS YOU LIKE IT

About sixty years ago L.S.E. recognised that every machine could not be driven conveniently by a standard motor, and started to design motors with special mechanical and electrical characteristics for specific applications.

By admitting that the customer may be right, and providing motors to fit the job, L.S.E. have complicated their production a little but have simplified the business of satisfying customers, many of whom have been active entries in the books since the days of copper gauze brushes.

(Below: An example of L.S.E. motors made for the job-six 265 H.P., 422 R.P.M., 3.3 kV direct starting squirrel cage EMCOL'' totally enclosed vertical spindle motors at Little Barford power station. *Electrical Review* photo)



LAURENCE, SCOTT & ELECTROMOTORS LTD.

NORWICH, MANCHESTER, LONDON AND BRANCHES

Y mad

motor, a

nanical

and prom

eir produc

Ing Queton

the books

of per cent., tax free, making 15 per cent. (same). The net profit for the year ended August 31st last was £27,753, as against £24,021.

The Direct Spanish Telegraph Co., Ltd., is maintaining its dividend at $4\frac{1}{2}$ per cent. The net profit for 1944 was £5,967 (£5,881).

Mersey Railway Co.—The accounts for the year ended December 31st last show a net revenue of £109,976, the same as for 1943. The full dividend of 3 per cent. is paid on the preference stock and a dividend of $2\frac{3}{3}$ per cent. (same) is recommended on the consolidated ordinary stock, leaving a balance of £3,617 (£3,598) to be carried forward.

British Industrial Plastics, Ltd., is maintaining its ordinary dividend at 8 per cent. The past year's net profit was $\pounds 21,705$ (against $\pounds 21,659$). The company is applying for permission to issue ordinary shares to the present shareholders; there is £150,000 of unissued authorised capital.

Taylor Tunnicliff (Electrical Industries), Ltd.⁹ reports a net profit for 1944 of £28,247 as compared with £27,244 in the preceding year. As reported last week, a first and final ordinary dividend of 10 per cent. (same) is recommended.

New Companies

pany. Registered February 16th. Capital, £200. Objects: To carry on the business of factors of, and dealers in, electrical and motor

equipment and accessories, radio sets and accessories, etc. Directors: C. R. Briginshaw, 58, Filton Road, Horfield, Bristol; and W. E. C.

Davies, 8, Hanbury Road, Clifton, Bristol, 8. Registered office: 58, Filton Road, Bristol.

Sims Electric, Ltd.—Private company. Regis-tered February 20th. Capital, £100. Objects: To carry on the business of electricians, en-gineers, etc. First directors: T. J. Sims, 18, Cross Path, Radlett, Herts, and H. B. Sims, 45, Forty Lane, Wembley Park, Middlesex. Regis-red officer ulls, Bredward, Corected Core

tered offices : 115, Parkway, Gloucester Gate,

Tyseley Auto-Batteries, Ltd.—Private com-pany. Registered February 21st. Capital, £100. Objects: To carry on the business of manu-facturers of, and dealers in, electrical batteries,

accumulators, dynamos and magnetos, motor and radio engineers, etc. Subscribers: G. E. Walker, and D. A. Walter, both of 2, Alder-brook Road, Solihull, Warwickshire. Regis-tered office: The Lodge, Bulstrode Park,

Broadway Radio, Ltd.—Private company. Registered February 21st. Capital, £1,000. Objects: To carry on the business of manu-

facturers of, and dealers in, wireless and television

sets and accessories, electrical goods, gramo-phones, etc. Directors: R. G. Calman and Edna M. Calman, both of 113, Burnt Oak Broadway, Edgware. Registered office: 113, Burnt Oak Broadway, Edgware.

Beresfords (Kidderminster), Ltd.-Private com-

pany. Registered February 22nd. Capital, £1,000. Objects: To carry on the business of manufacturers of, and wholesale and retail dealers in, radio sets, electrical and mechanical apparatus, etc. J. H. A. Beresford, Hollyhurst,

Western Services (Bristol), Ltd.-Private com-

10-0 M



N.W.1

Gerrards Cross, Bucks.

NO BULIC

Birmingham Road, Wylde Green, is the first director. Registered office: 108, Dale End, Birmingham.

Beresfords (Walsall) Ltd.—Private company. Registered February 22nd. Capital, £1,000. Objects and other particulars are similar to those of Beresfords (Kidderminster), Ltd. above.

Companies' Returns Statements of Capital

Flexible Lamps, Ltd.—Capital, £5,000 in £1 shares. Return dated October 10th. All shares taken up. £2,300 paid. £2,700 con-sidered as paid. Mortgages and charges : Nil.

Ever Ready Electric Bulb Co., Ltd.—Capital, £10,000 in £1 shares (all ordinary). Return dated July 14th (filed November 20th). 2,500 shares taken up. £2,500 paid. Mortgages and charges: Nil.

Invincible Electrical Engineering Co., Ltd.-Capital, £1,000 in £1 shares. Return dated September 25th. 400 shares taken up. £400 paid. Mortgages and charges: Nil.

Wholesale Electro (Halifax), Ltd.—Capital, £4,000 in £1 shares. Return dated October 10th. All shares taken up. £4,000 paid. Mortgages and charges: Nil.

Birmingham Sound Reproducers, Ltd.—Capital, £2,500 in £1 shares. Return dated October 23rd. All shares taken up. £1,000 paid. £1,500 considered as paid. Mortgages and charges: Nil.

Company Struck off Register

Ray Electric, Ltd. was struck off the Register on February 20th and is thereby dissolved.

Mortgages and Charges

Bowers & Barr, Ltd.-Satisfaction in full on January 20th of mortgages dated April 8th, 1945, and June 24th, 1930, and registered April 15th, 1925, and June 26th, 1930, securing all moneys due or to become due from the company to National Provincial Bank, Ltd.

B. & B. Batteries, Ltd.-Debenture dated February 1st to secure £500, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: Kathleen M. Pelham, London, S.W.

New Era Time & Telephone Systems, Ltd.— Issues on June 17th, 1938, of £2,060, and on September 8th, 1944, of £5,000 debentures, parts of a series already registered. (Particulars of issues filed February 17th, 1945.)

Bankruptcies

N. E. Butcher, trading as the Herts Electro-chemical Co., 2, Woodfield Road, Welwyn Garden City, battery manufacturer.--Last day for proofs for dividend March 15th. Trustee, Mr. C. P. Child, College Hill Chambers, Cloak Lane, E.C.4.

B. J. Wainwright, trading as the Wells Road Garage & Wainwright, trading as the weins Road Garage & Wainwright Neon Displays, 197-202, Wells Road, Shepherd's Bush, W.12.—First and final dividend of 7d. in the £ payable at the offices of Percy Phillips & Co., 76, New Caven-dish Street, W.1.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange business has been on a fairly satisfactory scale. If there is no particularly outstanding feature this week, some satisfaction can be derived from being able to report that prices are firm, and that on the whole a rising tendency is noticeable round the markets.

The Home Electricity supply companies have now declared their dividends for the final half of 1944, and these are, in nearly every case, similar to those which have been paid during the war years. The City of London Electric Lighting Co., as noted last week, increased its previous 5½ per cent. to 6 per cent., a surprise all the more pleasant because a slight measure of doubt had been felt as to whether the London companies might not have been damaged by air-raids. The price of the shares is better at 31s. According to the details now available, it is clear that whatever damage they may have suffered, the London companies had no difficulty in meeting the situation without detriment to current earnings. In consequence, the quotations for ordinary shares of the group maintain a high degree of strength which is reflected automatically in the modesty of the yields afforded at today's figures. The Yorkshire shares have improved; Mid-Cheshires are better at 41s. 6d.; Llanelly further advanced to 29s. 6d.

Midland Counties

The Midland Counties Electric Supply Co. pays 8 per cent. dividends on its ordinary shares, and at the present price, 41s. ex dividend the yield is £3 18s. per cent. on the money; 8 per cent. for the year has been distributed annually since 1936. The company owns the share and loan capital of various electric light and power undertakings in the northern Midland counties. Its transport service operates 330 vehicles over 520 route miles. The price of the ordinary shares fell to 23s. in the 1940 crisis, comparing with a high level of 42s. 6d. nine years ago.

Midland Electric Power

The Midland Electric Corporation for Power Distribution has announced its usual dividend of 6 per cent., making 9 per cent. for the year. The company paid 8 per cent. for some years. In respect of the year ended December, 1934, a capital bonus of 334 per cent. was distributed. For the year 1936 the 9 per cent. dividend came into operation, and at the present price of 44s. 6d. the yield is a little over 4 per cent. on the money. During the dark days of 1940, following the fall of France, the price went back to 29s. The highest within the past decade was 45s. 9d. in 1936, and the current price is the best reached since the beginning of the war.

English Electrics

English Electric ordinary retain their improvement at 56s. The accounts show that the company earned a little over 20 per cent. on its ordinary shares and paid, as already announced, 10 per cent.; its general reserve is raised to a round £1,000.000. The financial position is very strong. At the meeting last week the chairman, Sir George Nelson, reviewed in interesting fashion the range of work that the English Electric Co. has done during the war. He referred also to the demands there will be before long for normal requirements, in respect of which, he said, orders are coming along in satisfactory volume.

Matters of Moment

Home Railway stocks gathered strength a week ago, but sellers soon appeared, and the gains were mostly lost. Transport "C stock is dull at $66\frac{1}{2}$, disappointment with the dividend reduction being still a factor. Amongst communication issues International "Tel. & Tel." are a dollar lower at 29. Oriental Telephones at 51s., have put on 1s. Wireless shares are fairly active, with Philco a minor feature with a rise to 15s. Cossors have ranged between 32s. and 33s. E.M.I. change hands frequently and freely on the basis of 35s. 6d. At £2, E. K. Cole are 1s. lower: it may be of service to mention that a thousand or two of the company's $5\frac{1}{2}$ per cent. preference shares came on offer at $25s^{\circ}$ 6d. This gives a yield of $4\frac{3}{4}$ per cent. The dividend service is liberally covered.

Movements in Prices

De la Rue shares have advanced to $10\frac{1}{2}$, the highest level touched in the company's history. Callender's shares are a good market at $5\frac{1}{18}$ and Henley's at 27s. 9d. have risen 1s. Lancashire Dynamo at $5\frac{1}{4}$ are 2s. 6d. up. Automatic Telephones improved to 66s. 3d. The 10s. shares of the H.T.A.-as the Hall Telephone Accessories Co. has re-named itself---have eased off to 30s. At 65s. Enfield Cables show a florin rise. Associated Electrical Industries at 58s. 3d. are up 1s. Veritys and Allen Wests have lost a few pence. Ever Ready and Atlas are slightly better, at 44s. 3d. and 6s. 6d. respectively.

Signals and Brakes

Consolidated Signal has raised its dividend from $27\frac{1}{2}$ per cent. to 28 per cent., which goes against 24 per cent. two years ago. The issued capital of the company is £364,743 and the principal asset consists of £391,112 Westinghouse Brake & Signal shares. Consolidated Signals have hardened to £7, at which the yield is still 4 per cent. on the money, the same as it has been of recent weeks when, on

March 9, 19.45

1343

414 02.30

10 2

19 Cm

1 00 5

Chill I

10

a ha sa

Cr Etc E KZ I

it and

10

御田市

SHIL

11 XE (11 XE

EXC

=15

North Cont

STOT -

1.66.11

15 1920

the previous basis of $27\frac{1}{2}$ per cent. dividend, the quotation stood at $6\frac{7}{8}$. The Westinghouse Brake annual meeting was held last week, The chairman stated that the orders for the company's peacetime products were on the increase, and drew attention to the potential demand by the railway companies for renewals, replacements and new works. The price of "Brakes," as the Westinghouse Company's shares are called in the Stock Exchange, is steady at 76s.

Calcutta and Delhi

Calcutta Tramways shares are creeping up again in price. They have recovered to 67s., comparing with 58s. to which they fell at the end of last year. Another Indian share, the price of which has been moving rapidly, is Delhi Electric Supply & Traction ordinary. Last week the price was about 62s.: it is now 66s. The company issued a circular giving details of a cablegram from its Delhi agents, stating that the Provincial Government had given notice to purchase the undertaking, and that this had been sanctioned by the Government of India. The company is nearly forty years old. There has been a limited market in the shares, upon which the company has been paying dividends of 9 per cent. per annum tax free. The tramway track is about eight miles. Calcutta Electric Supply Corporation shares are 1s. up at 48s. 6d. and Cawnpore Electrics rose by 6d. to 42s. 6d.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

ADCOCK and H. Shiley.—" Electric motor control gear and electrically driven machines having built-in motor control gear." 9311. June 10th, 1943. (567405.) Automatic Telephone & Electric Co., Ltd., and P. N. Roseby.—" Snap-action electric switches." 13039. August 12th, 1943. (567471.) British Thomson-Houston Co., Ltd.— "Arrangements for carrier modulation." 18180/ 43. November 3rd 1942. (567517.)

43. November 3rd, 1942. (567517.) "Lubricating apparatus. 21521/43. December 29th, 1942. (567545.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"Lubricating systems for air-craft superchargers." 1066. January 19th, 1944. (567490.)

Cinema Television, Ltd., and A. Sommer.-" Electron-discharge devices comprising a photoelectric cathode and one or more secondary electron emitting electrodes." 11806. July

electron emitting electrodes." 11806. July 20th, 1943. (567441.)
G. P. Dennis.—" Electrical fuses." 8478.
May 27th, 1943. (567403.)
C. Ebel and W. F. Burr.—" Surface wiring systems for electric conductors." 14879.
September 10th, 1943. (567476.)
W. C. Fairweather (Singer Manufacturing Co.).—" Electric motor controllers." 13585.
August 20th, 1945. (567509.)
General Electric Co., Ltd., R. L. Breadner and C. H. Simms.—" Sealing of electrical conductors through vitreous walls." 6374.
May 11th, 1942. (567521.)
R. P. H. Hinds.—" Desk or table lamps."
14198. August 31st, 1943. (567412.)
Igranic Electric Co., Ltd.,—" Electric motor controllers." 10685/43. July 16th, 1942. (567508.)

(567508.)

International Polaroid Corporation. — "Generation of sound waves." 11863/41. September 16th, 1940. (567491.) Johnson Laboratories, Inc. — Adjustable

inductive coupling devices for radio circuits." 13009/43. May 16th, 1942. (567468.) Johnson, Matthey & Co., Ltd. — "Electro-deposition of silver." 7010/43. May 5th, 1942. (567428.) N. E. A. Kleen.—"Unitary grid assembly for ice freezing trays." 16893/42. February 2nd, 1942. (567522.)

Maschinenfabrik Oerlikon .- " Turbine power plant.'

ant." 8523/43. June 11th, 1942. (567404.) Micro Switch Corporation. — "Operating mechanism for electric switches." 16386/43.

mechanism for electric switches." 16386/43. December 16th, 1942. (567482.) Philips Lamps, Ltd., and R. G. D. Holmes. —"Tubular dielectric condensers." 4005. March 11th, 1943. (567426.) A. R. J. Ramsey (Eitel-McCullough, Inc.).— "Electronic tube." 7472. May 11th, 1943. (567462.)

(567462.)

Sangamo Weston, Ltd., H. J. Lovegrove and M. G. McBride.—" Moving-coil electrical instruments." 10371. June 26th, 1943. (567435.) "Moving-coil electrical instruments." 21090. May 17th, 1944. (Divided out of 567435.) (567459.) Sigmers Bros & Co. Ltd. and D. A.

Siemens Bros. & Co., Ltd., and D. A. Siemens Bros. & Co., Ltd., and D. A. Christian. — "Electric signalling systems." 13186. August 13th, 1943. (567451.) Siemens Electric Lamps & Supplies, Ltd. and J. N. Aldington.—"Incandescent electric lamps." 12036. July 23rd, 1943. (567442.) Standard Telephones & Cables Ltd.—

Tamps. 12036. July 251d, 1945. (367442.)
 Standard Telephones & Cables, Ltd.—
 'Means for optically scanning reflecting surfaces.'' 13993/43. August 27th, 1942. (567475.) '' Alternating current rectifiers.''
 I6956/43. November 5th, 1942. (567541.)
 Standard Telephones & Cables, Ltd., E. M. S.

McWhirter and H. J. Ward.—" Electric remote-control and indication systems." 1118. January 22nd, 1943. (576424.)

Tobe Deutschmann Corporation.—" Wave-filter capacitors." 18250/43. May 18th, 1943.

Inter capacitors." 16230(43: Way 18th, 1945. (567485.)
I. T. Vlasto and H. Armitage.—" Overload relays for electric supply systems." 16412. October 7th, 1943. (567483.)
F. E. Waring.—" Portable electric arc heating torch." 9720. June 17th, 1943. (567506.)

NEW BOOKS

The Steam Boiler Year Book and Manual (1944). By S. D. Scorer, A.M.I.Mcch.E., M.I.Mar.E. Pp. 557; figs. 470. Paul Elek (Publishers), Ltd., Africa House, Kingsway, W.C.2. Price 30s.

As in previous editions, this book is divided into two parts, and covers the usual wide field of steam production in all its aspects. Part I is made up of some twenty-five chapters, amongst which the most important and instructive deal with boiler house instruments, auto-matic boiler control systems, locomotive boilers, watertube and other boilers, superheaters, boiler mountings and accessories, boiler feed pumps, feed water treatment, and extracts from professional institution papers and the technical press. Part II consists of four chapters covering fuel utilisation, combustion appliance developments, feed water and steam problems, fireside problems, and modern practice and developments.

Considering the information given in Part II, I see no reason why the book should be so divided, and I would suggest that if any new developments are made during the year prior to publication, they should be included in the form of appendices. Features of especial practical interest to steam users could be arranged like-wise. The chapter on heat insulation is not up to the standard which generally obtains through-out the work, and I consider the mathematical approach outlined to be quite unnecessary in such a reference book, bearing in mind the procedure in the other chapters. Some of the features under "fireside problems" are of such a nature that I regard the title of this chapter to be a misnomer.

The book is well illustrated throughout, and manufacturers' products are, generally speaking, fairly well represented. The index of products used by the steam engineer should prove of value to all maintenance engineers. Some of the chapters are rather curtailed, and could be usefully extended to cover the requirements of both the works and the central power station engineer. The author's task has not been an easy one in this respect, and allowance must, of course, be made for paper shortage. The book should prove useful to operating and maintenance engineers, and also serve as an introduction to almost every type of plant and equipment likely to be met in steam plants generally.—T.H.C.

Rebuilding Britain—A Twenty-Year Plan. By Sir Ernest Simon. (256 pp., 16 illustrations.) Victor Gollancz, Ltd., 14, Henrietta Street, W.C.2. Price 6s.

His long experience in housing and town planning affairs invests anything which Sir Ernest Simon says upon these subjects with authority. He expresses his confidence that Britain can be rebuilt in twenty years so as to enable every inhabitant to live in a healthy home, in a neighbourhood so planned as to allow easy access to places of work and recreation.

It is not within the province of this journal to pass judgment on Sir Ernest's general plan; mention can be made only of his reference to services. On the subject of heating in dwellings he quotes Mr. Oscar Faber's presidential

Modern Boiler Practice. Training of Managers.

address to the Institution of Civil Engineers with general approval and advocates a national service of fuel experts to give impartial advice, and common showrooms for solid fuel, gas and electrical apparatus to afford easier comparisons. Reference is also made to the work of the Study Committee on Heating and Ventilating, of which the author is deputy-chairman. Standardisation and codes of practice are briefly touched upon and there is a passing allusion to prefabricated components of houses

Among the examples of foreign planning quoted is the Tennessee Valley Authority, which is claimed to prove that public control is compatible with high efficiency, but what comparable scope is there in this country for such an authority ?-J.H.C.

What is This Management? By Walter Puckey. 281 pp. Chapman & Hall, 37-39, Essex Street, W.C.2. Price 15s.

Mr. Oliver Lyttelton, Minister of Production, contributes a foreword to this book. The author (who is a director and general works manager of Hoover, Ltd.) first sets out to define managers and management and advocates a greater concern with the training and selection of future managers. There follows a considera-tion of the qualities and abilities required in a manager-personal, organisational and technical.

Mr. Puckey is not one of those who condemns management conferences-provided the numbers are kept within reasonable limits and he makes suggestions for the composition and conduct of these meetings. The tendency for the formation of groups is discussed and means are suggested for the effective linking of such groups. Further chapters cover the subjects of works councils or committees and the "social" responsibilities of the manager (meaning the need to keep the factory efficient and clean as a means of encouraging those qualities in the workers).

Next comes what is probably the most im-portant section of the book—the training and selection of managers—in which the author stresses that training by itself is useless without live personal contacts and interchange of experiences. The "action standards" of the manager are next treated : methods of planning and ensuring that plans are fulfilled. A final chapter deals with the future of management and ends with an apt quotation from Robert Bridges.—J.H.C.

100

180 -

-

14 2.0

100

22 1.24

北

Books Received

- A Treatise on Applied Hydraulics. By Herbert Addison, M.Sc., A.M.Inst.C.E., Professor of Hydraulics at the Fuad I University, Giza. Third edition, revised and enlarged. Pp. 614; figs. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 32s.
- Experimental Electronics. By Ralph H. Müller, R. L. Garman and M. E. Droz. Pp. 330; figs. George Allen & Unwin, Ltd., Ruskin House, 40, Museum Street, London, W.C.1. Price 21s.

News from France

Survey of the Electricity Supply Situation

Stor

司言

the state

1000

1011

PEIL

S THEFT

-

alle led a company

in inter

lain in

1 4 400

dir'a

1 201 201 1

1101

1 12 25 4

in party of

法当前

and the

2

a h Br

「日本の日本

France to-day one has to look back to the years before the war. In 1938 France possessed some of the finest hydro-electric plants in the world and had several others building. Her total production, including hydro-electric and thermal plants, was about 19,000 million kWh. Two very important hydro-electric schemes were under construction; Génissiat, with a planned capacity of 465,000 kW, and L'Aigle, in the Massif Central, with 202,000 kW. These should have been completed by this year or at the very latest in 1946. Apart from these two, many other small plants were under construction when the war broke out. In addition, extensions were being carried out at steam stations, particularly Vancey, St. Denis and Ivry.

The coming of war, the armistice and the occupation completely changed the position. Patriot engineers searched for means to stop rather than improve production in order to bring the manufacture of armaments for the Germans to a standstill. At the same time they realised that the wholesale destruction of transformers and generators would result in bankruptcy for French industry after the war. The F.F.I., which had many electrical engineers on its staff, therefore drew up a plan of campaign for the destruction of transmission towers rather than installations which would take some eighteen months to two years to rebuild. The result of the plan soon became evident and restrictions had to be introduced shortly after the occupation. Action was continuously taken against the 220,000-V, 150,000-V and 90,000-V lines and altogether some 2,500 towers were destroyed on these lines alone. If medium voltage is included, then the F.F.I. damaged well over 18,000 towers.

Allies' Effective Bombing

In 1943 the Allies launched their great bombing plan aimed at electrical plant with such success that France is still suffering through the destruction of important installations. In October, 1943, an attack was made against the Chevilley transformer groups and two of 60,000 kW each were completely destroyed. These transformers acted as interconnections between Paris and the Massif Central, with the result that supply over the high-voltage network to Paris was seriously impaired.

In the north the Allies destroyed thermal plants at Lens, Bethune and one or two other places. That was, of course, before

Do understand the By our Paris Correspondent the complete destruction of thermal plants, such as Caen, which stood in the way of the Allied advance in 1944.

The position of Paris is somewhat different from that of most other cities. Lyons and towns in the south have an abundant electricity supply from nearby hydro-electric plants. In the north the supply is—or rather was-almost entirely thermal. Paris used both and in 1938 thermal plant capacity in the Paris region was 730,000 kW and hydroelectric power available from the Massif Central stood at 390,000 kW. This total gave a margin of 300,000 kW.

Scarcity of Coal

Apart from Chevilley little damage was done to the Paris installations. There was, of course, a serious fall in efficiency owing to the impossibility of keeping installations under constant repair. The coal position, however, is one of the main difficulties. At the time of the liberation coal reserves in Paris were non-existent and the period of supply did not exceed half an hour per day. No hydro-electric power reached the capital until September 4th, when a supply from the Massif Central began to come in. The Germans in their retreat damaged as much as they could, but on the whole this was not extensive. They blew up a number of thermal plants including that at Vincey, near Nancy, and completely destroyed the barrage at Kembs so that the hydro-electric plant will be out of action for at least two years.

By September 15th supplies were mounting. Although the Chevilley transformers were out of action and coal stocks were low Paris was actually supplied with 12 million kWh per day while in the first week of January this year consumption stood at 13 million kWh, which is 30 per cent. more than in 1938. The increase is easily explained. The coal position being grave, there remained only one means for heating, electricity. When the barrage at the Massif Central froze up drastic restrictions had to be imposed.

The work of repair is going forward but is being slowed down by lack of materials and transport. French engineers also need the help of British engineers. A well-known engineer who was an F.F.I. officer told me that they were not well informed of the latest developments in electrical construction because during the past years they had taken no interest in it. Finally, work on the Genissiat and L'Aigle plants is going ahead and these two important schemes will probably be finished by 1947.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Abertillery.—March 17th. Electricity Depart-ment. Various materials. (See this issue.)

Australia. — May 28th. Mackay City Council, N.S.W. 2,500-kW turbo-alternator, Contract 42/45. Plans and spec. (10s. 6d.) from A. E. Axon, consulting engineer, Bank of Australasia Chambers, Brisbane. July 4th. Victoria State Electricity Com-

mission. 40,000-kVA synchronous condenser, Spec. 44-46/1.

July 11th. New South Wales Railways. Traction motors, control equipment, air compressors and pantographs for one electric locomotive.

Halifax.—March 30th. Markets Department. Renewing electrical installation at the abattoir. (See this issue.)

Leeds.-March 14th. Transport Department. 750-kW automatic mercury-arc rectifier equipment, complete with high- and low-voltage DC switchgear. (March 2nd.)

Manchester.-April 3rd. Electricity Department. Automatic voltage variation equipment and reactors. Mercury arc rectifier equipment. DC traction switchgear. (See this issue.)

Middlesbrough.—April 20th. Tees-Side Rail-less Traction Board. Two 300-kW mercury arc rectifiers and associated equipment. (See this issue.)

Plymouth.-March 10th. Electricity Department. Synchronous motor-driven time switches. (February 23rd.)

Southend-on-Sea.-March 31st. Electricity Department. House meters. (March 2nd.)

Wolverhampton.—April 4th. West Midlands Joint Electricity Authority. Transformers. (See this issue.)

Orders Placed

Glasgow .- Corporation Cleansing Committee. Accepted. Replacement of two tractor batteries (£99).—Tudor Accumulator Co.

Hampshire. — Health Committee. Accepted. Automatic telephone installation at Park Prewett Hospital (£1,434).—Siemens Bros.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashton-under-Lyne. — Works additions; R. Waddicor & Co., Ltd., Newman Street. Conversion of 15-21, Trafalgar Square into eight flats; Jas. Ridyard & Sons, Ltd., builders, Railway Saw Mills.

Dining Room, Mossley Road Council School; E. Marshall & Sons, Ltd., builders, Stamford Saw Mills, Cockbrook.

Burnage.—Central kitchen for 2,000 meals, Broadhill Road; Smith & Briggs, Ltd., builders, 652, Chester Road, Old Trafford, Manchester, 16.

Bury .- Works additions, Walshaw Road; Elton Cop Dyeing Co., Ltd., Walshaw Road, Bury.

Cheshire.-Conversion of Oakwood, Beechfield Avenue, Alderley Edge, into a maternity home; E. M. Parkes, county architect, The Castle, Chester.

Consett (Co. Durham).—Completion of 30 houses at Delves Lane for the U.D.C.; J. J. Eltringham, architect, Derwent Street, Blackhill.

Cumberland.—Two modern secondary schools; county architect, Alfred Street North, Carlisle.

Dundee.-New clinic at Broughty Ferry (£10,000); city architect.

- Rebuilding of Waverley Edinburgh. Market after the war; city architect.

Falkirk.—Proposed crematorium to be erected by Corporation; cemetery superintendent.

Hampshire.—School at Manor Farm, Port-chester; county architect, Winchester.

Hayley Green. — Extensions to Hospital (£5,000); North Worcestershire Joint Hospital Board.

Isle of Ely. — County nursing home and additions to Grammar School, Wisbech, and county library extension, March; county architect, March.

Leeds.—Reconstruction of Cookridge Street Public Baths (£35,000); W. S. Cameron, city engineer, Civic House.

Oldham. — Pathological laboratory at Boundary Park General Hospital (£2,500); G. C. Hardy, borough engineer, Municipal Offices, 75, Union Street.

Works additions, Magdala Street; James Stott, Ltd., cotton spinners, Hartford Mills.

Rotherham.—Hospital (200 beds); borough engineer.

Runcorn.—Fire station, central site; G. Rodgers, N.F.S., Heath House.

Salford.—Canteen at Royal Technical College; W. A. Walker, city engineer, Town Hall, Bexley Square, Salford, 3.

Tynemouth.—Theatre; R. A. Jackson and Sons, estate agents, Camden Street, North Shields.

School meals kitchens at Linskill School (J. H. Rogers, builder, North Shields) and Chirton School (H. Kindred, builder, West Road, Newcastle-on-Tyne).

Wallasey.—Branch library, Moreton (£1,897); W. S. Brocklebank, Ltd.

Reconstruction of 16 houses (£13,576); Lloyd & Cross, Ltd.

Wallsend.-Experimental station in connection with the development of marine engines and Parsons turbine for the Parsons and Marine Engineering Turbine Research and Develop-ment Association (£200,000); Dr. T. W. F. Brown, D.Sc., director, Jesmond Park West, Newcastle-on-Tyne.



THE REAL PROPERTY IN CONTRACTOR OF THE PROPERTY OF THE PROPERT

NEW

ways

10

۶G

20

and

A "problem picture"? Well, so it is. Which Stop Nut is the better? Both of them come from Simmonds of course, but one, the Simmonds Nut, has a fibre collar while the Pinnacle has a metal diaphragm. In the last ten years, hundreds of millions of Simmonds Nuts have been used in the aircraft and other industries, but to-day it is being rivalled for many purposes by the Pinnacle Nut. And, in some cases, rightly so. The Pinnacle is less affected by extremes of heat or humidity for instance. But the fibre collar of the Simmonds is more effective as a seal. As a matter of fact it's a problem without an answer except "It all depends". If you want our opinion in any particular case, you know that it is very much at your service.

SIMMONDS STOP NUTS

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

Water

Farm, Par iter. to H

ie hone n Wisbech n reh; com

ameroa a

r, Maaaa ord Nik

lsk; borous al site: 6

Jackson av Korth Stick Shields) av

Shields) Bi uilder, Wis

(E13,55) is cor

and Develop T. W. I. ark West

ELECTRICAL REVIEW

March 9, 1945



FOR SHIP WIRING... "ALL'S WELL" WHEN IT'S CROMPTON CABLES

CROMPTON PARKINSON LIMITED, ELECTRA HOUSE, VICTOR'A EMBANKMENT, LONDON, W.C.2 Telephone : TEMple Bar 5911 Telegrams : Crompark, Estrand, London

ZM

force - wat iance 49

ELECTRICAL REVIEW

March 9, 1945



at every link in the Power Chain

119700 1200 ast and to Tail Tail 100

ape

COLLIERIES WINDERS HIMING NOTORS ELANGEROOF APPARATUS TRANSFORMERS SWITCHGEAR PROTECTIVE GEAR GATE-END BOXES COSMOS MINERS' BULBS

STEEL WORKS

ELECTRIC FURNACES ROLLING MIEL MOTORS HEAVY DUTY MOTORS CONTROL GEAR ELOING EQUIPMENT USTRIAL LIGHTING

FACTORY INDUSTRIAL MOTORS CONTROL GEAR SWITCHGEAR SYNCHRONOUS MOTORS MACHINE TOOL DRIVES CRANE EQUIPMENT VOELDING EQUIPMENT INDUSTRIAL LIGHTING

> DOMESTIC WATT-HOUR METERS PREPATIGNT METERS PREPATIGNT METERS FRACTIONAL H P. MOTORS BOILING PLATES KETTLE ELEMENTS COSMOS BAMPS

Every requirement for the generation, transmission, distribution and application of Electrical power - the complete chain of equipment from the coal to the



ight aids production

R

POWER STATION TURBO-GENERATORS COLIDENSERS STEAM AUXILIARIES POWER INANSFORMERS SWITCHGEAR METERS & RELAYS VOLTAGE REGULATORS OUTDOOR SWITCHING STATION TRANSFORMERS ISOLATORS SWITCHGEAR LIGHTNING ARRESTERS FEEDER PROTECTION

SUBSTATION

51

FC (F

ELECTRIC TRACTION ELECTRIC LOCOMOTIVES ELECTRIC LOCOMOTIVES ELECTRIC COACH EQUIPMENT TRACTION MOTORS TRACTION CONTROL TROLLESSUS EQUIPMENT ADDING EQUIPMENT ADDING EQUIPMENT ADDING EQUIPMENT

10

5-87 THE ROOM DOWNER DRAFTS



FLAYS

F' I

OFFICES FEACTIONAL H.P. MOTORS COSMOS LAMPS LIGHTING FITTILIGS



AX/A402

IMPROVE YOUR LIGHTING in consultation with METROVICK'S ILLUMINATING ENGINEERS

ELECTRICAL RIVIEW

52

March 9, 1945



1444

ING

9

the last sectors that the last

ta, opus Tal inter

atteria BEND



"CIRSCALE" MOVING IRON and MOVING COIL AMMETERS and VOLTMETERS will give you the data you require

> "CIRSCALE" is the registered trade name of the Record Electrical Co. Ltd., and applies exclusively to their instruments.

THE RECORD ELECTRICAL COMPANY LTD. BROADHEATH · ALTRINCHAM · CHESHIRE. LONDON OFFICE:- 28, VICTORIA STREET, WESTMINSTER, S.W.I.



Murch 9, 1945



FAMOUS BELFAST INDUSTRIES

LINEN.

The same quality of workmanship which has made Belfast

Linen world famous is to be found in Scott Electric Motors. Into every model-from | h.p. to 250 b.h.p.-goes 40 years' experience in the design and manufacture of every type of Electric Motor.

We can despatch ex-stock 3-phase squirrel-cage Motors up to 25 b.h.p.



FUTL AND FOWER

AS BURAFRA



「日本日

耕

These

· Code

Tim

YOUR FUEL WATCHERS

and

these-

bring immediate **RESULTS**

Have you realised just how big the fuel saving can be when a planned, efficient Fuel Watching system is operating in a factory? Resourceful factory managements have found in intensified Fuel Watching the answer to their fuel problems. Don't forget that there are Fuel Efficiency Bulletins to provide you with the latest 'specialist 'knowledge on almost every fuel subject valuable advice at your finger-tips, ready to be put to full practical use.

MUNTSJRY OF

WINDJRY OF

INC ELECTRICITY

TICAL LEDNORY POINTS

AURE AND FOWER

POINCH

together they cannot fail

The combination of a good Fuel Watching system and the intelligent use of your Fuel Efficiency Bulletins cannot fail to bring immediate and very welcome economies in the consumption of coal, gas and electricity.

Fuel Watchers' Badges and additional copies of the Fuel Efficiency Bulletins can be obtained from the Regional Offices of the Ministry of Fuel and Power.



ISSUED BY THE MINISTRY OF FUEL & POWER

56

ELECTRICAL REVIEW

March 9, 1945



STURDY TRANSFORMERS

for

Distribution Systems Power Supplies Control Units and Electronic Equipment

10 Watts to 10 K.V.A.

Enquiries Assured of Immediate Attention

STURDY ELECTRIC CO. LTD. DIPTON, NEWCASTLE - ON - TYNE Telephone : DIPTON 221



'Grams : "RILOSPRING,"

'Phone : Rochdale 2237-8.

Sterre

ome

V.A

L LTD

N-THE

in in

Cath - Q. T.

TIM

CHOS

SW ALC D EI





Grinding external taper on Pultra Micro Lathe utilising Grinding Attachment VIO. MANY OTHER ACCESSORIES AVAILABLE

WATCH, CLOCK AND INSTRUMENT WORK METER TEST ROOM AND REPAIR WORK. ETC.

For

57

We are always ready to advise upon the adaptation of Pultra Lathes to meet special requirements. Write for Catalogue CA4 also Grinding and Milling Catalogue CA 5/5

TRA LTD 24 GRAVEL LANE SALFORD 3 MANCHESTER Phone BLA 9181

pole. Page 48 of 1939/40 catalogue.

MIK. 202



ELECTRICAL REVIEW

March 9, 1945



GEORGE H. SCHOLES & CO., LTD., WYLEX WORKS, WYTHENSHAWE, MANCHESTER. Telephone: Wythenshawe 2251/2. Telegrams: "Kilowatt," Manchester.

Now it can be told !

After serving the Electrical, Radio and Allied Trades for over 25 years in GREAT EASTERN STREET, LONDON, E.C.2, our premises were destroyed by enemy action. We have acquired another Warehouse and our new address is

244 TOTTENHAM COURT RD., LONDON, W.1.

We expect to commence business there soon. Kindly look out for a further detailed announcement later. Meanwhile, send your

ORDERS and ENQUIRIES to our WAR-TIME ADDRESS: weblite works, Earls Barton, Northampton.

ESTD. WHOLESALE DISTRIBUTORS TO THE 1919

WELWYN Miniature Wire-Wound Resistors



VITREOUS ENAMELLED Ι W. Ι Ω – Ι000 Ω LACQUERED ¼ W. ½ Ω – Ι800 Ω TYPE APPROVED

WELWYN ELECTRICAL LABORATORIES LIMITED WELWYN GARDEN CITY . HERTS



Fan and duct-work coated with rubber to withstand the effects of phosphoric acid.

Better Fume Removal Better Health Better Production



ŵ.

ED

Installation of an Airscrew Fume Removal System solves many problems of production

by removing corrosive and other fumes which would be injurious to operatives and products. Special surface finishes are available for fans and duct-work which withstand the effects of acid and alkali fumes indefinitely.

We shall be pleased to advise on any fume removal problem and to place our expert services at your disposal.





It's EASY to telephone in this ACOUSTI-BOOTH

Put your shop phones in Burgess Acoustibooths and you'll be able to hear clearly in spite of nearby noise.

There are no doors because no doors are needed. Patented sound-absorbing walls soak up factory noise and provide a "zone of silence" for easy telephoning.

Open construction makes these booths easy to keep clean and obviates any ventilation problem. Hundreds of these doorless booths are in constant use in all types of factories. Write for Bulletin BP.131/E.R.

BURGESS ACOUSTI-BOOTH

BURGESS PRODUCTS CO. LTD. Acoustical Division, HINCKLEY, LEICS. Phone : Hinckley 700 (3 lines) London Office : 72 Horseferry Road, S.W.1 Phone : ABBey 1868 Scottish Representatives : R. McCartney & Co., 142 Queen Street, Glasgow, C.1 ELECTRICAL REVIEW

March 9, 1945



INDUSTRIAL PORTABLE VACUUM CLEANERS

Plant in operation in a factory, showing two operators at work.



We are specialists in Dust Control Systems for the Electrical Industry. Let us help you with your Dust problem—the advice of our Technical Staff is at your disposal. Literature on request THE BRITISH VACUUM CLEANER & ENGINEERING CO. LTD. (Dept. 4/F) Goblin Works · Leatherhead Surrey. Tel.: Ashtead 866 Makers of the famous GOBLIN VACUUM CLEANERS



DORMAN & SMITH LTD. MANCHESTER · LONDON · GLASGOW

It's Sixty Years Ago

... since we built our first switchboard and the skill and experience gained over the years, the painstaking research and experiment we have made through the generations, are built into our products of to-day—reliable, efficient, distinctive... worthy products in the renowned Dorman tradition.

Ne Berrip He Berrip He adrie To Arrapies 10. LTC est lin

Care Ray Ma

spectrum ter Spectrum SPECIAL SPECIAL BELS

ESIN DNENTS SED

Bucks



CONNOLLYS WAR EMERGENCY LIMPET ADHESIVE TAPE

DORM

To meet the shortage of rubber we have temporarily ceased manufacture of the famous "Blackley," "Limpet" and "Jockey" tapes and in their place is introduced a "War Emergency Limpet" tape, which will meet all the exacting requirements of B.S.S. 1078-42 consistent with the lowest possible consumption of rubber.

This tape represents the highest quality which can now be manufactured. It is sold only on a yardage basis in $\frac{1}{2}^{"}$, $\frac{3}{4}^{"}$ and 1" widths, in rolls of 50-yds., 25-yds. and 10-yds.

We shall be pleased to furnish prices, technical data, etc., on application.

CONNOLLY S (BLACKLEY) LTD., MANCHESTER 9 Telephone : Cheetham Hill 1801 (3 lines) Telegrams : "Connollys, Blackley." London Office: OSWALDESTRE HOUSE, STRAND, W.C.2 Telephone : TEMple Bar 5506-7 Telegrams : "Syllonnoc, Estrand, London."

ERIML45



00

110

inni

ELECTRICAL REVIEW



63

ELECTRICAL REVIEW

March 9, 1945



For speeding up Copper-Conduit Installations

CONEX TERNA

Compression Joints

are a boon to the Wireman. Ten seconds and a spanner ensures a completely rigid joint easily unscrewed at any time for cable inspection.

Unquestionably the most effective type of Compression Joint available.



VIBRATION PROOF FUSES



BRITISH MICA COLTO BEDFORD

HEVE

WW SC

RAWIN

(a)

100

101

270

000

66

12.0

宜的

等には

100.00

160

IRIE



UT2

OFORI

r

I

Co.

19

65

automatic

Machines

etting

A/43

tor

Rivets

Every type of wire produced by Richard Johnson & Nephew Ltd., is the very best for its purpose that modern methods and science can produce. Richard Johnson & Nephew Ltd. have a proud record of unfailing service worthy of confidence now, and in the future.

RICHARD JOHNSONENEPHEW LTD. BRADFORD IRONWORKS, FORGE LANE, MANCHESTER, 11.

BIFURCATED • TUBULAR & SOLID RIVETS SAW SCREWS • UPHOLSTERY NAILS DRAWING PINS ETC.

Today we can supply only those products which are authorised as Essential so that your valued patronage must be forfeited temporarily to enable us to make our contribution to the War Effort.

We look forward to the time when we shall once more be able to give you the service for which we have long been noted and we apologise for our inability to serve many of our numerous friends until existing trade restrictions are withdrawn.

ON ADMIRALTY, AIR MINISTRY AND MINISTRY OF SUPPLY LISTS.

S.& D. RIVET COMPANY (PROP. STEELS & BUSKS LTD.) ARIEL WORKS TEMPLE ROAD

LEICESTER

ELECTRICAL REVIEW

March 9, 1945



(1) It provides hot water ready for use as required, whether it be a few gallons at the sink or a full bath.

(2) Simple to install: it can work with an existing hot water system.

(3) It can be placed "Under the Draining Board" or in a cupboard out of sight, saving space where space is valuable.

(4) It needs the minimum of maintenance: the SADIA once fitted can be forgotten.

(5) It is economical of current and therefore cheap to run. It has the highest efficiency yet attained in electric water heaters.

The SADIA Type UDB will be available in two sizes, 15 gallons and 20 gallons capacity, for installation in post-war homes. Write for further particulars.



At id. per unit it compares favourably with any other type of water heating.

Aidas Electric Limited, Sadia Works, Rowdell Rd., Northolt, Middx. Phone: WAXlow 1607.

Scottish Agents : W. Brown & Co. (Engineers) Ltd., 89 Douglas Street, Glasgow, C.2.
ESTATE

atford E.

187

BONE-TO-MUSCLE WELD

Nature perfected the welding of muscle to bone: Metalastik perfected the rubber-to-metal weld.

When, on the 'bus, you arch your foot to prevent vibration jarring through your heels, Nature's construction softens the vibration: when a manufacturer is troubled by a vibrating piece of machinery he mounts it on Metalastik rubber mountings, or damps the oscillations of his crankshaft with a Metalastik torsional vibration damper.

In its campaign against vibration, Metalastik engineering safeguards feather-weight instruments, softens the harshness of high-powered engines, cushions the shudders in heavy torques, isolates the tremors of unbalanced machines and, in short, takes the 'Brr' out of vibration.

That engineering experience is at your disposal.

Metalastik Ltd., Leicester.

METALASTIK

Ņ

DE

A



"Many hands make light work..." LIGHT WORKS MAKE "EXTRA" HANDS

HUNDREDS of war factories equipped with Mazda Fluorescent Lighting have demonstrated the important fact that peak production is not just a matter of "many hands". Working conditions have played a vital part in output and quality ; and light has been a number one priority condition, for these reasons:—

(1) The shadowless *daylight* quality of Mazda Fluorescent Lighting provides perfect "seeing" conditions and spoils have been appreciably reduced.

and MAZDALUX EQUIPMENT

M 3052

FLUORESCENT LAMPS

(2) The psychological effect of "daylight" lighting has been far-reaching. Fatigue, irritability and depression arising primarily from eye-strain have been largely eliminated, and absenteeism, due to ill-health and minor accidents, enormously decreased.
(3) Marda Eluorescent Lighting has

(3)Mazda Fluorescent Lighting has eliminated the "dark corners"; and a great deal of additional floor space has been utilised.

So, to essential factories and businesses, which can and shou'd have better light now; to others which need better lighting, but may have to await war's end before installing; and to those which are uncertain of the need for better lighting—we offer the free expert advice of our lighting engineers. Write or telephone, making an early appointment.

THE BRITISH THOMSON-HOUSTON CO., LTD. LIGHTING ADVISORY SERVICE: Bridle Path, Watford, Herts. Telephone: Watford 5811

Timbers of Every

CREOSOTED POLES for POWER LINES Telegraph Poles, Engineering and Constructional

MAXIMUM

DEMAND ALARM

The (D) 01

z)

œ

1

Description. <u>F. BOULTON & HAY WOO</u> BRETTENHAM HOUSE, WELLINGTON STREET, W.C. Telephane. Temple Bar 5801 (Slines) Telegrams, Burboul, Rand, Lond

> FOR CONSUMERS' **INSTALLATIONS**

Lona

GIVES WARNING AT ANY PREDETERMINED LOAD

Depots: LONDON

NEWPORT SOUTHAMPTON Etc

TIME LAG 15, 20 OR 30 MINUTES SINGLE OR 3-PHASE



B ENGINEERING. Co. LTD.

MAKERS OF MAXIMUM DEMAND INDICATORS TAMWORTH LANE WORKS, MITCHAM, SURREY 69

70

March 9, 1940

のお田の町に四日



POLYPHASE kWh METER WITH kVA DEMAND INDICATOR

SIMPLICITY—always a feature of C. & H. design—is strongly evident in this combination meter. One set of terminals and connections ensures correct installation. The testing and adjusting of the meters is simplicity itself.



VG

CLASSIFIED ADVERINSENTER

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to First post on Monday, at Dorset House, Stamford Street, London, SE1

S.E.1. **THE CHARGE** for advertisements in this section is 2/- per line (approz. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies. **SITUATIONS WANTED.** — Three insertions under this beading can be obtained for the price of the is ordered and prenaid with the first insertion.

two if ordered and prepaid with the first insertion.

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

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS. ETC.

WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

Contract No. 142-Transformers

THE above named Authority invite tenders for the supply, delivery, erection and testing of :-

2 5.000-kVA. 33.000/3.300-volt, 3-phase, 50-cycle outdoor type Transformers: 2 600-kVA, 3.300/400-volt, 3-phase, 50-cycle indoor type Transformers,

at Ocker Hill. Generating Station, Tipton, Staffordshire. A copy of the conditions, form of tender and specifica-tion may be obtained on payment of one guinea, which will, after the Authority have come to a decision on the tenders received, be returned to the tenderer, provided he shall have sent in a bona fide tender and shall not have withdrawn.

he shall have sent in a bona fide frender and shall not have withdrawn it. Additional copies of the specification, etc., can be obtained on a further payment of one guinea per copy, which sum will not be returnable. Cheques should be made payable to "West Midlands Joint Electricity Authority." Tenders must be forwarded in the envelope provided so as to reach the undersigned not later than noon on Wednesday, 4th April, 1945. The Authority do not bind themselves to accept the lowest or any tender. H. F. CARPENTER,

H. F. CARPENTER, Clerk and Manager.

Central Offices of the Authority, Phoenix Buildings. Dudley Road, Wolverhampton. 5th March, 1945.

ABERTILLERY URBAN DISTRICT COUNCIL

Electricity Department

Supply of Materials

THE above-named Council invite tenders for the supply

THE above-named Council invite tenders for the supply of the following materials for the period ending 31st March, 1946: (a) Cables: (b) Wiring Accessories; (c) Service Materials; (d) Meters; (e) Lamps for Public Light; ing: (g) Wood Poles; (h) Wash Boilers; (i) Washing Machines; (j) Meter Boards; (k) Wate Heating Equipment (i) Immersion Heaters, (ii) Storage Water Heaters (small), and (l) Cookers and Cooker Spare Parts. Forms of specification and tender may be obtained from Mr. Dawson Thomas, Electricity Engineer and Manager, 40, Somerset Street, Abertillery. Every tender must be made out on the forms supplied and forwarded in a plain sealed envelope (which shall not bear any name or mark indicating the sender), endorsed "Tender for Electricity Materials." to the undersigned, to be received not later than SATURDAY, 17th MARCH, 1945. The Council do not bind themselves to accept the lowest or any tender, and teserve the right to accept the whole or part of any tender. H J WILLIAMS tender.

H. J. WILLIAMS. Clerk of the Council.

1 II in a 202

-

Council Offices, Abertillery. 26th February, 1945.

1536

1568

CITY OF MANCHESTER

Electricity Department

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

- (a) AUTOMATIC VOLTAGE VARIATION EQUIP-MENT AND REACTORS (Specification No.
- BERCURY ARC RECTIFIER EQUIPMENT (Specification No. 822),
 (c) 660 VOLT D.C. TRACTION SWITCHGEAR (Specification No. 823).

Specifications, etc., from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a hona fide tender. Tenders to be delivered by 10 o'clock a.m. on Tuesday. 3rd April, 1945.

Fown Hall, Manabastar 2	PHILIP	Б.	DINGLE, Town	Clerk.
3rd March, 1945.				1567

THE TEES-SIDE RAILLESS TRACTION BOARD

Mercury Arc Rectifier Equipment

THE Board invite tenders for the supply of 2 300-kW Mercury Arc Rectifiers and Associated Equipment. The specification and form of tender may be abtained from the Clerk to the Board. Municipal Ruildings, Middles-brough, on payment of a fee of five guineas per copy, which will be returned on receipt of a bona fide tender not subsequently withdrawn. Tenders must be delivered to the Clerk to the Board in a plain sealed envelope, which will be provided and which must not bear any name or mark indicating the sender. endorsed "Tender for Rectifier Equipment, Tees-side Rail-less Traction Board," not later than 9 a.m., Friday, 20th April, 1945.

April, 1945. The Board do not bind themselves to accept the lowest or any tender. PRESTON KITCHEN. Clerk to the Board. Town Clerk's Office

Municipal Buildings, Middlesbrough,	1569

COUNTY BOROUGH OF HALIFAX

Markets Department

TENDERS are invited for the renewing of the Electrical Installation at the Halifax Abattoir (to be carried out in Mineral Insulated Copper Sheathed Cable). Specification and form of tender may be obtained from the Borough Electrical Engineer, Electricity Offices and Showrooms, 19-23. Northgate, Halifax. Tenders should be forwarded to the undersigned, in plain scaled envelopes, endorsed "Tender for Electrical Installa-tion-Halifax Abattoir," and delivered not later than 12 noon on Friday, March 20th, 1945. The Corporation does not bind itself to accept the lowest or any tender.

or any tender

W. USHER, Town Clerk.

Town Hall, Halifax. 26th February, 1945.

49

SITUATIONS VACANT

None of the vacancies for women advertised in these columns relates to a woman between 18 and 41 unless such woman (a) has living with her a child of hers under the age of 14, or (b) is registered under the Blind Persons Acts, or (c) has a Ministry of Labour permit to allow her to obtain employment by individual effort.

DEMOBILISATION

MEN of definitely outstanding ability seeking perma-nent and progressive positions upon demobilisation from the armed Forces or from war industries are invited to record particulars of what they have to offer with a large and important electro-mechanical manufacturing group engaged in the development and production of electrical materials, equipment, apparatus, valves, plas-tics wire and only tics, wire and cable

The policy of the group is to make promotions from within, but a few appointments for demobilised men of outstanding ability are available in the following fields:---

Research—electrical, mechanical, metallurgical. Efficiency, time and motion study. Production engineering—machine design, tool, jig and fixture design—shop-trained engineer draughtsmen. Tool Room and Shop Supervision.

Factory and Plant Engineering. Inspection.

Progress and Production Control.

Costing.

Employment and welfare of personnel. Superlative craftsmen, e.g., toolmakers. Young men of character suited for further training.

Appointments will be considered immediately relevant Government instructions concerning employment permit. Men other than those of outstanding ability are advised not to reply to this advertisement. Applications in the first instance should be made to Box 1491. c/o The Electrical Review.

AYRSHIRE ELECTRICITY BOARD

THE Board have the following vacancies -

(a) Mains Assistant. Salary and conditions of service in accordance with the N.J.B. Agreement, Class H. Grade 8a (present salary \$409 per annum). Applicants must have had a sound technical training, together with practical experience in the installation and operation of H.T. and L.T. underground distribution systems and contingent. equipment.

(b) Shift Engineer. Salary and conditions of service in accordance with the N.J.B. Agreement, Class H. Grade 8 (present salary 2433 per annum). Applicants must have had a sound practical experience and tech-nical training in mechanical and electrical engineering and experience in the operation of modern High Pressure Boilers and Turbo-Alternator Plant.

(c) Switchboard Attendant. Salary and conditions of service in accordance with the N.J.B. Agreement, Class H, Grade 9a (present salary 2526 per annum). Appli-cants must have had a sound practical and technical training in mechanical and electrical engineering and experience in a modern Power Station.

The appointments will be subject to the provisions of the Local Government and Other Officers' Superannuation Act, 1937, and the successful candidates will require to pass a medical examination. Applications, giving age, details of training and experi-ence, together with copies of not more than three testi-monials, to be forwarded to the undersigned not later than 19th March, 1945. WILLIAM C. BEXON

	WILLIAM C. BEAUN.
Greenholm Street,	Engineer and General Manager.
Kilmarnock.	1543

LONDON POWER COMPANY LIMITED

Switchboard Attendant

REQUIRED for shift duty, wages and conditions as No. 10 Area, D.J.I.C., at present inclusive rate \$4.57d. per hour. Applications, giving details of age, technical training and experience, should be forwarded to the :-

Superintending Engineer, Deptford Generating Station, London Power Company Limited, Stowage Whari, Deptford, S.E.8. 15 1545

ALDERLEY EDGE AND WILMSLOW ELECTRICITY BOARD

Appointment of Engineer and Manager

A PPLICATIONS are invited for the above position at a salary in accordance with Clause 10 of the Agreement dated 9th July, 1941, made between the National Joint Committee of Local Authorities and Chief Electrical Engineers, and will commence at \$700 per annum, rising at the beginning of the third year of service to the full scale. The appointment will be subject to the provisions of the Local Government Superannation Act, 1997, the person appointed being required to pass a medical examination, and subject to there all scale. Candidates must be Chartered Electrical Engineers and have had experience in a responsible position in the administration, management and development of an Electricity Undertaking, both in the technical and commercial branches of the work.

applications, giving full details of qualifications and experience, previous appointments held, etc., accompanied by copies of not more than three testimonials, to reach the undersigned not later than Wednesday, 21st March, 1945. Canvassing, directly or indirectly, will be deemed a dis-qualification.

La la ca	W. COBBETT.
Spring Gardens,	Clerk to the Board.
Manchester, 2.	1534

LONDON POWER COMPANY LIMITED

A PPLICATIONS are invited from suitable candidates for the following position :--

Boiler House Engineer

Boiler House Engineer Candidates should have had experience in the control and operation of large water tube boilers, combustion equipment, and auxiliary plant. They would be required to take charge of operation of boiler plant on shift duties. Applicants must have received a sound technical training and have had good general engineering experience. Salary in accordance with E.P.E.A. Schedule, Grade 8. Class K. at present amounting to 5257 per annum. The successful candidate for the above position would be required to pass a medical examination in order to qualify him for the Company's Superannuation Scheme. Applications, stating age, qualifications and experience, and including copies of testimonials, should be addressed to the:—

to the :-

Superintending Engineer. Deptford Generating Station, London Power Company Limited, Stowage Whari, Deptford, S.E.8. 15

1544

LIVERPOOL EDUCATION COMMITTEE

City Technical College, Byrom Street, Liverpool, 3 (Principal: R. R. Butler, M.Sc.)

THICHAI. A. R. Buller, M.Sc.) THE Committee invite applications for the appointment of a LECTURER (full-time) in the Department of Electrical Engineering, and Corporate membership of the Institution of Electrical Engineers. Industrial and teach-ing experience is desirable. Salary will be in accordance with the Burnham Technical Award, and will be subject to 5% contribution under the Teachers' Superannuation Acts. Forms of applications and conditions of appointment may be obtained (on receipt of a stamped addressed envelope) from The Director of Education. 14. Sir Thomas Street. Liverpool, I, and applications should be received by him not later than 24th March, 1945. W. H. BARNES, Town Clerk. Clerk to the Local Education Committee. 1532

A PPLICATIONS invited for position of Works Manager in transformer factory, North-West London. Appli-cants should have experience in manufacture of trans-formers of all types up to 500 kVA. Post becomes available upon lifting of the engagement order and will be permanent. Full particulars, giving details of experience and salary required. to—Box 1499, c/o The Electrical Review. CHARGE Hand required for small radio assembly work. female, must be good disciplinarian, Midlands district. —Box 1531, c/o The Electrical Review. CHIEF ALD, Inspector (female) required for small elec-trical assemblies by radio manufacturers in Midlands district.—Box 1530, c/o The Electrical Review.

.

din.

-125

1983 JR

CITY OF GLOUCESTER

Castle Meads Power Station

Endet meads Power Station Endet meads Power Station Endet in Charge of Shift, Class G. Grade 8, re-quin 40-MW Plant. Must be accustomed to modern high-pressure and temperature equipment. State full particulars of age, training, experience, etc., and present employers attitude with regard to release. Copies of not more than three recent testimonials should be given. The appointment is subject to the passing of a medical examination for superannuation purposes. The housing situation in the district is extremely acute, and the likelihood of finding married quarters is remote. Lodging allowance on Ministry of Labour scale is payable to a limited period. Closing date for application is March 17th, 1945. EMIL BRAATHEN. Chief Engineer and General Manager. Gloucester Corporation Electricity Department, Commercial Road. Gloucester.

Gloucester

Baca I

115

10ml

111 /17H ALC: N di i

and a state of the local division of the loc

CAL NO

「日本に日本日

ELESSI ELESSI

The state

STALYBRIDGE. HYDE MOSSLEY AND DUKIN-FIELD TRANSPORT AND ELECTRICITY BOARD.

Electricity Department

War Period Appointment

J. HARWOOD LUMSDEN, M.I.Mech.E., A.M.I.E.E., Chief Engineer.

Electricity Offices and Showrooms, Tame Valley. Stalybridge, Cheshire.

CORPORATION OF BRISTOL

Electricity Department

Appointment of Junior Charge Engineer

THE Electrical Committee of the City of Bristol have a vacancy for a JUNIOR CHARGE ENGINEER for Rotary Substation work.

Interv Substation work. The salary will be in accordance with the National Joint. Board Schedule for the Electricity Supply Industry, Class H. Grade 9a, which is at present £326 per annum. Applications, accompanied by copies of at least three testimonials, must be received by the undersigned not later than 23rd March, 1945, endorsed "Junior Charge Engineer."

I. A. D	. PEDLER, M.I.E.E.,
Dorset House.	Acting General Manager
Clifton Down, Bristol. 8.	and Chief Engineer.
27th February, 1945.	1540

CAPABLE Shorthand-Typist wanted for small Holborn office. Good salary and prospects. Write, with details of experience, to-Box 1570, c/o The Electrical

details of experience, to Box 1570, c/o The Electrical CORPORATION of Kirkcaldy Electricity Department : mains Assistant. Applicants must be graduates or and must not exceed 45 years of age. They should have and experience with a public supply authority and be experienced in a public supply authority and be experience with a public supply authority and be accordance with Grade 8. Class D, of the N.J.B. Schedule. The terms of the Town Council's conditions of service and a statisfactory medical examination. Copies of three recent testimonias are requested. Applicants should write, proving D 1075XA, to the Ministry of Labour and National service. Appointments Dept. Central (T & S.) Register. Room 5/17. Sardinia Street. Kingsway. London, W.C.2, for the necessary forms which should be returned com-bileted on before 12th March. 1945. 152 - The CRTRICAL Machine Manufacturers have vacancies Effort young lads accommodation in hosted can be pro-tical engineering. A contails statung age and height, and forward copies of school reports. Box 1563, c/o The Electrical Review.

Review (Supplement) - 13
 Review (Supplement)

²⁴ Ingineers requires immediately send the returned and the sender of the confidence to Box 1529, c/o The Electrical confidence to Box 1529, c/o The Electrical experience in the confidence to Box 1529, c/o The Electrical experience in the confidence to Box 1529, c/o The Electrical experience and salary required. Confidential the sender of the confidence to Box 1529, c/o The Electrical experience and salary required to Box 1529, c/o The Electrical experience and salary required. Confidential the sender of the confidence to Box 1529, c/o The Electrical experience and salary required. Confidential the sender of the confidence to Box 1529, c/o The Electrical experience and salary required. Confidential the sender of the confidence to Box 1529, c/o The Electrical and mechanical engineering. Age not over 40 for the confidence to Box 1629, c/o The Sender of the transmitter of the sender of the confidence to Box 1629, c/o the sender of the transmitter of the sender of the transmitter of the sender of the sender of the transmitter of the transmitter of the sender of the sender of the sender of the transmitter of the sender of the transmitter of the sender of the transmitter of the sender of the sender of the transmitter of the sender of the transmitter of the sender of the sender of the transmitter of the sender of the

PROGRESSIVE Company, employing 1,500, manufac-turing light electrical mechanical equipment, S.W. Londou district, requires Max with extensive experience in similar capacity. Applicants must be competent to control labour all grades, have thorough knowledge latest manufacturing methods and layout. Capable of super-vising large quantity production on economical basis to give results. Write, giving full details and salary required, to—Box 1566, c/o The Electrical Review.

to-Box 1566. e/o The Electrical Review. **BEPRESENTATIVES** required by manufacturer to call upon export houses in London area, also upon manu-facturers, mostly London area. State experience, age, full particulars of qualifications, remuneration desired.-Box 118, Parts, Craven House, Kingsway, London, W.C.2. 1510 **R**EQUIRED for municipal power station in the West, Boiler Fireman, rate 25.67d, per hour, D.J.L.C. con-ditions of employment. Permanent, pensionable post for suitable man. The successful applicant, if not more than forty-five years of age, will be required to pass a medical examination for the purpose of contributing to the super-annuation fund. Applicants must be used to modern H.P. boilers and chain-grate stokers. They should state clearly prospects of release as regards present employment. State age, whether married or single, and full address. The housing situation in the locality is extremely acute, and it may be necessary for the successful applicant to live either in lodgings or in hostel acrongments for the pay-ment of lodging allowances are in operation.-Box 1450. c/o The Electrical Review. **SALES** Representative required for Atlas Lamps in Mid-land is a succedibuting a proventing a proventing the succedibuting a succedibuting a proventing a succedibuting a suce a succedibuting a succedibuting a succedibutin

SALES Representative required for Atlas Lamps in Mid-land counties. Remnerative position with excellent post-war prospects for keen, energetic man not liable for military service. Connection in electrical and hardware trade and large users an advantage. Salary, commission and expenses. Write, in confidence, details of past ex-perience to-Box E.L.4, T.E.I., 105, Judd St., London, WC.I.

SALES Representative required for specialized range of Lighting Fittings. State age, experience and salary required to—Box 1519, c/o The Electrical Review.

Lighting Fittings. State age, experience and salary required to-Box 1519, c/o The Electrical Review. STOREKEEPER required by Electrical Contractor (London). Apply, giving full particulars and wages required, to-Box 1574, c/o The Electrical Review. THE British Broadcasting Corporation. Applications the Engineering Division of the British Broadcasting Corporation. Applicants must be of British nationality and parentage and must have a sound technical knowledge of electrical communications, coupled with administrative ability and experience. The duties comprise the prepara-tion of estimates, general administrative work in con-nection with financial control, and the handling of matters, routine and otherwise, relating to patents. The last-mentioned work includes the checking of patent speci-fications, liaison with the Corporations's Patent Agents and advice on patent applications. Commencing salary will be in accordance with qualifications and experience and will, subject to satisfactory report, rise by annual increments to a maximum of £800 per annum. A cost of living bonus (at present £44 4s, per annum) and family allowances are paid in addition to salary. Appointment will be to the Unestablished Staff, and entry to the per-manent staff must be subject to consideration there there and experience, should be sent to the Engineering Establishment Officer. Broadcasting House, London, W.1. 578 WORKS Engineer required to take charge, improve

by 24th March. 1945. WORKS Engineer required to take charge, improve and maintain existing methods of manufacture of sessential, knowledge of rubber and synthetics preferred. Should appeal to live man with own ideas anxious to join progressive firm.—Box 1575. (·) or he Electrical Review. YOUNG Lady, Typing, General Office Work, electrical contractors' office. Westminster. E.W.O. Must have experience. State salary required.—Box 1573. c/o The Electrical Review.

experience. State Electrical Review.

SITUATIONS WANTED

A DMINISTRATIVE Engineer (40), University Graduate, M.I.Mech. E., M.I.E.E., with intensive technical and commercial operating and development experience with industrial and electricity supply undertakings, seeks posi-tion with post-war prospects inside or outside the engineer-taking. Organisation, management, finance, company practice, contracting, construction, sales, public relations. Highest credentials. —Box 8810, c/o The Electrical Review. A GRICULTURER Consumers' Engineer, with long ex-perience in public supply industry, wishes to ioin enterprising organisation specialising in articultural equip-ment. Sales, demonstrations, estimates, installations.— Box 6806, c/o The Electrical Review.

A DVERTISER specialising in the introduction of high-class insulation materials to electrical engineering works and radio manufacturers would like to contact a progressive manufacturing concern who can use a live and well-connected gentleman in present and post-war activi-ties. Main items are mica and productions therefrom, synthetic resin laminated boards, rods and tubes, etc. Write first to-1.N.S., Box 6775, c/o The Electrical Review. A RMATURE Winding Foreman, through experience repairs, rewinds, assembly fractional to 500-h.p. A.C. and D.C., production or repair shop, desires permanent progressive position. -Box 6817. c/o The Electrical Review. C APABLE Engineer (37) with extensive sales, buying and administrative experience desires executive posi-tion with manufacturer or wholesaler. Wide knowledge of the electrical industry and specialised in motors and generators.--Box 6822. c/o The Electrical Review. E ECC. Designer (30), small motor control gear, desires post-war position Sales Engineer. Energetic, keen, smart appearance. Southern area.-Box 6815. c/o The Electrical engineer (27), 10 yrs.' experience elec-trical engineering, including discharge lamps, appren-tieeship. Higher National Certificate, desires change.-Box 6812. c/o The Electrical Review. E LECCTRICAL Engineer (35), Inst.B.E., A.S.E.E., 21

Box 6812, c/o The Electrical Review. **E** LECTRICAL Engineer (53). Inst. B.E., A.S.E.E., 21 years' experience installation, maintenance, etc., quotations, design, development of factory plant and equip-ment, desires change. Control staff 40 (mixed). Executive post with p.w. prospects. Salary commenurate with responsibility.—Box 6773, c/o The Electrical Review. **E** LECTRICAL Engineer (41), specialist in time study. bonus systems, methods, layout and equipment, de-sires post with progressive firm endeavouring to modernise factory methods and plant.—Box 6780, c/o The Elec-trical Review.

trical Review. **DLECTRICAL Installation and Maintenance Engineer**, 20 years' sound practical experience, desires change. progressive post, home or colonies, (37), keen, competent. Can take charge.—Box 6786, c/o The Electrical Review. **DLECTRICAL Manager controlling large staff engaged** on design, development and manufacture of small electrical equipment requires change to similar post, or position as Works or Technical Manager.—Box 6772, c/o The Electrical Review. **DLECTRICIAL all branches disengaged wants work**

ELECTRICIAN, all branches, disengaged, wants work, Would suit works maintenance. - P., 70, Standen Road, S.W.18. MAINTENANCE Engineer, disengaged, used to pumps, elec, installations, motors, diesel engines, hot water, and control of staff. - Box 6809, c/o The Electrical Review.

and control of staff.—Box 6809. c/o The Electrical Review. TECHNICAL Sales Engineer (39). Associate I.E.E., over 15 years' established connection electricity under-takings, electrical trade and large industrial concerns over wile area Midlands—Northampton to Sheffield. Birming-ham, etc.: lighting, heating, cables, switchgear and general L.T. distribution specialist, desires similar position where initiative. resourcefulness and responsibility are demanded. Write—BM/KAY1L, London, W.C.1. WORKS Manager, sound commercial background, ex-perienced in control of planning, production, time study. stores and personnel depts., light electrical engineer-ing.—Box 6826, c/o The Electrical Review.

FOR SALE

Traders buying and selling hereunder must observe the Restriction of Resale Order, S. R. & O. 1942 No. 958.

GEORGE COHEN, SONS & CO. LTD.

for

GUARANTEED ELECTRICAL

PLANT.

MOTORS, GENERATORS.

SWITCHGEAR,

etc.

WOOD LANE, LONDON, W.12. Telephone : Shepherds Bush 2070 and

STANNINGLEY, NEAR LEEDS. Telephone: Pudsey 2241. Established 1834.

March 9, 1945

10

ľ.

211

1.825

113

The second

1181

132

1000

-

10

Navallan .

Yes. Beaglet

7

ALLE, I DESCRIPTION OF THE OWNER OWNER

d hai eo

inten) we intensi in intensi intensi in inte

the state of the s

18

REBUILT MOTORS AND GENERATORS

 $L_{\rm rebuilt}^{\rm ONG}$ defineries can often be avoided by purchasing aurplus plant of any tree. We can redesign or replace

SEND US YOUR ENQUIRIES.

OVER 1.000 RATINGS ACTUALLY IN STOCK HERE

DYNAMO & MOTOR REPAIRS LTD., Wembley Park, Middlesex, Telephone: Wembley 3121 (4 lines).

Also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham. Telephone: Northern 0898.

26

WATER TUBE BOILERS IN STOCK

Two	25,000 lbs.	evaporation.	175 lbs.	W.P.
Three	20,000 lbs.		175 lbs.	
One	12.000 lbs.		200 lbs.	
One	12.000 lbs.		160 lbs.	
One 9	10,000 lbs.	-	200 lbs.	

We install complete. including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD. TAYLOR & CO. LTD., Boiler Specialists, Middlesbrough. Telephone : Middlesbrough 2622.

32

A.C. SLIP-RING MOTORS FOR DISPOSAL

Wound for 400/440-volts, 3-phase, 50-cycle Supply

ONE 140-h.p., 980-r.p.m. ball-bearing machine by LAURENCE SCOTT, with oil starting gear. One 145-h.p., 485-r.p.m. three-bearing machine for belt drive by CROMPTON, with Ellison oil switchgear. One 530-h.p., 600-r.p.m., 6,600-volts, 3-phase, 50-cycles auto-synchronous Motor by CROMPTON, with switch-

NEWMAN INDUSTRIES LIMITED, YATE, BRISTOL 1468

ELECTRIC MOTORS AND DYNAMOS

WE hold one of the largest stocks of New and Second-hand Motors. Secondhand machines are thoroughly overhauled. Inspection and tests van be made at our Works.

For Sale or Hire. Send your enquiries to :--

BRITANNIA MANUFACTURING CO. LTD., 22-26, BRITANNIA WALK, CITY ROAD, LONDON, N.1. Telephone: 5512-3 Clerkenwell. 13

IMPORTANT NOTICE

APEX SALES Has now been merged into CLERKENWELL SCREWS. 109, Clerkenwell Road, London, E.C.1. Telephone: Holborn 6504. Specialists the principal a strength aircraft, instrument and aviation firms in the country. Discounts and orders and orders DESPATCHED PER RETURN 6825 APEX SALES

A large stock of Searchlights (sale or hire). Mirrors, Lenses, A.I.D. self sustaining types, and Fibre. Hundreds of thousands supplied during the last and Fibre. Hundreds of thousands supplied during the last d0 years to immumerable trader London Electric Firm, Croydon, 42

ECONOMISERS IN STOCK

TWO Green's Economisers, 208 tubes, 250 lbs. W.P. Guaranteed re-insurable and first-class condition only, low prices. Quotations per return. Installations delivered and erected complete.

BURFORD, TAYLOR & CO. LTD., 7. Commercial Street, Middlesbrough. Telephone 2622.

MAN POWER IS MULTIPLIED

by the installation of MORGAN ELECTRIC LIFTING BLOCKS

All capacities A.C. and D.C. Supply. Delivery from 2-3 days.

MORGAN LIFTWAYS & POWERWAYS 50, WILKIN STREET, N.W.5. Gul. 1147.

BURDETTE & CO. LTD.

Stock

Reconditioned A.C. and D.C. Motors and Starters Equal to New.

STONHOUSE STREET, CLAPHAM, S.W.4.

ALTERNATORS

Day and night service

MACaulay 4555

47

Suitable for	400-3-50, in perfec	t condition.	
65 kVA	1,000 r.p.m.	with exciter	
160 kVA	300 r.p.m.	for coupling	
170 kVA	I,000 T.p.m.	with exciter	
235 kVA	300 r.p.m.	for coupling	
600 kVA	300 r.p.m.	for coupling	
THE	ELECTROPLANT	CO.,	
	Wembley, Middx.		1555

Wenbley, Middx. 1552 Membley, Middx. 1552 A. C. Motors, 400/3/50, slip-ring, squir. cage, R.O., with starters, h.p. 12, 10, 74, 5, and one tot, enc. induct. a. A. D. Polishing Machine, just left work. Tuinol Panels. new, 1 doz., 4^{*} and 3/32". -F. Rushton, 19, Hay Lane. Kingsbury, N.W.9. A. C. Motor, 100 h.p., 400/3/50, 580 r.p.m., Crompton, Silp-ring, with liquid starter, reconditioned. - The Electroplant Co., Wenbley, Middx. 1553 A. C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations. - The Victa Electrical Co., 47, Battersea Hip Street, S.W.11. Tel Battersea 0780. 19 A. C. Motors, 1/50th h.p. to 10 h.p., from stock. Also D.C. - The Johnson Engineering Works. Milo Road. East Dulwich, S.E.22 (Forest Hill 4422). 6781 and Street, Lendon, W.1. Tel.: Museum 6373. 57 A ERIAL Cables, all sizes quoted for: good deliveries arguinet Government contract numbers. --Edwardes Bros., 20. Blacktriars Road, London. S.E.1. 6629 A LITERNATING Petrol Sets. 14 kVA. 230/1/50. Mirect coupled. enclosed housing, compact. self-contained units, with meters and regulators. Condition as new.-The Electroplant Co., Wembley, Middx. 1573 A LITERNATING Petrol Sets. 14 kVA. 230/1/50. Mirect coupled enclosed housing, compact. self-contained units, with meters and regulators. Condition as new.-The Electroplant Co., Wembley, Middx. 1573 A LITERNATING, 500 kVA, 3-p. 50 c., 400/440 v. 750 rese, direct coupled exter, 2 brigs, on hedplate -Stewart Thomson & Sons, Fort Road. Scaloth. Liver-pool 21 A LITERNATOR, 200 kVA, 250 r.p.m., 400/3/50. for LITERNATOR, 200 kVA, 250 r.p.m., 400/3/50. for

Stewart Inomson & Sons, Fort Road, Schlotth, Liverpol, 21.
 A. (TTERNATOR, 200 kVA, 250 r.p.m., 400/3/50, for coupling, perfect order. — The Electroplant Co., Wembley, Middx.
 B. EST English Cables, 1/.044 up to 127/.103, deliveries against M.O.S. requirements — Edwardes Bros., 20.
 Blackfiars Road, London, S.E. 1.
 CENTRIFUGAL Pumps, 100/110 v. A.C. or D.C., for industrial operation, 512 105, each. — Universal Electrical, 221, City Road, E.C.1.
 COMPLETE set of Working Drawings, Patterns, and Winding Details for a range of small Electric Motors.
 Price Sci. — Edwards for a range of small Electric Motors.
 Price Sci. — Edwards for a range of small Electric Motors.
 Price Sci. — Edwards, C.G. or D.C., 200/240 v., 3.
 Sond ID amps., 175, 6d, each. — Universal Electrical, 221, City Road, E.C.1.

76 (Supplement) ELECTRICA EXHAUST Fans, new, 14", 1-phase, 200/250 v., 1,900 cu. ft./min., 511 155.—Southern Ignition Co. Ltd., 190, Thornton Road, Croydon. 75 FULING Cabinets, Steel Cupboards, Shelving, Safes, Office Furniture Co., 184, Vauxhall Bridge Rd., London, S.W.I. Tel.: Victoria 9770 and 8685. 40 FOUR identical 150-kW "Weir Sulzer/E.C.C." Diesel-driven Generating Sets, 220 volt D.C.—Stewart Innome & Sons, Fort Rd., Seaforth, L'pool, 21. 74 FUME Extractor Air Puriflers, 25 cub. ft. approx., with large filter chamber, all steel. 154", x 204" x 14", with intake down shaft, fitted geared hand drive or 4-b. p. (A.C.) motor.—Leslie Dixon Co., 214, Queenstown Road, Battersea, London, S.W.8. Phone, MACaulay 2159. 1522 G SNOTH, Co.C. and States, S.E. 10. 29 ENERATING Sets for sale, 18 kVA, petrol. 400/3/50: Sudo amp., petrol-driven, portable Welding Set: 24 kW, 220-W.D.C. Crude Oll Set.—Fyfe, Wilson & Co. Ltd., Eishop's Stortford. Str. 8. VA, sectorial Listrument Wires, No. 18 s.W.g., No. 40 s.w.g., stock deliveries —Saronia, Rean Works, Greenwich, S.E. 10. 29 EAD-covered and Armoured Cables, P.I. and V.I.E., various special lines at low prices.—Edwardes Bros. 20. Blackfriars Road, London, S.E. 6832 L'AD-covered and V.I.R. Cables, several tons, new condition.—Box 6788, c/0 The Electrical Review. EAD-covered and V.I.R. Cables, several tons, new condition.—Box 6788, c/0 The Electrical Review. EAD-covered and Cundon, S.E. 6832 M OTOR Generator Sets and Convertors, all sizes and voltages from 3 kW up to 500 kW in stock.— M OTOR Generator Sets and Convertors, all sizes and voltages from 3 kW up to 500 kW in stock.— Futamin Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.I. Telephone, Clerkenwell 5512, 513 & 5514. 29 AMEELATES, Engraving, Diesinking, Stencils, Steel Puendes — Stille I Store ttd., 152, Far Coofford

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches .- Stilwell & Sons Ltd., 152, Far Gosford

Nanker-Hest, Engrands, Leiser, and Construction of Street. Coventry.
 ONE 3-h.p., 1,500-r.p.m. Higgs Motor, suitable for 230-volts, single-phase, 50-cycles supply. Seen Stafford.
 Box 1542, e/o The Electrical Review.
 ONE New 25-h.p. squirrel case, protected type, Howel's "Sovereign "Motor, with slide rails and star delta starter, 400 volts, 3-phase, 50 cycles, 1,000 r.p.m. For intribution of the starter, 400 volts, 3-phase, 50 cycles, 1,000 r.p.m. For jurther particulars and price apply to -Electricals Ltd.
 Caremont Place, Newcastle-upon-Tyme, 2. 1511
 PHONE 98 Staines, 35-kW Crude Oil Set, 220 vo.; 35-kW Browett Steam Set, 220 vo.; 50-kW Hindley Steam Set, 440/220 vo.; 75-h.p. National Twin Diesel; Three-throw Ramp Pump, 3² × 6^o, 700 lbs. w.p.—Elarry H. Gardam & Co. Ltd., Staines.
 PORCELAIN Cleats, 2 and 3 groove, various sizes ex stock, price list.—Edwardes Bros., 20. Blacktriars Road, London, S.E.1.
 PORCELAIN Insulators, various sizes in stock, galv spinles.—Edwardes Bros., 20. Blacktriars Road, London, S.E.1.
 Consensity of the stock stock apple to the stock stock price list.—Edwardes Bros., 20. Blacktriars Road, London, S.E.1.

spindles.—Edwardes Bros., 20. Blackfriars Roar, London, S.E.I.
 PORTABLE Engine-driven Welding Sets, output 75/ 350 amps., brand new, Government licence to pur-chase. delivery stock.—Gladiator Welder Sets Ltd., 18, Leicester Road, Sale, Manchester.
 ROTARY Converters in stock. all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.I.
 TEVERAL Telescopic Tower Ladders ready for essential work. Extensions, Tresiles and Steps to order.— Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363.
 GPECIAL line, Bell and Telephone Wires, also screened

Special line, Bell and Telephone Wires, also screened wires, large quantity, cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 6835

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional con-dition. Write — Box 528, Smiths, 100, Fleet Street, London, E.C.4.

SWITCH and Fuse Units, Conduits and fittings, works requirements stocked.—Edwardes Bros., 20, Black-friars Road, London, S.E.1.

friars koad. London. S.E.I. 6536 TECALEMIT Ltd., Great West Road. Brentford, Middleser (Tel. Ealing 6661), invite offers for an English Electric Overhead Busbar System comprising 10 x 12 ft. lengths triple busbar chamber, 600 amp. total capacity; 60 30-amp. triple-pole plug-in fuse boxes; 3 60-amp. triple-pole plug-in fuse boxes; 153 spare fuses of various amperages; 2 cable entry boxes. The equipment is in good condition and may be inspected at the above address.

in good condition and may be inspected at the 1541 address. TRANSFORMER Lead-in Wire, 7/38 and 14/38 s.w.g. Insu-Glass finished, various colours, stock.—Saxonia, Greenwich, S. E.10. TRANSFORMERS, single and three-phase. All types up to 10 LVA.—Woden Transformer Co. (Phone. Bilston 41959), Moxley Road, Bilston, Staffs. 12

in goou Workson

18 good condition. Best offer.-Beards (Millers) Ltd.. Worksop. 1520 25 kW, 220 volts diesel-driven Generating Set, consist-ing of 373/42.h.p. Crossley vertical diesel engine-and direct coupled 25.kW compound wound generator. mounted on baseplate, complete with regulator.-Newman Industries Limited, Yate, Bristol. 1623 ch.p. Motorised Reduction Gear Unit, 400/3/50, final speed 182 r.p.m., complete with regulator.-Newman Works. New Islington. Ancoats, Manchester. 1562 ch.y. 220v., 770-revs. C.I. three-bearing Generator. Burtons Field Mill. Atherton, Manchester. 1679 ch.g. 200, 770-revs. C.I. three-bearing Generator. Burtons Field Mill. Atherton, Manchester. 1600 h.p. Drysdale Vertical Squirrel Cage A.C. Motors. 1600 h.p. Drysdale Vertical Squirrel Cage A.C. Motors. 1559 ch.p. L.D.M. Squirrel Cage A.C. Motors, B.B., 720 r.p.m., 400/3/50, with starter, £150 100 r.p.m., 400/3/50, with starter, £157 100 r.p. L.D.M. Squirrel Cage A.C. Motors, B.B., 720 m.Ancoats, Manchester. 1559 ch.p. Loude Startons Field Mill. Atherton. Morks, New Islington, Ancoats, Manchester. 1559 ch.p. Loude Startons Field Mill. Atherton, Morks, New Islington, Ancoats, Manchester. 1559 ch.p. 400/3/50, S.R., 730-revs. Louvre Vent. Br H. (hall bearings). with Eilison O.I. gear.-Greenhale Bros. Burtons Field Mill. Atherton. Motor, 1478 1100 v. Battery, 300-kh capacity, together with prynamo and Switcbbaard, available shortly. Can be seen in use by appointment.-Jas. Edwards & Sons (Inkpen) Ltd., Inkpen. Newbury, Berks. 1420-h.p. Harland Slipring A.C. Motor, 400/3/50 at 750 r.p.m., complete with Ellison control gear. 200-h.p. ditto at 600 r.p.m.-Electric Machinery Co. (M/cr.) Ltd., New Union Works, New Islington, Ancoats, Manchester. 1557 ch.v. Atlernator, 400 volts, 3-phase, 50 cycles, 750

(M/cr.) Ltd., New Union Works, New Islington, Anccats. 1557 **250** kVA Alternator, 400 volts, 3-phase, 50 cycles, 750 revs., with direct coupled exciter — Midland Coun-ties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. **1,000** politan-Vickers in 1920, 3-phase, 50-period. 400 volts, steam pressure 200 bs., jet condenser. Apply— Patons & Baldwins Ltd., Halifax, Yorkshire. **184**

ARTICLES WANTED

SALVAGE OR SCRAP CABLES

OFFERS are invited of small or large lots, job or odd lengths, Single or Twin T.R.S. Cables up to 7/.044, by weight or otherwise; also Cotton or Rubber-covered Flexibles. Spot Cash.

ELECTRICAL WHOLESALERS, 32. COLLEGE STREET, BELFAST.

ACETATE

A CETATE and other thermoplastic scrap: polythene and P.V.C. in any form; also scrap cable and in-sulated wire; urgently wanted.—Elton Levy & Co. Ltd.. 18. St. Thomas Street, S.E.I. 30 COLL Winding Machines wanted for essential work.— Rot 63, c/o The Electrical Review. D YNAMOS, 110 volts, 200-400 amps: D.C. Motors. à h.p. to 10 h.p., 200-500 volts, ball bearings.— W.H. Sugden, Glemny Road, Barking, Rip. 3302. 1526 ENAMELLED Copper Wire wanted. Please state quan-tity, make, gauge and price.—Box 61, c/o The Electrical Review.

 $\begin{array}{c} \begin{array}{c} \label{eq:linear} \hline Electrical Review \\ \hline E^{\rm NGINEERING Technical Books (new or secondhand) \\ \hline wanted in any quantity. Attractive cash offers. Call \\ \hline -Third Hoor. 356. Oxford Street, W.1, or "Stoneleigh." \\ \mbox{St. George's Avenue, Weybridge.} \end{array}$

3. FL

1 100

15 20

ICE8

100

1 35

EI

Cine

LT'S

CONTRACTOR

---「日本日日 C.M. June 1 「日田」

二日二日

「日本のの

and the second s

T Contrait

AL AN A

a lin in

062/11

A sta la Station Sec. br

という

100

100 Str.

A STREET

ALL AL

O'NI co pund w. d D.C. Generator, 3-bearing type, rotk: 3-phase, 50-cycles Alternator, with direct coupled possible completion with the coupled of the Electrical Review. The Electrical Review. Mainter Directory States and States

WORK WANTED AND OFFERED

ARMATURE, Rotor and Stator rewinds and repairs: Itractional to 60 h.p. Prompt deliveries.—T. A. Boxall & Co. Horley, Surrey. Phone 654. 6811 MUTOMATIC capacity required up to § bar. Large quantity.—Box 6818. (/o The Electrical Review. CAPACITY available for Winding. Armatures, Stators and Coils. Quantities preferred.—Kingsland Electric Dif you suffer losses in 1944 through bad tooling? It so, we invite you to place your Tool Designing with s. Capacity available immediately!—Kirk Designs Ltd., Woodford Green, Essex. Phone, Buckhurst 3835. 1550 JGS, Fixtures, Press Tools, Power and Fly Press work. Welding, Capstans, Light milling. A. I.D. approved. Promt delivery.—Box 6819. (/o The Electrical Review. MACHINING Work, for Centre Lathes up to § in reterred).—The London Electric Firm. Croydon. Up meterred).—The London Electric Firm. Croydon. Up Market Sci. Cooks. Floatsin Cooks. Construct. Con-DEPAIRS. (Doks. Floatsin Cooks. Construct. Co-

ands 48/1. 50 R EPAIRS: Clocks, Electric Clocks, Clockwork Con-trollers for public lighting, control and time switches, erpoare meters and every, kind of clockwork appliance repaired and overhauled. Inquiries welcomed -J W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W.1. Phone, Victoria 0134. 66

AGENCIES

AVOID UNEMPLOYMENT-

EXPORT 1

LARGE ORGANISATION WITH GOOD CONNECTIONS IN ALL CONTINENTAL COUNTRIES, OFFERS ITS SERVICES TO BRITISH MANUFACTURERS OF HIGH-GRADE ELECTRICAL GOODS AND APPLIANCES.

Write-Box 6824, c/o The Electrical Review.

A CENCIES required for London. South of England. for the following: (1) Domestic electrical appliances: (2) Brass electrical accessories, switch plugs, etc. (3) Con-bit. Advertisers have clientle with every wholesaler in the territory mentioned. Immediate turnover can be maranteed. Either commission or buying basis. Post waranteed. Either commission or buying basis. Common area: (a) Cables: (b) Small Switchgear; (c) molesaler; maines. Elex 40. c/o The Electrical Review. As a reputed firm of Elec. and Mech. Engineers enjoying biomens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I commens we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite sole agencies for motors, dynamos. I des motors we invite s

ELECTRICAL Representative with established connec-tion, opening warehouse in Manchester, desires agency for domestic appliances, electric lighting fittings and fires. Fullest details, please.—Box 6748, c/o The Electrical

Fullest details, please.—Box 6748, c/o The Electrical Review.
 ELECTRICAL Wholesaler with showrooms in Newcastle-ter on Tyne, with 36 years' connection with supply authorities, shipyards, works, collicries, wholesalers and contractors, covering N.E. Coast area (principal and son qualified sales engineers, well known in the trade), deeires agencies, heating and cooking apparatus, retrigreators, transformers, cables, lamps, switchgear, accessories, etc., for present and post-war development. Please write—Box 6827, c/o The Electrical Review.
 EXPORT. Firm with connections and selling organisation in almost every country desire to contact firms who are interested in establishing a sound Export Trade-Sales & Partners Ltd., 7, Victoria Street, Westminster, 5.W.1. Phone, Abbey 2089.
 M ANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contact-emission or buying), post-war arrangements considered.
 —Exclass wholesalers for distribution rights in several areas of the British Isles.—Box 1512, c/o The Electrical Review.
 M ANUFACTURERS of Electrical Appliances, including for the British Isles.—Box 1512, c/o The Electrical Review.
 MANUFACTURERS of Electrical Appliances, whole of the British Isles.—Box 1512, c/o The Electrical Review.

to develop post-war range of their own branded lines, would like to discuss such distribution with interested manufacturers. Write—Box 1577, c/o The Electrical Review.

SMALL mnfr. wishes contact few high-class retailers able of the handle individual Model Lampshades of all types. Write-Altman, 95, Albert Avenue, Prestwich, Lancs. (or Tel. Pre. 3117).

VORKSHIRE Agent with 20 years' contact with elec-trical wholesalers and retailers is prepared to handle a further line, appliances or accessories, for a manufacturer of repute.—Box 6816, c/o The Electrical Review.

MISCELLANEOUS

BATTERY Chargers Modernised. Your old Charger made-like new by specialists. Conversion from valve to metal rectification. Send for interesting leaflet "0.D." on this service.—Runbaken Electrical Products, Manchester, 1. 45 DON'T Part With Your Plans. Produce blue prints and black line copies, etc. in your own office with-out glass frame, privately and economically. "Arcoflex" Copiers from 28 shillings. As supplied to H.M. Govern-ment.—W. R. Boughton, 53, Kenley Road, Merton, London, S.W.19. 43 FORMER owner of considerable foreign concern for pattent electrical installation speciality which has made exceptional profits, wishes to contact with electrical firm to found a similar undertaking.—Box 6820, c/o The Electrical Review. DHOTOGRAPHY. A photograph says more than a

Electrical Review. PHOTOGRAPHY. A photograph says more than a thousand words. Realistic photographs for catalogues, brochures and general reproduction purposes for present and after-the-war uses. Records made of present work, premises, etc.—Miles & Kaye Ltd. Industrial Photo-graphers, 100, Southampton Row, London, W.C.1. Tele-phone, HOLborn 6858. Established over 50 years. 1492

PARTNERSHIPS

PARTNERSHIP required in electrical contractors' or wholesale business by electrician. Replies in strict confidence.-BM/LEK., London. W.C.1. 6628 YOUNG Man requires financial interest (up to £1,000) in an electrical business. Advertiser has wide elec-trical experience. Replies treated in strict confidence.--Box 6823, c/o The Electrical Review.

PATENT NOTICES

NOTICE is hereby given that Radio Transmission Equip-ment Limited and Klaas Anne Zandstra seek leave to amend the specification of Letters Patent No. 563420. entitled "Improvements in and relating to brazing and soldering." Particulars of the proposed amendment were set forth in the Official Journal (Patents). No. 2927, dated February 28th. 1945. Any person may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office. 25, Southampton Buildings, London, W.C.2, on or before the 31st March, 1945. 1539

The fact that poods made of raw materials in short
supply owing to war conditions are advertised in this
fournal should not be taken as an indication that
they are necessarily available for export

BUSINESS OPPORTUNITIES

PROPRIETORS of new Electrical Universal Domestic PROPRIETORS of new Electrical Universal Domestic Appliance needed in every household wish to negotiate with concerns who are either interested in mass production (light metal engineering works of large cap.) or sole sales representation (only large organisation dealing on sim. Jines). Advertisers can provide either facilities themselves, but wish to split activities to cope with the expected demand. Full details in confidence to-Box 1555, c/o The Electrical Review.

EDUCATIONAL NOTICES

LATEST A.M.I.E.E. RESULTS

IN the recent Examinations held by the Institution of Electrical Engineers 477 Candidates sat who had taken B.I.E.T. courses. Of these 457 were successful in passing the examinations. We believe this record of 457 successes out of 477 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of Technical Training which we have laid down.

The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination. The B.I.E.T.

We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers.

WE GUARANTEE-" NO PASS-NO FEE"

May we send a copy of "ENGINEERING OPPOR-TUNITIES"? Containing a great deal of useful advice and detailed information on over 200 Home-Study Courses and examinations, this handbook is of very real value to the ambitious engineer. Our bieldy information

Our highly informative handbook will be sent FREE and without obligation on request. BRITISH INSTITUTE OF ENGINEERING

TECHNOLOGY

Established 1927—over 200,000 students. 12, Shakespeare House, 17, 18 & 19, Stratford Place Oxford Street, London, W.I. 33 33

Great Possibilities for TECHNICALLY QUALIFIED ENGINEERS

Key Men in War-Time and Afterwards

THE finest posts and the great majority of posts in Great Britain in this war are technical. The same will be the case when the war is over. The vast increase in mechanisation now heing applied to war purposes will then he suitably utilised in reconstruction, and in trade and commerce. Take a reconstruction, and in trade Students have gained 35 FIRST PLACES in the A.M.Inst.C.E., A.M.I.E.E., A.M.I.Mech.E., A.F.R.A.E.S., etc., examinations. Write today for "The Engineeris Guide to Success," containing the world's widest choice of engineering Course—over 200—covering all branches : Electrical. Aeronautical. Mechanical. Wireless. etc. **THE TECHNOLOGICAL INSTITUTE OF GT. BRITAIN**. 35 Tampie Bar House London E.C.4 77

35, Temple Bar House, London, E.C.4

INTENSIVE COURSES FOR THE WIGHER National Certificate in Mechanical And Electrical Engineering

It is proposed under the Intensive Training Scheme (Engineering) to conduct full-time intensive courses of six months' duration for the award of Higher National Certificates in Mechanical Engineering at the Technical College. Gamble Institute. St. Helens, at which there will be accommodation for 20 students, and in Electrical Engi-neering at the Royal Technical College, Salford, at which there will be accommodation for 24 students. The courses, which will both commence on the 9th April next, will be open to engineering apprentices and others, whose firms wish them to attend and who have reached the standard of the Ordinary National Certificate in Mechanical or Electrical Engineering, or an equivalent standard.

Application forms, together with full details of the courses, maintenance allowances, etc., may be obtained from the Principal, The Technical College, Gamble Insti-tute, St. Helens, or from the Principal, Royal Technical College, Salford, according to the course which it is wished to pursue to pursue.

COMPANY MEETING

ENGLISH ELECTRIC COMPANY

Dividend of 10 per cent

THE Twenty-sixth Annual General Meeting of The English Electric Company Limited was held in London on the 1st March, 1945

Sir'George H. Nelson, M.I.Mech.E., M.I.E.E. (Chairman and Managing Director), in the course of his speech, said :

and Managing Director), in the course of his speech, said : There has been no change in our Share Capital, and our Debenture Debt has been reduced by the application of the Sinking Fund, in accordance with the Trust Deed. Our creditors have increased by £2,256,000, which was largely offset by an increase in work-in-progress and stocks items, which, of course, directly reflect the volume of contracts in hand. Our net liquid assets now stand at over £3,000,000. Your Board has proposed the allocation of a further £100,000 to the General Reserve. bringing it up to £1,000,000. Turning to the assets side, there is an increase in the written-down value of our land and build ings, and a slight decrease in plant and machinery. The profit carried to the balance sheet was £434,984, and after providing for the Preference and Ordinary Dividends, plus £100,000 for General Reserve, we carry forward £37,870, which is £25,239 greater than the amount brought in.

Staffs and workpeople generally throughout the country have received bonuses to meet the increased cost of living, and therefore we would have liked to have been able slightly to increase our dividends so that stockholders who may be completely dependent for their sustenance on dividends from hard-earned savings invested in our com-pany could have received an additional payment to meet increased cost of living, but owing to taxation there is no surplus available to make such additional payments.

Some Outstanding Achievements

Some Outstanding Achievements The company's war activities have been spread over a tremendous range, and they have directly contributed to the success of our Forces in the field, in the air, and on and under the sea. Further, the performance of the Typhoon and Tempest aircraft had been made possible by the Sabre engines manufactured by D. Napier & Son Limited. The greatest tribute is due to every member of the English Electric and Napier organisations for what they have achieved. Your company has manufactured, since E.P.T. was introduced, more than £60,000,000 worth of apparatus over and above its normal turnover of its established products, and for this immense extra effort if yill receive no reward other than a post-war credit, sub-ject to income tax, of approximately one and a half per cent, on the extra turnover. cent. on the extra turnover

With regard to the future, orders for our normal products are reaching us in satisfactory volume, and we are taking steps to play our proper part in the export trade, in which we have always been prominent.

The Report and Accounts were adopted, and a Dividend of 10% was declared on the Ordinary Stock. 1551

-Immediate Deliveries

"Triumph" Fuses are in for Switchboard and Busbar Mounting, in all ratings from 5 amps, 250 volts to 350 amps, 5 amps. 500 volts.

Prompt deliveries of all types of Distribution Boards, including

The only Rewirable H.O. Fuse incorporating both pressure self-aligning contacts and vented explosion chamber in base.



Sole Patentees and Manufacturers The Castle Fuse & Engineering Co. Limited Castle Works, 31,35 Chester Street, Liverpool 8 Phone [Royal 1610. Grams : " Corundum, Liverpool '

ELECTRICAL REVIEW

(Supplement) 79





The 50-range Model 7 Universal AvoMeter.

The world-wide use of "AVO" Instruments is striking testimony to their outstanding versatility, precision and reliability, In every sphere of elec-trical test work they are appreciated for their

dependable accuracy, which is often used as a standard by which other instruments are judged. There is an "AVO" instrument for every essential electrical test.

Orders can now only be accepted which bear a Government Contract Number and Priority Rating.

Sole Proprietors and Manufacturers :

AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD., Winder House, Douglas Street, London, S.W.1. Phone : Victoria 3404-8.



E Iforthe A the star C'S Lal ACT. ate. they a s had and bee Bathney. D.

manistery. The s SAM, Sid, and finity Devidences r carry forward fon the amount e have ben se payment to me

een sprend over a rity contrabulat to in the air, and a a made possible " D. Napier & se M LITER MEN bas 260.000.000 war wal taxaana d I

= 11 1 1 our sound parts port trade, a vi

ted, and a Divident Stock. LE.



TH & LAS The state and a line

ELECTRICAL REVIEW

Index to Advertisers

	PAG
Aidas Electric Ltd	66
Airscrew Co. Ltd.	- 59
Astor Boisselier & Lawrence Ltd.	60
Automatic Coil Winder & Elecl. Equipment Co. Ltd.	. 79
Bahcock & Wilcox Ltd	4
Banner Electric Co. Ltd	8.
Barns, W., & Son	5.
Belling & Co. Ltd	1:
Black & Decker Ltd	29
Braithwaite & Co. Engineers Ltd	
Brandon Electrical Eng. Co. (Leeds) Ltd	- 20
Bray Geo & Co Itd	62
British Electric Transformer Co. Ltd.	- 39
British Mica Co. Ltd	64
British Power Transformer Co. Ltd	3.
British Thomson-Houston Co. Ltd 5	& 61
Dittish Vacuum Cleaner & Engineering Co. Ltd	6
Purgess Products Co. Ltd	51
Burgess Floudets Co. Etd.	6
Burt, Boulton & Haywood Ltd	0.
Cable Makers' Association	2
Canning, W., & Co, Ltd	24
Castle Fuse & Engineering Co. Ltd	71
Chamberlain & Hookham Ltd	70
Churchouse, C. M., Ltd.	- 38
City Electrical Co.	81
Connolly's (Blackley) Ltd	6
Constructors Ltd	54
Corrugated Packing & Sheet Metal Co. Ltd	41
Craig & Derricott I td	50
Critchlay Pros. I td	3
Crompton Parkinson Ltd. 2	8 4
Cronsland D & A G	2
Crossiand, K. & A. G	2
Cryselco Ltd	21
Dalyte Electrical Co. Ltd.	8
Davidson & Co. Ltd	1
Davis & Timmins Ltd.	84
Desoutter Bros. Ltd.	3

IA	GE
Donovan Electrical Co. Ltd	84 61
Dryden, Thomas, & Sons Ltd.	84 67
Edicar Swar Electric Co. Ltd	35
Electric Construction Co. Ltd	22
Electrical & General Accessories (Leicester) Ltd	80 63
E. & M. Developments Ltd	60
Everett, Edgcumbe & Co. Ltd	44
Ferranti Ltd	23
General Electric Co. Ltd.	53
Gent & Co. Ltd	32
Glenfield & Kennedy LtdCover	1V 20
Grelco Ltd	62
Heatrae Ltd	1
Hellermann Electric Ltd	52
Higgs Motors Ltd	15
Hopkinsons Ltd	iii
Igranic Electric Co. LtdCover	r ii
Insuloid Manufacturing Co. Ltd.	69
Johnson Dichard & Nenhew I td	65
Jones, Samuel, & Co. Ltd.	82
Laurence, Scott & Electromotors Ltd	.46
Litholite Insulators & St. Albans Mouldings Ltd	30 79
Liverpool Electric Cable Co. Ltd	4
London Electrical Co. (Blackfriars) Ltd	18
Macpherson, Donald, & Co. Ltd Matthews & Yates Ltd	52 80
(Continued on page 82)	



CONDUIT FITTINGS 170 treosster at TAKEN OVER Accessones GENERAL electrical UFACTURE AN EXTENSIVE OF SCREWED FITTINGS. FOR CATALOGUE NOW (DER) ARTLEY & BALDWIN LTD. ARBAL HOUSE 7 NEWHALL ST., BIRMINGHAM 3

WHOLESALE ONLY

1650



How many Man-hours do you waste on Loading and Handling?

The Parker Portable Belt Loader is ideal for handling such loose materials as Coal, Coke, Sand, Steel Turnings, Scrap, etc. Belt widths from 16" to 24". Discharge height (fixed) from 9' 6" to 24'. Also with adjustable head for altering discharge height as required.

VGS

NOW

NLTD.

SHAME

Y-

Parker Portable Horizontal Conveyors, Fixed Conveyors (Horizontal and Inclined), and Sectional Ground Conveyors.

FREDERICK PARKER LIMITED Extension 19, Viaduct Works, Catherine Street LEICESTER

'Phone : Leicester 61273 (4 lines). Landon Office : (Ext. 19) Talbot House, Arundel St., Strand, W.C.2 'Phone 4239 Arunde 2739 Temple Bar Even in normal times manual loading and stacking of loose materials was a waste of time and money. To-day, it is a serious loss of valuable man-power. The days when time and labour can be thrown away will not return. Many firms in numerous industries have found in the Parker Portable Belt Loader a permanent asset with which they would not willingly dispense.

Proved Performance Pays!



(Continued from page 80)		
McGregor, Robert, & Co		PAGE 64
M.C.L. & Repetition Ltd.		. 1
Metropolitan-Vickers Electrical Co. Ltd.	6	& 51
Metway Electrical Industries Ltd.		. 38
Ministry of Fuel & Power.		. 55
M.K. Electric Ltd		. 57
Nalder Bros. & Thompson Ltd		. 21
Non-Ferrous Die Casting Co. Ltd.		26
Normand Electrical Co. Ltd	• • •	. 40
Ormond Engineering Co. Ltd	• • •	. 63
Parker, Frederick, Ltd.		. 81
Parsons, C. A., & Co. Ltd		. 25
P. & B. Engineering Co. Ltd		. 69
Premier Electric Heaters Ltd.		. 16
Pultra Ltd	• • •	. 57
Record Electrical Co. Ltd.	•••	. 69
Revrolle, A , & Co. Ltd.		. 3
Riley, Robert, Ltd.		. 56
Rotherham & Sons Ltd.		48
Sanbra Ltd.		. 64
Scholes, Wm., & Co. (Wednesbury) Ltd		. 27
Scott, Hugh J., & Co. (Bel'ast) Ltd.		. 54
S. & D. Rivet Co		65
Sheffield Smelting Co. Ltd.		. 79
Siemens Brothers & Co. Ltd.		. 9
Sims, F. D., Ltd.		62
Standard Telephones & Cables Ltd		. 37
Stone, W. H., & Co. (Cardiff) Ltd		. 30
Sturdy Electric Co. Ltd.		. 56
Sutcliffe Speakman & Co. Ltd	• • •	50
Thew, Edward H., Ltd		. 84
Tube Products Ltd		. 41
Varley Magnet Co		. 79
Ward & Goldstone Ltd		. 43
Wardle Engineering Co. Ltd	Cov	er iii
Welwyn Electrical Laboratories Ltd		. 58
Westminster Engineering Co. Ltd.		. 1
Wilcox, Edward, & Co. Ltd.	• • •	. 62
Wilmot-Breeden Ltd		. 48
Young Accumulator Co. Ltd		. 26
Zenith Electric Co. Ltd		. 83

Index to Advertisers





Muich 9, 1945

- ia 44 Les prob AB MORE

Tester

and services. 10:0

876 60. 172

- - Hera 121

NOVEL ISLA

ELECTRICAL REVIEW

(Supplement) 83



SWITCH AND FUSEGEAR

Designed to suit all situations and incorporating Aeroflex high · breaking capacity, rewirable cartridge fuses

PARMITER, HOPE & SUGDEN LTD.

Fluvent Electrical Works Longsight, Manchester 12





GREGO

Improved Type

CERAMIC EMBEDDED RESISTORS

of the highest quality, complying with all Government Specifications

> Please allow us to send you a copy of our descriptive catalogue

THE ZENITH ELECTRIC CO. LTD.

Zenith Works, Villiers Road Willesden Green, London, N.W.Z

Phone : Williesden 4087-8-9 Grams : "Voltaohm, Phone, London "

84 (Supplement)

ELECTRICAL REVIEW

March 9, 1943



Prioted in Great Britain at THE CHAPEL RIVER PRESS, Andover, Hants, and published by ELECTRICAL REVIEW, LIMITED, at Dorset House, Stamford Street, London, S.E.1.



Totally Enclosed Motors

All sizes ½ to 10 h.p. available
 No larger than protected type
 Supersede all fan-cooled types

LONDON: Palmers Green 5428 MANCHESTER: Didsbury 4709 BRISTOL: 25916 NEWCASTLE: 28617

WARDLE

BIRMINGHAM: Central 7909 STOKE-ON-TRENT: 29624

HORIZONTAL OR VERTICAL MOUNTING FOR LARGE BSS CONDUIT BOX.

ADJUSTABLE MA

MACHINE TOOL LIGHTING FITTINGS

on Machine Tools and Assembly Benches.

Price List L587 on application

WARDLE ENGINEERING CO. LTD. OLD TRAFFORD, MANCHESTER 16 LONDON 34 VICTORIA STREET, SW.I ш

THE GLENFIELD SELF-CLEANING ROTARY WATER STRAINER

XLITECHIMINI

RCAL

REVIEW

River or other water used for process purposes in Mills, Works, etc., can be most economically and thoroughly cleaned with the Peebles Patent Rotary Water Strainer, which can be supplied to deal with any quantity of water, the mesh of the gauze being determined by the impurities in the water.

The screen is always interposed in the stream, and is constantly and automatically cleaned, thus eliminating the tedious and constant manual cleaning necessary with screening frames or dual filters.

These machines are driven through suitable gearing by a water motor working at a pressure of only 7 to 10 lb. per square inch, but electric drive can be substituted if preferred.

A fully descriptive booklet will be sent post free on demand.



Head Office & Works : KILMARNOCK, SCOTLAND

Full particulars will gladly be sent on request