

THE

ELECTRICIAN

Vol. CXXXIV. No. 3487.

Friday, March 30, 1945.

Sixpence

[Registered at the General Post Office. Entered as Second Class at the New York U.S.A. Post Office.]

UNCRUSHABLE CABLE JOINT BOX FOR COLLIERY INSTALLATIONS

*Strength
and Utility!*



Callender PRESSURE
non-dissipating
For Compound, Blum...

Callender

MINING TYPE
STRAIGHT JOINT
BOX



UNCRUSHABLE
Made of Pressed Steel

Full particulars in our new
PUBLICATION NO. 139

CALLENDER'S CABLE & CONSTRUCTION CO. LTD., HAMILTON HOUSE, VICTORIA EMBANKMENT, LONDON, E.C.4

All over the World.



FLUORESCENT LAMP

5 ft. 80 watt

The brilliant daylight effect of OSRAM Fluorescent lamps has done much to maintain and increase production in the war factories. There are situations, however, where a light of warmer tone than the existing "Daylight colour" is desired. *For these situations the "Warm-white" Fluorescent Lamp has been introduced.* With the exception of the change in colour, all other characteristics remain the same.

Low Surface Brightness reduces direct or reflected glare

Large area source means soft shadows

High efficiency means economy in current consumption

Cool Burning reduces discomfort due to heat

Quick starting, full light obtained almost instantaneously

Suitable for existing installations

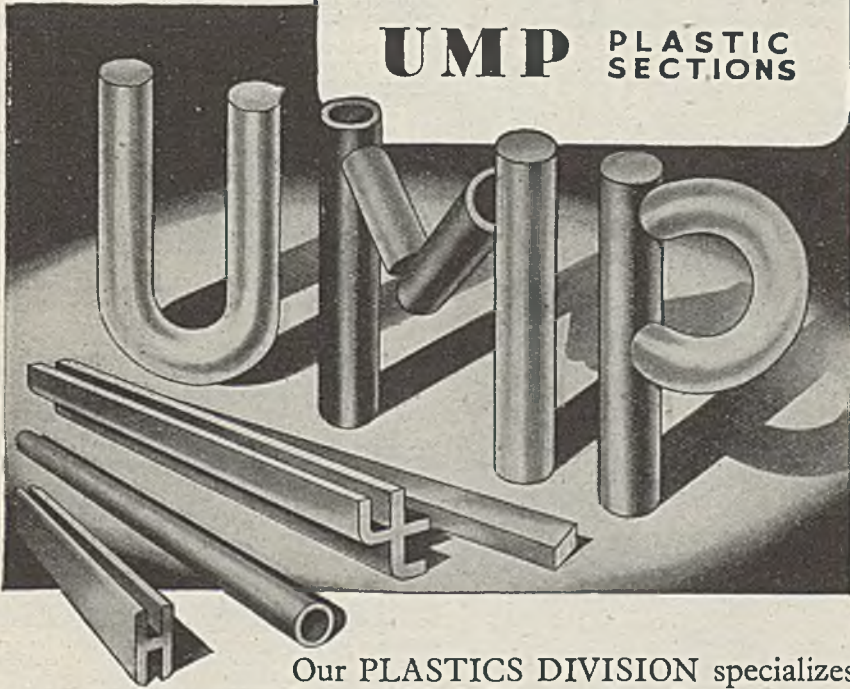
G.E.C. Research and skilled manufacture have thus made available pleasing alternatives for almost any industrial need—and opened up a vista of unlimited promise for attractive and efficient lighting in other directions after the war. An extensive range of G.E.C. Industrial fittings is available.

**CONSULT THE G.E.C. ON FLUORESCENT LIGHTING
AND ALL FORMS OF ILLUMINATION**

UMP PLASTIC
TUBING

UMP PLASTIC
SLEEVINGS

UMP PLASTIC
SECTIONS



Our PLASTICS DIVISION specializes in moulded Plastics by Compression, Transfer and Injection methods, and in plastic Extrusions of all types.

U.M.P. SERVICE includes expert advice by our technical staff on your particular problems. Why not write or 'phone to enable us to assist you?

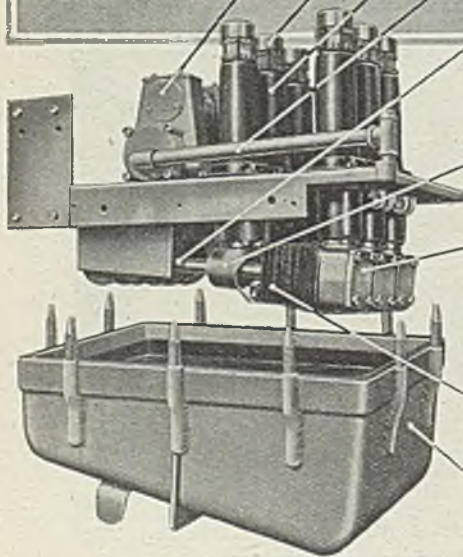
UNIVERSAL METAL PRODUCTS LTD

PLASTICS DIVISION

SALFORD · LANC'S · TELEPHONE PENDLETON 1631-23

Advantages which merit the
attention of Engineers!

The
TYPE D.4.
**OIL CIRCUIT
BREAKER**



LOW OIL CONTENT

Requires a total quantity of 7 gallons of oil only.

BREAKER MECHANISM

High-speed, trip free mechanism to give rapid opening and full closure under fault conditions. Safety buffers allow test operations with tank removed.

ISOLATING CONTACTS

Multi-segment, tulip type, self-aligning high-pressure line contacts for quick maintenance.

PORCELAIN BUSHINGS

High-grade porcelain insulators throughout range

VENTING

Arranged to relieve breaker of exhaust gases and return ejected oil to circuit breaker tank.

MOVING CONTACTS

Circular section copper rods incorporated into a rigid and positively-spaced carriage the whole running in accurate guides ensuring correct alignment.

SLIDING CONTACTS

Multi-point spring loaded contact, immune from burning, pitting and seizing. Maintenance negligible.

ARCING & MAIN CONTACTS

Multi-segment, tulip type, self-aligning, high-initial pressure line contacts ensuring minimum contact burning on load and short circuit operation. Contact replacement effected without removing arc control device.

ARC CONTROL DEVICE

Positive arc extinction by compensated cross jet pot giving consistent operation with short arc durations over entire range.

O.C.B. TANK

Heavy fabricated steel construction. Fitted with arc-resisting phase barriers and tank lining. Hydraulically tested.

UP TO 350 M.V.A. 11 kV

ASTA CERTIFICATED UP TO 250 M.V.A. 6.6 AND 11 kV

COOKE & FERGUSON

ELECTRICAL DIVISION

LIMITED

VICTORIA STREET
MANCHESTER 11



40-41 CRAVEN HOUSE
KINGSWAY, W.C.2

B.I. SUPPORTING, TERMINATING AND COLLECTOR *Equipment*

FOR CRANES & CONVEYORS

The current collector equipment for the 2 ton Travelling Electric Hoist shown in the illustration, was designed and installed by B.I.

The equipment comprises three miniature current collectors of the swivel base and insulated swivel head type. Renewable carbon inserts are incorporated and the slippers are centrally pivoted at contact wire level.

B.I. grooved contact wires are supported by porcelain insulators and mechanical ears, giving a non-fouling run-through for the carbon inserts.

Extensive experience in the design, manufacture and installation of all types of Power and Traction Equipment, has given B.I. an unrivalled position in this field of electrical development.

B.I. Advisory Service is available to give expert advice on any projected installation.



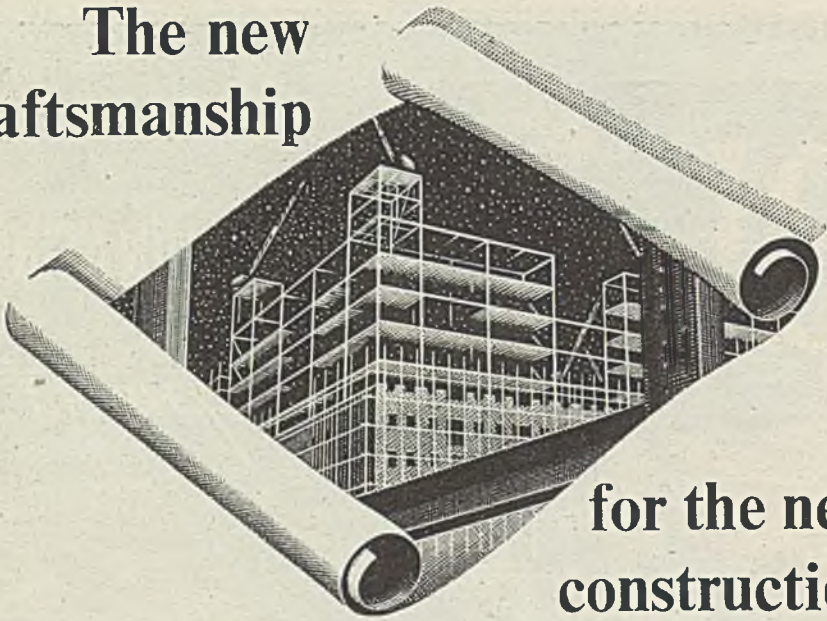
Write
for Catalogue

BRITISH INSULATED CABLES LTD.,

Head Office · PRESCOT LANC'S · ENGLAND

Telephone · PRESCOT 6571

The new craftsmanship

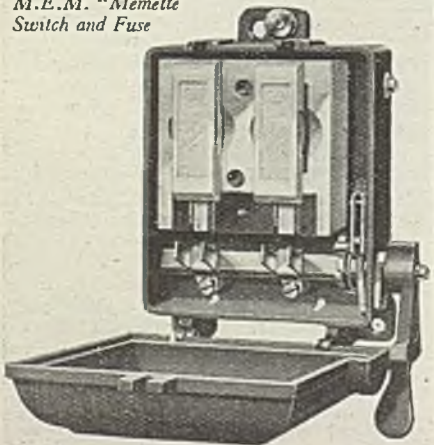


for the new construction

The post-war demand that the building industry and its suppliers will have to face will be for quality in quantities. Only the New Craftsmanship of mass production can

provide it. M.E.M. have demonstrated, in the manufacture of Switch and Fuse Gear, how the scientifically organised large-scale production of standardised designs can combine quality, quantity and low prices. With an entirely self-contained factory, organised and equipped along the most efficient lines, M.E.M. will be ready to meet all post-war demands in Switchgear, Fusegear, Motor Starters, and Electric Fires.

M.E.M. "Memette"
Switch and Fuse



SWITCHGEAR

MOTOR STARTERS • FUSEGEAR

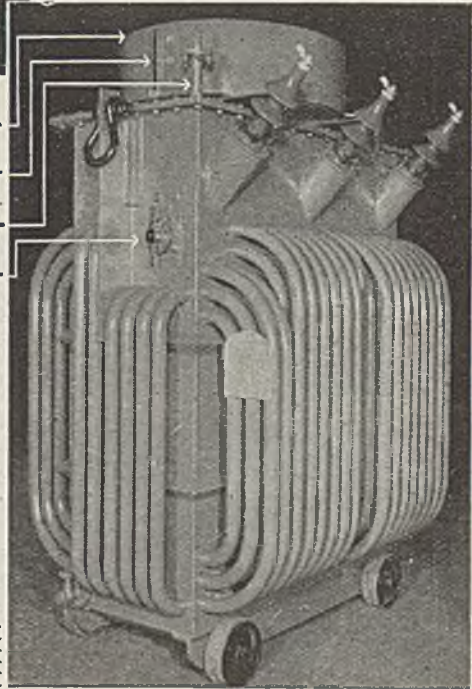
ELECTRIC FIRES

The LINDLEY THOMPSON TRANSFORMER & SERVICE CO., LTD.

Hermetically Sealed
THOMPSON RELIEF CHAMBER (PATENTED)

- Diaphragm and Cover _____
- Temperature Calibration _____
- Filling Pipe _____
- Off Load Tapping Switch _____

NO MOISTURE
 NO SLUDGING
 OF OIL
 NO SERVICE
 COSTS



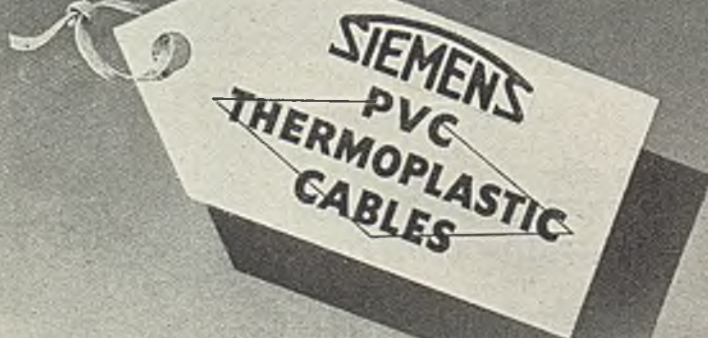
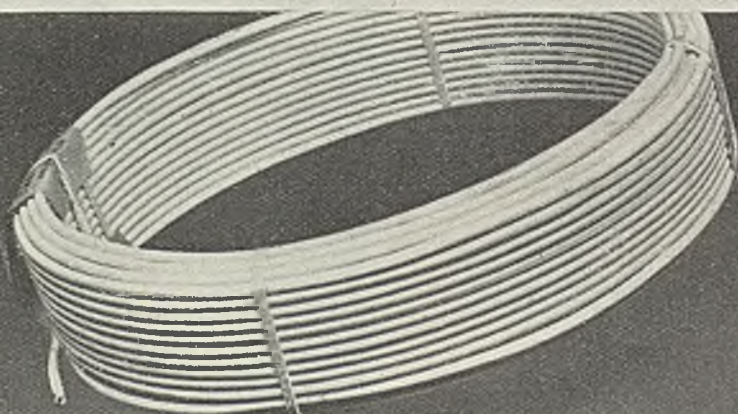
600 KVA 3ϕ 50 ~ 11000/400 Volts.
 PART OF A GOVERNMENT CONTRACT
 FOR INDIA

Designed to give
TROUBLE-FREE SERVICE under
DAMP and HUMID CONDITIONS.

This type of unit is operating perfectly in
**INDIA, EAST & WEST AFRICA,
 MALAYA, EAST INDIA, ETC.**

**APPLY FOR BROCHURE TO:-
 ST. MARY'S ROAD, MIDDLE GREEN, SLOUGH, BUCKS.
 Telephone. LANGLEY (BUCKS) 200/201**

Still a **VITAL NEED**
SAVE RUBBER



Manufactured by **SIEMENS**
therefore of the highest quality.

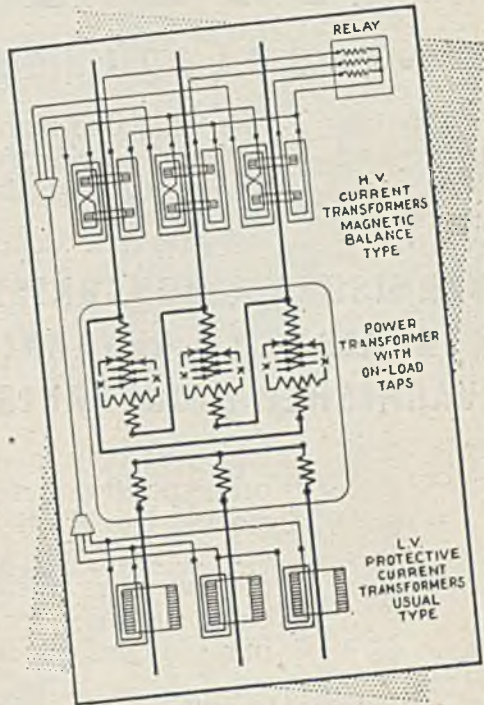


PROTECTIVE GEAR

MAGNETIC BALANCE SYSTEM FOR POWER TRANSFORMERS

- Sensitive protection against inter-phase, inter-turn and inter-tap faults in addition to circuit faults to earth.
- Inherent stability against unbalance due to ON-LOAD tap-changing.
- Performance unimpaired by wide ratio of power transformer or small H.V. current.
- Bar primary type current transformers.
- Relays of simple and robust construction—induction type.

Extendible to "Transformer-feeders" with ON-LOAD tap-changing.



The BTH Company manufactures a complete range of Protective Gear for all essential points of an A.C. System.

BTH

WILLESDEN

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED, WILLESDEN, ENGLAND.

A 2750



A.I.D. APPROVAL, Part I

VIDAFLEX

INSULATING SLEEVINGS

We are large manufacturers of all types of sleeving, from raw material to finished product.

VIDAFLEX PRODUCTS include—

VARNISHED & UNVARNISHED COTTON SLEEVING
VARNISHED & UNVARNISHED SILK SLEEVING
VARNISHED & UNVARNISHED GLASS SLEEVING

which comply to Air Ministry and other specifications. Deliveries from stock. Our Technical Department can assist you with the design of new types of sleeving for particular purposes, or on the use of our standard product.

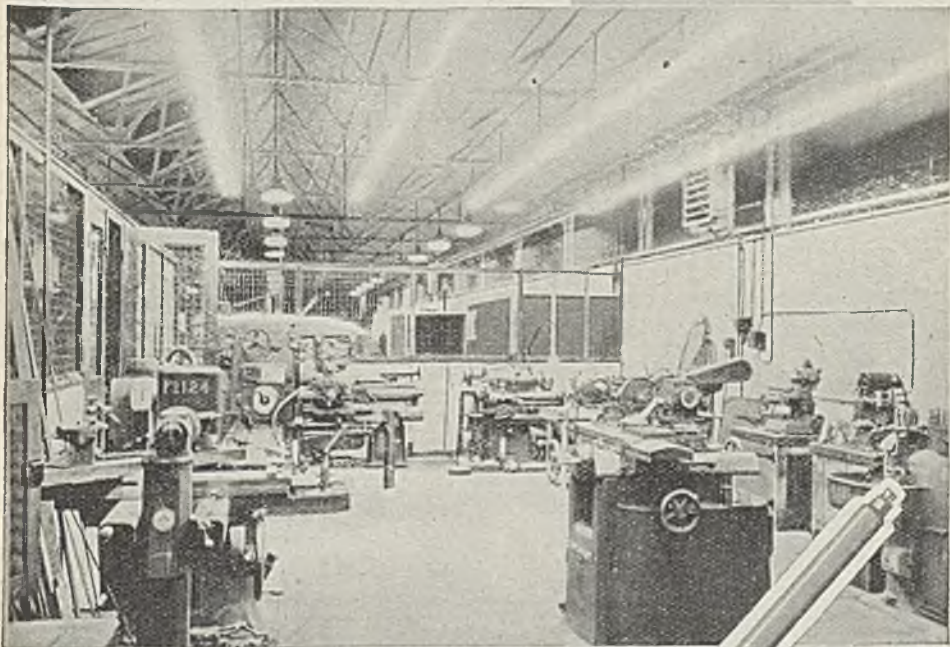
LONDON REPRESENTATIVE
NORMAN & CO.,
55 Downs Road,
Coulson, Surrey
Telephone: Downland 225

BIRMINGHAM REPRESENTATIVE
F. G. GRIMES,
Coleridge Chambers,
177 Corporation St., Birmingham
Telephone: Central 3889

Price list and samples available on request.

JONES STROUD & Co., Ltd., VIDA MILLS, LONG EATON, NOTTINGHAM

Telephone: LONG EATON 404/6



*'Fine' work
demands
Fine lighting*

∴

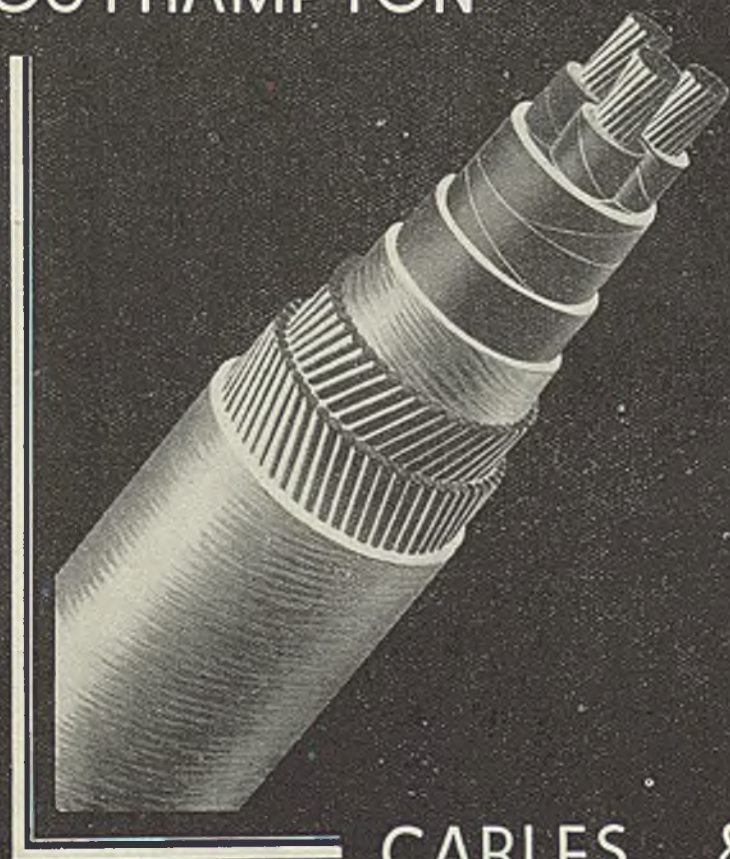


Metrovick Fluorescent & **COSMOS LAMPS**

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.
NUMBER ONE KINGSWAY, LONDON, W.C.2

PIRELLI-GENERAL

SOUTHAMPTON



CABLES &
ACCESSORIES



VERSATILITY

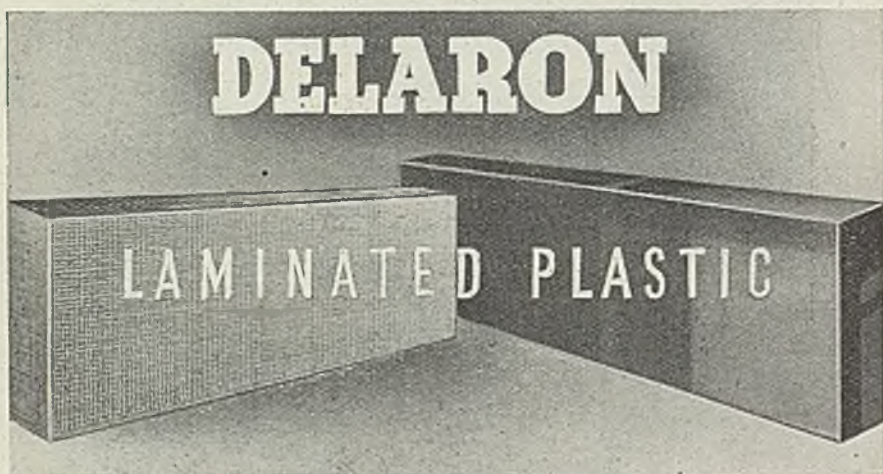
For nearly 20 years Westinghouse Metal Rectifiers have been called upon to perform a great variety of duties, ranging from small instrument work to high voltage for electrostatic precipitation or heavy current for electrodeposition.

The illustration shows a typical installation of an automatic magnetic plating plant where metal rectifiers are used for three different functions—(1) D.C. current to the vat, (2) current for the rotating magnet to hold the work, and (3) D.C. supply for the variable speed motor rotating the magnet

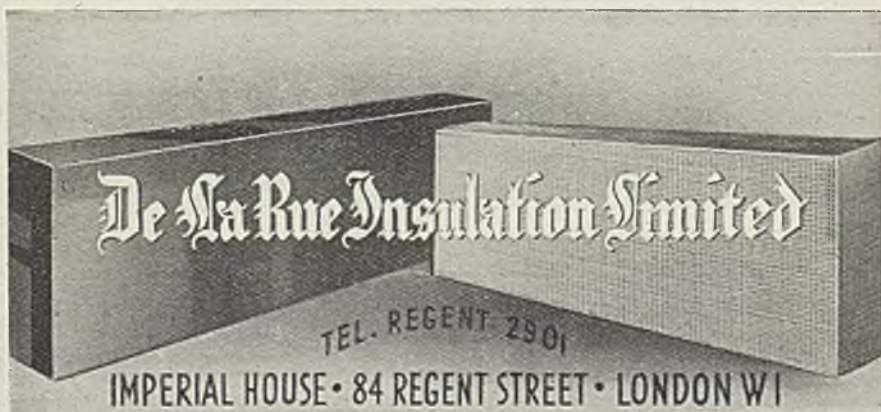


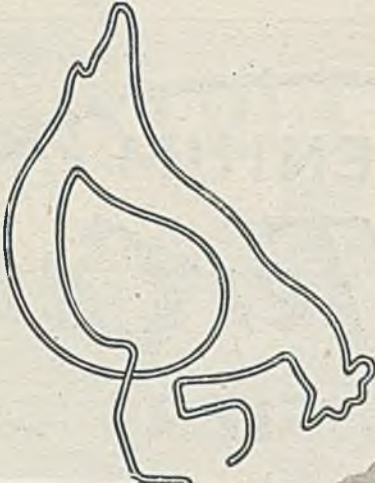
METAL RECTIFIERS

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., PEW HILL HOUSE, CHIPPENHAM, WILTS



DELARON Laminated Plastic Sheets and Boards are available in Fabric and Paper Base to British Standards and Government Specifications in a wide range of thicknesses from .010 in. upwards suitable for electrical insulation, cold punching and machining. Freely at your disposal are the services of our Technical and Development Department in determining the effective application of **DELARON** to your needs. Fullest details, samples and prices will gladly be sent on request.





CROMPTON
V. I. R. CABLE



ALWAYS COMES UP TO SCRATCH



CROMPTON PARKINSON LIMITED, ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2
Telephone : TEMple Bar 5911

Telegrams : Crompark, Estrand, London

SELENIUM
SenTerCel
RECTIFIERS

WHEN we were the only manufacturers of Selenium Rectifiers in this country there was no need to give a special name to our product.

The many advantages of the "Standard" Selenium Rectifier over other types has inevitably introduced competition, and we have therefore adopted the name of "SenTerCel" as our trade mark, so that our customers may know that rectifiers bearing this name will have the high standard of performance to which they have become accustomed.

The name "SenTerCel" combines the idea of centre-contact construction, which is an exclusive feature of our rectifiers, with the S.T.C. registered trade mark which is known all over the world as the symbol of the highest quality in tele-communication equipment.

Standard Telephones and Cables Limited

Oakleigh Road, New Southgate, London, N.11

Telephone : Enterprise 1234

UNIT CONSTRUCTION



**UNIT-TYPE
METALGLAD DISTRIBUTION-GEAR**

Simple to erect and extend

REYROLLE

HEBBURN-ON-TYNE

ENGLAND

MANUFACTURERS' SUPPLIES SECTION

MICA AND MICANITE SHEETS, in Moulding, Com-mutator, Flexible and Heater qualities, Pure Mica Tubes, Washers, Shapes, etc. Micafolium, Mica Paper, Mica Cloth, Slot Insulation, etc. Pure Mica cut to size and calibrated.

ALL SPECIAL MACHINE WORK IN MICA AND MICANITE.

Actual Manufacturers for over 25 years
H. CLARKE & CO. (Manchester) LTD.

Atlas Works, Patrloroft, Manchester

Telephones: Eccles 2001-2-3-4-5.

1,000 ELECTRIC MOTORS DYNAMOS IN STOCK

REPAIRS, REWINDING RECONDITIONING and TESTING

DYNAMO & MOTOR REPAIRS LTD.

Wembley Park Works WEMBLEY Telephone: WEMBLEY 3121/2

INSULATING MATERIALS INCLUDING BAKELITE SHEETS, RODS, TUBES, AND WASHERS . . .

All special Machine Parts quoted for. Large stocks held of Fibre, Leatheroid, Press-pahn, Insulating Cloth and Tapes, Black Adhesive Tape, etc.

Actual Manufacturers for over 25 years.
H. CLARKE & CO. (Manchester) LTD.

Atlas Works, Patrloroft, Manchester

Telephones: Eccles 2001-2-3-4-5.

DAVIS & TIMMINS LTD

Head Office, BILLET ROAD WALTHAMSTOW, LONDON E.17

Manufacturers of

SCREWS, BOLTS, NUTS,

& all forms of small Screw Machine products

Established in 1876.

H. MASSIL & SONS (Woodturners), LTD.

invite enquiries for

REPETITION WOODTURNING

for Air Ministry, Ministry of Supply and Admiralty Contracts.

37, PITFIELD ST., LONDON, N.1

Phone: CLErkenwell 2894 (2 lines)

Litholite
40 Years of
Plastic Moulding

LITHOLITE INSULATORS & ST. ALBANS MOULDINGS LTD.
WATFORD
PHCF.E: WATFCRO 4494

Rototherm
FOR ACCURATE TEMPERATURE MEASUREMENT AND CONTROL

SWITZER ROTO THERM CO. HEYDON ABBEY LONDON S.W.15

CHAINS

WELDED RINGS, HOOKS, etc.

A. J. PRATT & SONS, LTD.
9, Woodbridge St., Clerkenwell, E.C.1

PRESSPAHN, LTD.

Manufacturers of Insulating Materials of all kinds.

38, WELL STREET, BRADFORD

Phone: Bradford 5050.
Grams & Cables: "Presspahn, Bradford"

Soldering - then **ELCO**

ELCO design and build soldering irons, machines, melting pots, and special furnaces for all soldering needs to suit any voltage from 24 v. up. Illustrated are four interchangeable units. There are many others.

Write for leaflet to Sole Agent -

ELCO U.K. & FOREIGN PATENTS

ELCORDIA LTD.
2, CAXTON STREET, LONDON SW1

Let ELCO Solve Soldering Problems

STREAMLINE
TINQUICK
UNIVERSAL
HATCHET

TEL: ABBEY 4266 (LONDON)

MISCELLANEOUS ADVERTISEMENTS

SITUATIONS VACANT

TECHNICAL Electrical Engineer Manager, able to design Electric Motors for Refrigerators and Cleaners. Must have knowledge of mass production and be able to lay out plant. Only those having good experience will be considered. Glasgow district.—Address, "2232" Wm. Porteous and Co., Ltd.

THE UNIVERSITY OF SHEFFIELD.

LECTURER IN ELECTRICAL ENGINEERING.

The Council invite applications for appointment as Lecturer in Electrical Engineering. Qualifications in light-current engineering, particularly electronics, will be a recommendation. Salary £370 per annum with war-time marriage and children allowance. Further particulars may be obtained from the undersigned, with whom applications should be lodged by April 30th.

A. W. CHAPMAN,
Registrar.

SHIFT ENGINEERS.

SHIFT ENGINEERS wanted for Power Station. Permanent position. Salary in accordance with Grade 8 Class F of N.J.B. Schedule.—Reply, giving age and technical training and experience, to West Gloucestershire Power Co., Ltd., 126, London Road, Gloucester, enclosing envelope "Shift Engineer."

FOR SALE

LAMP Lowering and Suspension Gear, T.R.S. lead and other Cables, Winches (hand), hundreds of thousands in use, Searchlights (sale or hire), Carbon rods, Ebonite, Fibre Hightensite, Porcelain House-wiring and other Cleats, Beels and Knobs, Mirrors, Lenses, etc.—London Electric Firm, Croydon.

B.A. NUTS, SCREWS, WASHERS, ETC. In brass and steel. Immediate delivery. Enquiries welcomed. Clerkenwell Screws, 109, Clerkenwell Road, London, E.C.1. Holborn 6504.

PATENT AGENTS

KINGS PATENT AGENCY, LTD., B. T. King, A.I.Mech.E. (Patent Agent), 146A, Queen Victoria Street, London, E.C.4. **ADVICE, Handbook, and Consultations free.** 'Phone: City 6161.

LONDEX PROCESS TIMERS

Synchronously driven, fitted with easily interchangeable gearing, giving ample variation on one model. Up to 20 circuits can be controlled, each circuit with different time characteristics.

Ask for leaflet 92B/EL.



Process Timer PR1XX

LONDEX LTD

MANUFACTURERS OF RELAYS

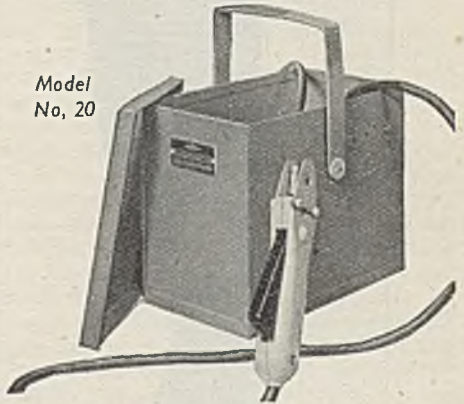
40, Abchurch Lane, London, E.C. 4, U.K. Telephone: 5-1-20



'FUZIT' JOINTERS

(Patents pending)

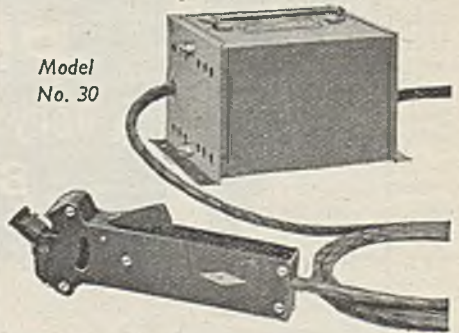
Model No. 20



The NEW Technique for Jointing Wires

No solder or flux is required, and dry joints are eliminated. Model 30 is suitable for jointing wires between 50 s.w.g. and 30 s.w.g., including nichrome. Model 20 and other types are available for jointing heavier wires. Full particulars sent upon request.

Model No. 30



Stanelco Products

PROPRIETORS: STANDARD TELEPHONES AND CABLES LIMITED

NORTHWOOD HILLS, NORTHWOOD, MIDDLESEX

Telephone: PINNER 4885

PHILIPS

it's a
PHILIPS
a very good lamp indeed
BUY THEM

MAKERS OF *GOOD LAMPS* FOR OVER 50 YEARS.

PHILIPS LAMPS LTD · CENTURY HOUSE · SHAFTESBURY AVE · W.C.2

THE ELECTRICIAN

Established 1861. The Oldest Weekly Illustrated Journal of

Electrical Engineering, Industry, Science and Finance

Bouverie House, 154, Fleet Street, London, E.C.4. Telegrams: "Benbrotric, Fleet, London.

Telephone: Central 3212 (Ten Lines).

Midlands Office: Daimler House, Paradise Street, Birmingham. Telephone: Midland 0784.

Glasgow Office: 116, Hope Street, Glasgow, C.2. Telephone: Central 3970.

The Offices of THE ELECTRICIAN are closed on Saturdays in accordance with the "Five-day Week" plan adopted by Benn Brothers, Ltd., and its associated publishing organisations. Until further notice the offices will be open between the hours of 9 a.m. and 5.30 p.m. from Monday to Friday.

No. 3487. [Vol. ^{No. 13} CXXXIV]

March 30, 1945

Annual Subscription 25s
Overseas 30s.

CHIEF CONTENTS OF THIS ISSUE

	Page
Time for Decision	273
Views on Current Affairs	274
Post-War Off-Peak Development ...	276
Export Market Research	277
News from Abroad	278
Electrical Personalities	279
Problem of Development Personnel	280
Electric Light Fittings	281
Electrical Facilities in Shoreditch	
Hutments	282
Colour Television	283
Equipment and Appliances	284
News in Brief	285
Book Reviews	286
Answers to Technical Questions;	
Coming Events	287
Other Electrical News of the Week	288-294

Time for Decision

MUCH of the potential expansion of the electrical industry is dependent upon an early return of house building, for though much can be done with respect to converting existing houses to the electrical idea and increasing the loads of houses partially electrical in their appointments, it is perhaps in the houses not yet built that the greatest opportunities present themselves.

The Government have already announced that the maximum target which they can properly adopt in relation to the labour and materials position, is one of 300 000 permanent houses built or building by the end of the second year after the end of hostilities in Europe; of which total it is anticipated that there would be about 220 000 completed at the end of the second year, and 80 000 in varying stages of erection. Accepting these figures on their face value, the industry will thus during the two years following the end of the German war, be presented with opportunities for develop-

ing the electric house, to an extent determined by the success or otherwise of the competition set up by the other fuel industries, and it is reasonable to ask what the industry is doing to overcome that resistance.

At the moment little more than preparation is possible, but even so, is the industry convinced that all attempts are being made to direct public opinion along the lines which will lead to success, and is everything possible being done to parry the blows which rival fuel interests are known to be preparing? Since the answers to these and similar questions which come to mind are beyond the scope of any one person, and there is no organisation which can rightly claim to speak for the industry as a whole, satisfaction on the points at issue thus becomes a matter of personal research, inquiry and investigation, with the following results.

The supply industry, or the foundation stone upon which electrical expansion in the housing field is based, appears to be widely divided in its views upon future policy, and has submitted to the Ministry of Fuel so many reports on the subject that the position has become confused. The installation section of the industry, the prosperity of which is dependent upon the supply section with respect to availability of electricity, is by no means unanimous concerning future practice and flexibility of wiring systems; while on the manufacturing side, the long debates on certain aspects of sockets and plugs seem far from reaching a conclusion. The subject matter which forms the basis for this diversity of views, is in all cases closely related to housing during the building stage, and has no bearing on the type or style of finish of the appliances to be used in the domestic



sphere. It is subject matter as important to the electrical side of housing as is the material of which the houses themselves are to be built, and if the industry is to be ready to launch its offensive against its competitors with weapons which are claimed to be an improvement on those used before the war, it is, we submit, time that decisions on their production were made.

The Plug and Socket Problem

IT will be generally agreed that electrical development will come about after the German war, whether the industry does anything outstanding to promote it or not. Whether the rate of that development will be satisfactory, however, will depend upon the efforts of the industry to counter the enthusiasm of rival fuel industries, and, as representing how present energies are being expended, the following is of interest. When the No. 11 report of the Post-War Building Studies was published, there were many who thought that more speedy action with regard to the future would be taken, but seemingly, opinion in support of the recommendations is not as unanimous as was hoped. Among the points about which disagreement seems to grow in volume, is the 3 kW plug and socket, for though the Study Committee favoured its adoption, the Code of Practice Committee, when presented with the recommendation, were less impressed. However, after lengthy discussions and wide ventilation of opinion, it is understood that the latter Committee have, by a small margin of agreement, at last adopted the recommendations of the Study Committee. Incidentally, those readers who are not as yet familiar with the framework upon which the plug and socket controversy has been built up will be interested to hear that Mr. R. AMBERTON, who has been an advocate of a new universal plug since the idea was first conceived, feels so strongly on the subject that he has produced a comprehensive "analysis" of the situation, which is worth reading.

Flat and Round Pin Plugs

COINCIDENT with the acceptance by the Code of Practice Committee of the recommendations of the No. 11 report with respect to the 3 kW plug, the flat-pin versus round-pin controversy

seems to have become intensified in some quarters, suggesting that with the conclusion of one argument on the subject of plugs, the industry is preparing itself for another. There may be much to say in favour of both round- and flat-pins, as was pointed out in these columns in January last year, but, we submit, the business of the installation trade, and those allied to it, should be to so prepare itself, that the demands which will be made upon it, will find the trade well armed with standard accessories and ready to serve the public with the quickest possible service. With so much indecision, first with respect to uprating the 5 A plug, fused sockets or fused plugs, 3 kW plugs, and now flat- or round-pin plugs, the manufacturers of those components are faced with a problem which unless solved at an early date may result in their stocks of whatever is decided upon being, if not inadequate when the demand comes, at any rate not as plentiful as the industry might wish.

The B.E.T.R.O.

THE suggestion in our last issue that some concentration of effort might lead to a wider expansion of our overseas trade, has found practical expression in the formation of a body to be known as the British Export Trade Research Organisation. The movement has behind it a number of influential electrical concerns and its aims and objects are outlined elsewhere in this issue. The central organisation is likely to need something like £50 000 a year for it to be effective, but it is expected that the overseas branches will be more or less self-supporting. On this basis, enrolment of 100 founder members should be enough to give it a fair start, and since small concerns, which might legitimately expect to limit themselves to the financial obligations of ordinary membership, have, it is thought, so much to gain, they are expected to enrol in substantial numbers in due course. The promoters of the scheme who have naturally explored the ground with care, are optimistic, and believe they will be able to fill the higher appointments at the central headquarters at a reasonably early date. The appointment of permanent overseas field staffs, will be dependent to some extent upon demobilisation, so, in the immediate future, and during the earlier stages of demobilisa-

tion, the gap will be filled by a temporary use of "flying squad" tactics, involving a pool of field investigators who will be sent to the particular markets which are judged to merit the highest priority. The fact that the scheme is sponsored by some of the largest exporting companies in the country, is evidence of the contribution which it may be expected to make to an expansion of demand for British goods.

Exports and Rising Coal Costs

ADDED interest to the formation of an export organisation is given by the remarks of Mr. H. N. SPORBORG, when speaking at the annual meeting of the B.T.H. Co., Ltd., last week, in that he insisted on the necessity for expanding export trade if all the plans for social improvement are to be fulfilled. Carrying the argument further, even the maintenance of our pre-war standard of living is dependent on larger sales abroad, and in face of rising costs and of the march of industrialisation in countries which were formerly our customers, how is that expansion to come about? The Chairman of the B.T.H. Co. speaks with practical experience of this subject and his studied declaration is that overseas purchasers have made it clear that, both as regards technical performance and price, our products must be competitive with those of foreign manufacturers. As to the technical side of competition, Mr. SPORBORG is quite confident of British ability, but he is less happy about prices in view, among other things, of the effect of the higher coal price in raising the cost of the raw materials.

Rural Electrification and Non-Stats.

WITH the problem of rural electrification so much in discussion, we note with some interest that the Chairman of the Welsh branch of the Association of Non-Statutory Electricity Suppliers and Distributors has communicated to the Secretary of the Merioneth branch of the National Farmers Union, an appeal for his support, and offering the union the benefit of the association's experience in bringing into material effect the supplying of light and power in rural areas. It is suggested by the Welsh branch of the Non-Stat. Association that each member of the N.F.U. should discuss details with his own M.P., and it draws attention to the fact that certain Non-Stat. mem-

bers are also farmers—supplying themselves and their neighbours with electricity. What results have attended these efforts to aid the farmer we have not yet heard, but the position is an interesting one, in view of the strong and favourable opinions on electrification already expressed by the N.F.U.

Preferential Treatment for Gas

IT is significant that of the nineteen Government factories already allocated for peace-time production two are to be used for the manufacture of gas stoves and one for gas appliances, while only one will be absorbed by the electrical industry for the production of appliances falling within the domestic sphere, namely, refrigerators. It would, we feel, have been better to have allocated in addition, two factories for the production of electric cookers, in that there is such a shortage of these appliances that some local authorities, who prefer electricity, have had to turn to the gas industry for their cooker supplies.

Board of Trade Please Note

THE Government has on other occasions displayed its liking for gas in preference to electricity, and one can only assume that the reason is to be found in the apparent inability of politicians to move with the times where engineering advancement is concerned. Some of our Ministers are more enlightened of course, but on the whole the remarks made by most of our Government representatives, on housing for instance, are suggestive of standards below the present possibilities. Sir STAFFORD CRIPPS, who was the guest of honour at the recent E.D.A. luncheon, has already confessed that he has become a convert to electricity and we look to him therefore, to make the rest of the Government more electricity conscious. As Minister of Aircraft Production, he has seen in our factories the vast use made of electricity, not only for power purposes, but for the very important domestic needs of factory canteens, and while his Ministry has on more than one occasion acknowledged the debt that it owes to the war-time services of the electrical industry, the Board of Trade on the other hand, does not yet seem to be aware of the importance of the industry in our economic structure, nor of the public outcry for its products. It is time that it did.

Post-War Off-Peak Development

By F. D. PARKER, A.M.I.E.E.

FOR reasons which will be obvious, connection of new loads, at any rate those likely to become an embarrassment during peak periods, will have to be more closely scrutinised in immediate post-war years. As the famine in generating capacity is likely to persist for some time, increased attention may have to be paid, and even special encouragement given, to the development of off-peak loads—not especially thermal storage space heating, involving long periods of restriction, but those applications including direct heating which by virtue of their nature and type can be subject to short periods of restriction. It is customary to think of off-peak supplies in terms of the larger type of consumer, but it may well be that the possibilities will have to be explored among all consumers.

Development of the orthodox type of thermal storage space heating installation in post-war years may be somewhat at a disadvantage in view of the increased cost of coal during the war, this being more directly reflected in the average tariff available for such purpose, as compared with the alternative direct heating installation.

In the domestic sphere there is less scope for cultivating off-peak loads; but it is in this field that the connection of a large hand-controlled space heating load of the portable radiator variety may prove especially dangerous unless reasonable safeguards are applied. So far as post-war building is concerned, there are unmistakable signs that the road to increased electrical progress will be by way of the cooking, washboiler, water heating and occasional space heating type of installation, the last two items being generally employed in the spring, summer and autumn as alternatives to coal fires. If such a policy matures, so far so good, but it is not difficult to visualise that the coal-electric conception may easily result in aggravating the peak difficulty and without any corresponding consumption to off-set it, such as is obtained from the all-electric alternative.

The Commercial Field

So far as off-peak development is concerned, it is perhaps in the commercial field that most scope is to be found. Firstly, there is the type of installation which, by virtue of its hours of usage, is almost off-peak, secondly, those installations the efficiency of which is not materially impaired by short periods of restriction. Then there is the third category—loads of the seasonal variety such as large-scale cooking, space and water heating at seaside resorts, etc., loads which may offer much scope for

development when reconstruction gets under way. The use of electricity for space and water heating purposes in licensed premises from an off-peak viewpoint offers perhaps more potentialities for development than in any other direction. The licensing laws ensure that the load will be reasonably off-peak in the first place, and thermostatically controlled direct heating is ideally suited to the requirements. No doubt each post-war housing estate, etc., will have its own "locals" in the vicinity and there is no reason why substantial progress should not be made in the electrification of such establishments.

Church Heating

The problem of electric church heating has always been interesting. From the installation viewpoint, the severe weather experienced during recent winters, together with difficulties in arranging satisfactory stoking and shortage of fuel has revealed the unsuitability of the ordinary type of low pressure hot water system for this requirement, especially if intermittently employed. Usually, unsatisfactory heating results and cracked pipes following severe weather.

This has found practical expression recently in the correspondence columns of that section of the Press devoted to ecclesiastical matters, the general conclusion being that there is much to be said for electrical heating. Here, it must be admitted, development in this direction has, not in the past been helped by some electric church heating installations proving unsatisfactory, both from the heating and economic standpoints. The trouble has often been due to lack of foresight in design and attempts being made to deal with them as orthodox space heating installations—which in many cases is virtually impossible—rather than to secure comfortable conditions for the congregation. From the supply aspect, although the hours of services invariably make church heating an off-peak load, the revenue obtained does not justify much additional expenditure by way of increased capacity of transformers, mains, etc., to meet the special requirements. If the whole of the heating installation is required during week-days then the position is even less favourable.

Generally speaking, supply authorities may find the introduction of off-peak tariffs, subject to specified hours of restriction by time switch, well worth consideration until the shortage of generating plant is made good, the hours of restriction being adjusted in accordance with local supply conditions.

Export Market Research

Formation of Co-operative Organisation

WITH a view to the furtherance of British export trade there has been formulated by a number of electrical manufacturers, and others, a new concern, under the title of the British Export-Trade Research Organisation, to carry out co-operative export market research and publicity for all British exporting firms which become members.

Main Objects of Research

Its main object is to establish a substantial research organisation which will obtain and make available first-hand information on markets, marketing, and sales methods in all overseas territories. It will seek to provide all services which are not at present adequately covered by public or private organisations, and allied with it will be a joint overseas advertising service to be called the British Export Trade Advertising Corporation.

The Department of Overseas Trade has stated that the department is fully in accord with the aims and objectives of the proposed organisation, and that, if there is sufficient industrial support, the department will continue to give any help that may be possible. During the initiation of the project there have been full discussions with the Board of Trade and the Department of Overseas Trade.

A number of large industrial and commercial concerns which desire to give administrative and financial assistance to the organisation of the B.E.T.R.O. have become founder members, including the Automatic Telephone and Electric Co. Ltd., British Insulated Cables Ltd., Cable and Wireless Ltd., General Electric Co., Ltd., and The Pressed Steel Co. Ltd. The founder members have elected a "formation committee" consisting of representatives of industrial companies and leading advertising agencies, including Messrs. F. C. Burstall (Automatic Telephone and Electric Co.) and Leslie Gamage (General Electric Co.). The chairman is Mr. Ivor Cooper (Lever Brothers and Unilever). The organiser on behalf of the formation committee is Mr. Philip Scott, Georgian House, Bury Street, St. James's, S.W.1.

The main object of the organisation will be export market research in the ordinary sense. Its information will be derived primarily from field staffs and marketing investigators, who will supply information from all markets on all matters relating to consumers' tastes, habits, purchasing power etc., the economic, commercial, and social characteristics of the markets concerned, methods of marketing, sales, publicity and advertising, the nature of transport and

distribution facilities, trade customs, financial and insurance facilities, and all Governmental regulations and practices affecting import trade. Questions of publicity will also be closely studied. All information will be collated and made available at the headquarters in this country, and specific information on production, sales, advice, etc., will be issued to members partly on inquiry and partly in the form of publications.

It is also intended that the organisation should handle specific tasks of investigation for individual members or groups of members when this can be done more cheaply and efficiently by the organisation than it could by the members themselves. It is not intended, however, that it should play a purely passive part but would itself take the initiative in suggesting possible fields of fruitful investigation to members who might be interested.

It is intended that the B.E.T.R.O. shall be registered as a company limited by guarantee and operating under Board of Trade licence. It will be non-profit making and will derive its revenue from two sources—membership subscriptions and payments for specific research. It will be governed by a council all of whose members will be unpaid, which is intended to be fully representative of British industry on the highest plane. The council will elect an unpaid executive committee charged with the responsibility of taking and reporting to the council decisions on matters of improved policy. The management will operate under the general direction of the executive committee.

Yearly Subscriptions

The first council will be elected by the founder members. But the founder members will enjoy no special advantages. Ordinary members will pay a yearly subscription of £100 for the use of all the ordinary services of the organisation and for the right to have additional specific research carried out at their expense. The founder members undertake to subscribe £500 a year for three years, at the end of which period they will become ordinary members.

Both Mr. Ivor Cooper and Mr. Leslie Gamage have expressed a desire that the leading industrial companies will assist the enterprise, for the benefit of British industry as a whole, by entering as founder members. Mr. Gamage has described it as a plan for industry to help itself, and has said that it is up to every enterprising manufacturer to see the plan through its building operations.

Electrical News from Abroad

Turkey.—The Turkish Government are currently considering a proposal from a foreign company to start up an electric lamp factory in the country.

Argentina.—Electricity output increased by 43 per cent. between 1938 and 1943. Output in 1943 was about 3.1-3.2 milliard kWh from public plants, and about 0.4 milliard kWh from private plants.

Finland.—To save foreign currency, Finland has recently embarked on the manufacture of electrical appliances. Wireless receivers, for example, are now being produced at the rate of 30 000 a year from locally-made components.

Germany.—In mid-1944 Germany was still producing electric household irons, for one of the items in Speer's industrial rationalisation plans involved a cut from 65 types of iron made by 22 companies to one type made by two firms.

Slovakia.—Slovakia's water-power resources are estimated at 3 million kW, of which only 30 000 kW are exploited at present. Hydro-electric plants now under construction, mostly on the River Vah, will shortly raise this figure to 95 000 kW.

Manchuria.—The most important electricity-supply concern in Manchuria, the Showa Electricity Co., has increased its share capital from 122 to 244 million yen. Electrical development in Manchuria is now more significant than in many European countries: for example, a 300 kV line is now in operation there.

Denmark.—In the year 1943/4, the Copenhagen Light and Power Company sold 227.8 million kWh, slightly less than in 1942/3. Difficulties of coal supply were more acute than in former years; deliveries to the company's power stations and gas-works were 265 000 tons, as compared with 344 300 tons in 1942/3. The company also used 360 000 tons of home-produced peat and brown coal in the year, over 100 000 tons more than 1942/3.

Norway.—Following on a number of measures directly restricting household and industrial electricity consumption in Norway, it was decreed in December, 1944, that sales of electric cookers and hot-plates were suspended and that no such appliances might be removed from one address to another for re-connection. Retailers, wholesalers and manufacturers were required to notify their stocks of electric cookers and hot-plates to the Norwegian Iron and Steel Control.

Sweden.—In 1942/3 two important hydro-electric power stations were put into operation in Sweden: Kattstrupefossen (36 000 kW) and Hojumsvarp (90 000

kW). At the end of 1938 there were 3 710 km. of electrified railway line in Sweden, out of a total of 16 710 km. In July, 1944, electrified lines amounted to 5 263 km., of which 4 505 km. belonged to the State Railways and 758 km. to private companies. Work is in hand at present on the electrification of the 162 km. stretch from Oestersund to Setorlien on the Norwegian frontier.

Spain.—Heavy rainfall in N.W. Spain during the autumn of 1944 allowed full operation of some of the local hydro-electric stations. The Electrica de Viesgo, for example, has recently been enjoying a record output of 1.2 million kWh a day. Elsewhere in Spain the situation remains more or less unchanged, and the highest priority is now being given to the reconditioning of a large part of the old stand-by thermal plant. Spain is planning to electrify a large part of her railways, using power from hydro-electric sources to be exploited over the next twelve years. Some 4 000 km. of normal (i.e., broad) gauge line and 1 000 km. of narrow-gauge line are involved, at a cost of 2½ milliard pesetas. The saving of coal is expected to amount to 0.8-1.0 million tons a year. About 500 km. of Spain's 12 750 km. of railways are already electrified.

Final official figures for Spain's electricity output in 1942 are 4 156 million kWh. It is a noteworthy feature of Spanish electricity supply that prices for current remain very low, as the following figures show:—

	General trade index.	Price of current.
1913	100	100
July, 1916	164	166
Dec., 1943	442	231

France.—A recent announcement by M. Lacoste, the French Minister of Industrial Production, in connection with the establishment of a Commission to reorganise electricity production and distribution, reveals a considerable recovery in France's electrical position since mid-1944. Total output at the end of 1944 was at the rate of 80 per cent. of the average rate for 1939, and in Paris daily consumption had risen from 900 000 kWh to 9.6 million kWh; the increase in both cases was largely from hydro-electric sources, which had been greatly helped by the heavy rains in the three months September-November. The Minister also disclosed that two new hydro-electric schemes, the Moyenne-Gironde system and the Génissiat plant on the Rhône, were or would shortly be in operation, and he said that an output of 400 million kWh was expected from the Middle Gironde plants in 1945.

Electrical Personalities

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

Reproduced on this page is a photograph of the late **Mr. Ernest Alfred Hounsell**, manager and joint manager during the war years of the London office of the Brush Electrical Engineering Co., Ltd., notice of whose death on March 20 at the age of 51 years, was given in our last issue.



Mr. A. E. Hounsell

Much sympathy is extended to **Lieut-Col. D. C. Thomson**, engineer and manager of the Walton and Weybridge electricity department, in the loss of his only brother, **Mr. Gordon G. Thomson**, of Hong Kong Electric Supply Co., who was killed in the internment camp at Hong Kong on January 16, as a result of an Allied air raid. He had been a prisoner since December, 1941, and leaves a widow and two children, who are returning to England from Australia.

Mr. A. C. Yeats has been appointed a director of Crossley-Premier Engines, Ltd.

Mr. R. E. Fordham has been elected a director of Lightalloys, Ltd.

Mr. W. Kilpatrick has resigned from the position of managing director of Davy and United Engineering Co., Ltd., and his seat on the board of that company and its subsidiaries, Duncan Stewart and Co., and Davy and United Roll Foundry.

Mr. Stuart Evans, managing director of Evans and Wheeler (Electrical Engineers), Ltd., has accepted an invitation to be chairman of Hoylake U.D.C. for the ensuing year. He is a former chairman of the Lighting and Heating Committee.

E. K. Cole, Ltd., announces that **Mr. W. S. Verrells** has resigned from the board and from the joint managing directorship of the company. **Mr. A. G. Allen**, a director, succeeds Mr. Verrells as chairman of the company.

Mr. E. Player, technical director of Birimid Industries, Ltd., has been appointed joint managing director of that company and also of the Birmingham Aluminium Casting (1903) Co., Ltd.—a subsidiary. **Mr. Cyril C. Maudslay** continues as chairman and joint managing director of both companies.

Mr. J. M. Calder, engineer and general manager of the Reading transport undertaking, who is retiring, has received gold cuff links and a series of photographs from

the uniformed employees, and a gold wrist-let watch, a wallet and a leather case from the office and depot staff.

Colonel E. T. Brook retired on Tuesday after 41 years' service with London's transport. At 24, after three years' service in the Mounted Police in Rhodesia, he joined the Great Central Railway, then being extended in London, and helped to equip its new power houses. In 1904 he joined the Underground, and, as new lines came into being, he was associated with many developments. In 1922 Colonel Brook was appointed superintendent of rolling stock (railways) and in 1932 he helped in the building of the Moscow tube railway.

The Manchester and Salford branch of the Electrical Association for Women held its annual meeting at Salford electricity showrooms on March 20, as a tribute to the demonstrator there, **Miss J. Thorpe**, who won the Elizabeth Sloan Chesser Cup in the association's electrical housecraft diploma test. The cup was presented at the meeting by the chairman, the Mayor of Salford, Alderman J. Binns.

In "The Housemaster," by Ian Hay, the Henley Dramatic Club found a comedy with a wide appeal, for by their three recent performances at the British Legion Hut, Westcott, Surrey, the war-time home of the head office of W. T. Henley's Telegraph Works Co., Ltd., they raised over £45 for the British Red Cross and St. John Fund. The producer was Mr. A. S. Brewer, of Henley's advertising department.

Mr. J. E. Kingsbury, deputy chairman of Bakelite, Ltd., celebrated his 90th birthday recently. He joined the board of the Darnard Lacquer Co., Ltd., on its formation in 1910 and played a large part in the building up of that company and of Bakelite, Ltd. He was general manager of the Western Electric Co., Ltd., up to 1910 and was responsible for the erection of that company's works at Woolwich. He took part in the first telephone conversation between Great Britain and France, and has written many technical contributions and a book on the subject of telephonic communication. He was a member of the Council of the I.E.E. for a number of years, a vice-president from 1903-1905 and the institution's honorary treasurer from 1915-1919.

Obituary

Mr. Herbert Saxby, manager of the deaf aid department of the Multitone Electric Co., Ltd., on March 24.

Problem of Development Personnel

By G. A. T. BURDETT, A.M.I.E.E.

WITHOUT attempting to prophesy a date when the cessation of hostilities in Europe will come about, it seems reasonable to assume that the time when development will again commence is not too far distant. Although such development cannot for some years be expected on a scale comparable with that just prior to the war, the industry will still have much to accomplish in the early post-war period.

Development may in fact, at first be confined to the electrification of temporary and permanent houses together with the replacement of worn and damaged appliances; even so, there are indications that the industry is re-grouping its forces. One is that the E.D.A. is putting its house in order and another is that one of the largest groups of electricity undertakings operating under private enterprise is prepared to spend £15 million on rural development over a period of five years.

Without entering into politics, it may be said that some of the "paper proposals" which have been put forward, appear to be rather insignificant when the existing organisations, whether company, municipal or joint authority, show not only what can be done without undue reorganisation, but what they intend to do. £15 million is a lot of money and when spent by one organisation over a period of five years in the rural field, it approaches the colossal.

If this project is only one of many to be undertaken immediately after the war, then it is reasonable to hope that the development of electricity in the rural areas will, at least, be tackled with courage and tenacity.

Rural Distribution Schemes

Experience has shown that a large proportion of capital expended on rural electrification is absorbed in the transmission and distribution equipment. Mr. C. A. Cameron-Brown has estimated that to supply 200 000 farms and holdings as yet without electricity, would involve a total capital expenditure of £50 million. Of this, £20 million would be absorbed in mains and equipment; £10 million for internal wiring of premises, and £20 million for farm electrical equipment.

How the £15 million referred to above is to be spent has not been stated, but it may be assumed that the larger portion is to be allocated to mains and equipment. A further sum, in this case, would be required for internal wiring and equipment. Even so, it is one thing to construct a distribution network and another to obtain con-

sumers willing and able to utilise electricity to render the scheme a sound economic proposition.

In the past the development officer had first to convince his prospective consumer, assess the likely load, and obtain deposits or guarantees to ensure that the supply would be sufficiently utilised. While in many instances progress was naturally slow, surprisingly good results were often obtained owing to the desire of the rural dweller to enjoy the advantages of electricity. Where, however, the net-work is first to be developed, the task of the development officer may be expected to be lighter.

In the past, many rural dwellers became consumers for lighting only, but before the last connection was made their desire for electric cooking, heating and water heating was wakened and the system became inadequate before the polish on the bare conductors was even tarnished.

Training of Technicians

Any large scale programme of mains construction will call for experienced engineers; these, no doubt, will be forthcoming. Experienced development personnel, on the other hand, may be harder to come by for little development has been conducted during the war years to give the supply authorities' staff suitable experience. After the war, therefore, the demand in both town and country for development specialists is likely to be great: greater, it is thought, than can be met for a considerable period. This should not mean that the qualifications of the ordinary development officer or sales engineer will be lowered to meet it, but possibly a compromise will have to be reached. That is, a number of technicians and salesmen will need to be put into the field and trained during their initial experience in the work; the technicians concentrating on selling methods as applied to electricity utilisation, while the salesmen will need to be taught the fundamentals of engineering.

Development of urban and city areas, present, on the whole, fewer problems, in that the work is not of such a specialised nature. The chief form of development will lie, at first, in the equipment of emergency houses and since so much of this work will be in the form of canvassing and demonstrations, women may be adapted to such tasks.

The more specialised fields, such as the equipment of large buildings for space heating, water heating, power and cooking, call for engineer specialists capable of discuss-

ing proposals with consumers, architects and the like. Should there be a dearth of such specialists, their numbers may be augmented by the manufacturing industry which usually retains a number of sales-engineers ready to assist in the preparation and selling of such schemes.

Too much stress cannot be laid upon the fact that the whole field of development requires careful examination, and it is reasonable to suppose that some thought has been given to the recruitment of suitable personnel. Some undertakings may

fare better than others and some system of interchange and movement of personnel may therefore be considered.

The past year or so has witnessed the compilation and publication of a number of schemes for reconstruction, not all of which are, however, workable. Where the scheme is reasonable there is the hope that with capital to expend, territory to develop, and given a fair share of labour and equipment, the electrical industry will lead the way back to prosperity, both at home and overseas.

Electric Light Fittings

Annual Report of the E.L.F.A.—Post-War Problems

PROBLEMS likely to affect the industry in the transition from war to peace-time conditions are dealt with by the chairman of the Electric Lights Fittings Association and its Council, Mr. A. E. Iliffe, in his annual report for 1944. He states that the improving war situation has enabled the association to broaden its activities for the assistance of its members. On street lighting, for example, the duty fell upon the E.L.F.A. to develop the best technical advice needed by local authorities and others in regard to conversion of existing street lighting equipment to the emergency war-time lighting now permitted by the Government.

The Government departments continued to consult the E.L.F.A., on all subjects of interest to the lighting fittings industry, and the confidence thus enjoyed has considerably helped the electric light fittings industry to maintain an "even keel," in spite of the very difficult war-time conditions, and to prepare for a reasonable amount of post-war development. Many members of E.L.F.A. have completely sacrificed their normal production in favour of making munitions of war. Everything possible is being done to ensure that such firms are fairly treated in the rehabilitation phases now in sight, or taking place.

Many problems likely to face the electric light fittings industry during transition from war to peace, continue to engage the Council's close attention, with due regard to latest scientific trends in illumination, and to the valuable experience gained since 1939. Disposal of Government surplus stocks is another problem that is before the Council, and the E.L.F.A. is collaborating closely with the B.E.A.M.A., who are negotiating that question with the Ministries concerned with electrical plant, apparatus and equipment generally. The Council is conscious of the dangers that may arise unless Government surplus

stores are disposed of in an orderly way to ensure that the working structure of the industry is not undermined and full employment of labour not jeopardised.

The association has been active in advising on lighting fittings for post-war housing schemes.

Available production capacity is still considerably limited insofar as normal products are concerned. Therefore, the distributing section of the industry and the public must not, for the time being, expect unlimited supplies of decorative and commercial fittings, as the flow of such fittings must necessarily depend upon the degree and rate with which manufacturers can turn over their plant to peace-time products without any interference with the essential war effort.

There has been an increasing tendency towards linking commercial with decorative type fittings, especially on questions, of trading policy and discounts. As a result of discussion, it has been decided to combine the two interests under one title, viz., the Decorative and Commercial Fittings Section, leaving industrial fittings to be dealt with by the re-named Industrial Fittings Section.

Under the aegis of the industrial section, considerable work has been done by the E.L.F.A. Fluorescent Fittings Committee, towards defining and aligning fair trading conditions of sale for those new types of fittings. This important work will, in future, form a major part of the trading policy of the association in view of the ever increasing popularity of 5 ft. tubular lamps. The closest collaboration is maintained with the E.L.M.A. and the E.D.L.A.C. (Electric Discharge Lamp Auxiliaries Committee). As a result, all members of the E.L.F.A. have been kept fully informed on the latest developments of auxiliary control gear, and on the E.D.L.A.C. trading policy.

The section is drafting a complete fair trading code, based on the electrical fair trading policy for the home trade, which, it is hoped, all approved electric light fittings wholesalers on the E.L.F.A./E.W.F. register will formally adopt and agree to operate in common with the fittings manufacturers. When the code is finalised, it is intended to offer it for signature to non-E.L.F.A. industrial fittings manufacturers, as well as to the E.L.F.A. members, and thus to establish a code of ethics which all engaged in the manufacture and wholesale distribution of industrial electric lighting fittings will operate to the common good. In this matter, the E.L.F.A. is collaborating closely with the E.W.F. and it is hoped, in the success so far obtained, to extend the major principles of the code to other sections of the association, all of which already operate in accordance with the fundamental principles enunciated by the Electrical Fair Trading Council.

Advanced work is already in hand towards establishing a fair Trading Code for the future sale of street lighting fittings and equipment. Thereon, the Street Lighting Fittings Section has collaborated with the

pole manufacturers and others interested in apparatus used for street lighting, and considerable agreement has already been established. Such a code will greatly assist towards a better understanding in the electric street lighting fittings industry in place of the somewhat haphazard conditions that prevailed before the war.

The section has been able to assist its members very considerably on all questions appertaining to the recent relaxations on war-time street lighting and to the re-instatement of pre-war street lanterns and equipment throughout the country in readiness for peace-time lighting.

Following the setting up of the Technical Committee in 1943, a survey of the technical structure of the E.L.F.A. resulted in re-arrangement calculated to deal more effectively with various aspects of the technical work in which the association is interested; and six technical sub-committees were set up, composed of members with special knowledge of and interest in the particular subjects delegated to them. Those subjects are light sources, fittings materials, general lighting technology, street lighting, industrial lighting and commercial lighting.

Electrical Facilities in Shoreditch Hutments

IN Shoreditch, about 80 Uniseco huts are being erected for the temporary accommodation of families who have lost their homes, and all these will have electrical equipment for cooking, water-heating and lighting. Over 40 of the huts are already occupied and there has been installed in each an electric cooker, an electric wash-boiler and three radiator plugs, one being for universal use for radio, iron or additional lighting. Some of the tenants have hired electric fires.

Before the war the Borough Council encouraged the use of electricity for all domestic purposes, and advantage was taken of the electricity department's assisted wiring scheme by approximately 23 000 consumers out of a population of 80 000. This was very popular. It never became the property of the consumer. The addition of a penny per unit covered the capital cost of the wiring and maintenance. The meters registered slightly above the current consumed, and the consumers received a rebate calculated on the number of units sold. This was looked upon as a form of saving, and housewives were able to replace lamps without a cash payment, the cost being deducted from the rebate.

It was the Council's policy to provide electrical facilities for cooking, water heating, space heating and lighting in all the municipal flats, unless the tenants had a preference for gas, and this policy will be

extended to their post-war housing schemes, which will come under the London plan. Large areas of the borough have been devastated by bombing.

ELECTRICITY IN PERTH

The annual report of the General Manager of the City of Perth Electricity and Gas Department, for the year ending September 30, 1944, gives the number of units of electricity purchased as 85 856 524 (79 360 581), while units sold totalled 80 241 917 (74 139 360). The maximum half-hourly demand on the system occurred on July 11, 1944, from 6.30 p.m. to 7 p.m. and totalled 21 329 kW. The total kVA of transformers connected was 40 917 (40 157). The present length of h.t. underground mains is 18.3 miles and of l.t. underground mains 20.3 miles. Pole lines total 475.6 miles. At September 30, 1944, there were 50 998 meters in use, including 7 671 subsidiary meters, the increase being 662. The total number of street and park lamps in Greater Perth was 4 924, while the number of lamps operated by the department for outside Road Boards and Municipalities was 3 438.

The financial statement of the electricity department gives the total revenue as £468 727 (£433 387) and the working expenditure £351 717 (£332 290) leaving a balance of £117 010 (£101 097).

Colour Television

Methods Proposed—Discussion by I.E.E. Radio Section

THE subject of discussion at a meeting of the I.E.E. Radio Section on March 13, was "Colour Television."

The discussion was opened by Mr. L. C. Jesty, who stated that it seemed inevitable that a colour television service would be established. Any deliberate influence that could be exerted on the natural development of this art should be directed towards (a) the agreement of the technical methods to be employed, particularly with regard to the colour analysis and synthesis of the picture, and (b) the standard of definition to be achieved before colour was introduced.

Number of Colours

All the demonstrations of colour television so far given, by Baird in this country and Bell Telephone and C.B.S. in America, had employed scanning processes embodying various colour sequences for analysis and synthesis. It was now taken for granted that the science of colour had established the necessity for a minimum of three primary colours for acceptable reproduction.

Various methods from "roseau" screens to moving filters had been proposed for producing the necessary primary colours. All additive colour systems resulted in a loss of sensitivity in the transmitter camera, and loss of brightness in the received picture. These must be restored by improvements in cameras and cathode-ray tubes.

It would appear that the only immediately practicable system was the sequential-colour frame-scanning system, unless some unpublished device had been perfected, such as a method of altering the colour of a fluorescent screen at will, or receiver picture storage, or the simultaneous transmission of all picture points instead of scanning.

With regard to the standard of definition, the additional information to be conveyed in a colour picture resulted in an increase in the video band-width of about three times compared with the equivalent definition black-and-white picture. A 405-line colour picture would require about three times the video band-width, and with vestigial sideband transmission about twice the other space of the pre-war 405-line transmission. On this basis, a 500-600-line colour picture was not inconceivable as a long-term development. Should it be demonstrated, however, that higher definition, say 800-1 000 lines, was necessary on purely visual grounds, then it would seem that colour television was only a remote possibility, until much greater experience of the higher transmission-frequency bands had been obtained. In this case, it was possible that electronic colour-scanning methods

would prove more useful in the field of photographic reproduction before they were adopted for television purposes.

Several speakers commented on the apparent improvement in contrast in the colour pictures, and it was agreed that less range of tone was required in colour than in a black-and-white system. On the other hand, the brightness level of an additive colour television picture would be less than that of monochrome, and there was need for further development in projection type tubes by an increase in the efficiency of screen fluorescence. One speaker thought that a mechanical system of scanning might provide a solution and there was a tendency to exaggerate the difficulties.

Colour fringing on moving objects was a serious defect of present frame-by-frame scanning methods. It could also be caused by hum in the receiver if the vertical scanning rate were not an integral multiple of the mains frequency, and by fading in a propagation system depending on a network of radio links. Point-by-point scanning must be the ultimate goal, and one method by which this might be reached was to introduce transverse velocity modulation in the time base so that the wanted colour in each point would receive a longer period of illumination.

Frame by Frame Scanning

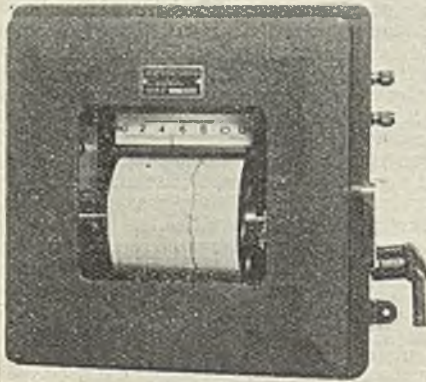
In a written communication, Mr. J. L. Baird expressed the opinion that point-by-point scanning did not offer sufficient advantages over line-by-line scanning to counterbalance the increased difficulties involved. With present frame-by-frame scanning methods a considerable reduction in colour flicker was obtained by increasing the number of interlacings (and consequently the frame frequency) for the same number of lines. He thought it rather misleading to state that frame-by-frame scanning could not be added to existing black and white systems. A two-colour 600-line system (200-line frames at a frame frequency of 50 per sec., interlaced three times) could be used in the pre-war B.B.C. 405-line system and would be received as a 200-line black and white picture on existing receivers. A three-colour system was necessary for accurate colour reproduction, but, in his view, a two-colour system gave a pleasing and acceptable picture.

Other speakers held that colour reproduction should not be attempted until adequate definition was assured, and that the problem of colour should be set as a separate objective, not as an adjunct to existing systems.

Equipment and Appliances

Temperature Indicators and Automatic Controllers

The **Nottingham Thermometer Co., Ltd.**, manufacturers of a wide range of industrial type thermometers, electrical indicators, controllers, and recorders, offer in



Nottingham daily chart type temperature recorder

their series of special instruments the recording pyrometer illustrated. This has a daily chart and the recorder can be supplied with a resistance thermometer for refrigeration and for recording temperatures of constant temperature baths.

The company's indicating controller is another instrument offered in the series and is used for the automatic control of gas-fired and electric muffle furnaces with suitable motorised valves and contactor gear; coloured signal lamps are fitted to give the operator warning of the on and off periods. The company also make surface type pyrometers for use in the plastic industry for the determining of platen, die and laminated board and moulded product temperatures. Another instrument made by the company is a potentiometer pyrometer designed to read true temperature, and while retaining, it is claimed, the accuracy of a potentiometer, it eliminates having to refer to tables of constants and correcting for cold junction temperatures. Among the advantages claimed for the instrument are: the scale length is 12 in.; accuracy is independent of variations in the external resistance; it can be calibrated for use with any two ranges of the listed temperature ranges and it automatically compensates for the "cold junction" on both ranges.

In addition, its degree of accuracy enables it to be used as a sub-standard for tem-

peratures between minus 100 and plus 1 600°C. Instruments can be supplied for use with copper/constantan, chromel/alumel or platinum/platinum rhodium thermo-couples and the following are a few of the normal ranges in use—Copper/constantan, -50/+150°C. -50/+200°C. 0-200°C, 0-250°C, 0-350°C; chromel/alumel, 0-200°C, 0-400°C, 0-600°C. 0-800°C, 0-1 000°C, 0-1 200°C, 200-800°C, 200-1 000°C, 400-1 200°C; platinum/platinum rhodium, 0-1 400°C, 400-1 400°C, 1 000-1 600°C. A portable wood-cased instrument for use in laboratories and as a convenient sub-standard instrument for checking existing pyrometer installations is offered, together with a metal cased wall or panel mounting single or multi-point instrument for works use. In the multi-point instrument full advantage can be taken of independence of the ex-



A potentiometer pyrometer in metal case for works use

ternal resistance, while thermo-couples and compensating leads on the various points can be of different lengths and resistances, without affecting the accuracy of the indicated temperature.

To meet a demand for a soldering iron which can be fed from a battery at a very low wattage rating the **Acru Electric Tool Manufacturing Co., Ltd.**, have produced an iron for 6 V, and rated at only 25 W. In appearance, this new soldering iron is similar to the company's "Pyrobit" wireless model which is rated at 45 W. The difference is in the element and the copper bit. The tool is light in weight, but robust in construction, and all parts are easily replaceable.

News in Brief

Ministry of Fuel and Power Bill.—The Ministry of Fuel and Power Bill has been considered as amended, read the third time, and passed.

Institute of Physics.—A meeting of the Scottish Branch of the Institute of Physics will be held on April 6, at 7.30 p.m. in the University of Glasgow, Natural Philosophy Department, when Dr. W. Hume-Rothery, F.R.S. will lecture on "The Theoretical Interpretation of Alloy Structures."

All-Electric Houses.—Fifty temporary houses to be built by the Morpeth (North-umberland) T.C. are to be all-electric.

Portable Electric Tool Demonstration.

—A three-day demonstration of portable electric tools was held at the Scottish Building Centre, Glasgow, from March 20-22, in co-operation with Black and Decker, Ltd.

Mass-production of Kitchen Equipment.

—The Stockton-on-Tees T.C. has agreed to support a resolution by local women's organisations that labour-saving devices installed in the Council's model kitchen should be mass-produced after the war so that they would be available to the general public.

Leeds Telephone Exchange.

—The automatic telephone exchange in Basinghall Street, which was built in 1918, is to be modernised, and it is understood that the work will be completed by the summer.

Vaal Power Station.—The first generating set at the Vaal power station is now reported to be in operation. The construction of this station began in 1939, the intention being to have it in operation by 1942, but the war delayed the delivery of the plant from Great Britain and the first 33 000 kW set began to operate last month. Another of the same size is nearing completion. The station, which is equipped with two 320-ft. cooling towers will feed the extension electricity network of the Witwatersrand.

N. Wales Post-war Development.—The North Wales Power Co., Ltd., and its subsidiary, the British Power and Light Corporation, Ltd., have submitted to the

Ministry of Fuel and Power, the Commissioners and the C.E.B. a report by two consulting engineers who investigated the possibilities of further development of North-Wales water-power resources. The directors of the power company in the annual report state that post-war development has been closely examined and that schemes held in abeyance because of the war are ready to be put in hand as soon as circumstances permit.

College X-ray Apparatus.

—At a recent meeting of the Council of University College, Dundee, it was intimated that X-ray apparatus was to be installed in the university within the next six weeks. It was stated that a grant of £250 had been promised by the Royal Society for the purchase of an X-ray camera on condition that the balance of £750 was met from other sources.

Electrical Exhibition.

—The British Electrical Development Association proposes to hold an exhibition at Blackburn next August and electricity undertakings are recommended to make contributions towards the cost. Clitheroe Council has decided not to participate in it.

Hebrew Teletypewriter Service.—It is announced that for the first time in telegraphic history messages are to be teletyped in Hebrew characters now that the teletypewriter service between Jerusalem and Tel Aviv has been inaugurated. It has been necessary completely to redesign and adapt the standard machine to make the tape emerge from left to right.

Vactric's New Works.—It is announced that arrangements have been made for fully-equipped works of approximately 100 000 sq. ft. at Chapelhall, near Airdrie, Scotland, to be taken over by Vactric, Ltd. Arrangements have also been completed by the company for the erection within twelve months of another factory of 200 000 sq. ft. with the provision of additional area up to 600 000 sq. ft.

TWENTY-FIVE YEARS AGO

FROM THE ELECTRICIAN of March 26, 1920: The proposals of the Royal Commission for the reform of the income tax have attracted considerable attention, but we are afraid that the rejoicing caused by the recommendation to reduce the amount of the tax due from the smaller taxpayer will prevent the Report as a whole from receiving that careful scrutiny which it deserves. The injustice of the double income tax in the United Kingdom and in the Dominions is recognised, and certain suggestions are made for relieving the situation. This is an important question, and many Anglo-colonial and Anglo-foreign companies have already removed their headquarters abroad in order to avoid the British income tax.

Book Reviews

An Introduction to Electronics, by RALPH G. HUDSON. (New York: The Macmillan Co.) Pp. x + 97, 109 diagrams and photographic illustrations. \$3 net.

The author of this book is a professor of electrical engineering and chairman of the courses in general science and engineering at the Massachusetts Institute of Technology. One of the leading authorities on electronics in U.S.A., he has dealt with his subject in a manner that will appeal not only to the student, but also to the ordinary reader. The book gives a clear explanation of the modern theory of the constitution of matter and the nature of an electric current in a gas, a liquid, a solid and in vacuum. It also describes the diverse applications of electronics.

The British Journal Photographic Almanac, 1945. Edited by ARTHUR J. DALLADAY (London: Henry Greenwood). Pp. 388 + 32 pages pictorial photogravure supplement. 5s. net (cloth bound), 3s. 6d. (paper covers).

This well-known annual, which has now reached its 86th year of publication, needs little of the reviewer to tell of its value, and though paper shortage and war-time restrictions have made their mark upon this year's edition, there is little evidence of it. Apart from a useful collection of technical articles on photographic matters, the contents are crammed with information and data designed to make its readers up to date, while one of the most useful features is an editorial review of new materials and apparatus. The photogravure section, though smaller, is up to the usual high standard of perfection, and the examples given make ambition in the photographic art all the keener.

"The Measurement of Colour," by W. D. WRIGHT (London: Adam Hilger). Pp. VII + 223, 65 diagrams and illustrations, six in colour. 30s. net.

This book covers a wider field than is indicated by its title, and while its fundamental purpose concerns the measurement of colour, the author devotes some space to the subjects of light and colour vision. The subject is handled throughout with exactitude, but in spite of its technical nature, the book makes fairly easy reading, even for the semi-specialised person. There are seven chapters, followed by appendices and index, the headings covering radiation in the visible spectrum, its emission, absorption and reflection; radiation in the visible spectrum, its reception in the eye; the trichromatic system of colour measurement; colorimeters, their design and use; spectrophotometry applied to the measurement of colour; the

colour atlas as a sub-standard of colour measurement; and the practical applications of colorimetry. The principles and methods of colour measurement and specification are reviewed very thoroughly, and a considerable amount of important data are given in connection with the trichromatic system of colour measurement. The author, who is obviously an expert on the subject, shows how a reference framework can be established for the specification of colours on the trichromatic system. The author begins with information concerning the nature of light, and, after dealing with light sources and the measurement of energy distribution, deals at some length with the absorption and reflection of light. Several pages are devoted to the optical system of the eye. The trichromatic system of colour measurement is then treated at length. The design and use of colorimeters is reviewed very comprehensively and detailed information given concerning the Guild, Wright, and Donaldson colorimeters, also the Lovibond tintometer and the blanchometer. Both photo-electric and visual instruments are discussed. After a page on spectrophotometry applied to the measurement of colour, information is given concerning the use of the colour atlas as a sub-standard of colour measurement. Then follows a long chapter concerning the practical applications of colorimetry, where a wide field is covered, including chemicals, lighting agriculture, paint, signal glasses, etc. R. G. W.

Costing for Builders. 4th Edition.—By WM. A. SMITH, F.C.W.A. (London: Moore's Modern Methods, Ltd.). Pp. 58. 5s. net.

This fourth edition, which has been revised and brought into line with the latest practice, will be found a useful guide for builders who appreciate the importance of efficient accounting. Attention is directed to the possibilities of the loose-leaf cost ledger, which permits of all relative records being kept together, and of the separation of closed matter from current accounts. Two systems are described and illustrated. One is intended for the general building contractor with a comprehensive business, and the other for the small jobbing builder, house decorator, electrician, plumber and so on. The latter is a simple method of accounting with features impossible with bound book methods. P.A.Y.E. income tax deductions are dealt with. In addition to the very clear examples and illustrations, there is a list of definitions of terms that will be helpful.

Answers to Technical Questions

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

A correspondent has asked for information regarding electric fences.

An electric fence consists of a single electrified wire used in place of an ordinary fence or hedge for the enclosure of live stock. Plain, or occasionally barbed, galvanised wire is employed and is mounted by means of insulators on posts at suitable intervals, the height of the wire should be about two-thirds of that of the stock to be enclosed.

The supply to the wire is obtained from a 6V battery through an interrupter and induction coil. An electro-mechanical interrupter, similar to that employed with an electric bell, is generally used and is connected on the primary (battery) side of the induction coil, and interrupts the current at intervals of about 1 second. This interruption induces a high voltage (30 or 40 V) in the secondary of the induction coil, one

terminal of which is connected to the fence, the other being earthed. The fence thus receives a succession of unidirectional pulses of voltage. Although 30 or 40 V may be dangerous to animals if applied continuously, the amount of energy involved in each pulse from the coil is so small as to render it harmless. Under no circumstances should the fence be connected in any way to the supply mains owing to the possibility of leakage causing a dangerous voltage. Either a dry cell or an accumulator may be used as the source of current; the drain on the battery, although more or less continuous while the fence is electrified, is very small and 3 or 4 months is a typical life for a dry battery. It is found in practice that some animals, after once or twice receiving a shock, keep well away from the fence so that it may not be necessary to have it continuously alive. E.O.T.

Coming Events

Friday, March 30 (To-day).

I.E.E., CARDIFF STUDENTS' SECTION.—"A.C. Commutator Motors, Schrage Type," S. R. Phelps and L. Davies.

Saturday, March 31.

I.E.E., BRISTOL STUDENTS' SECTION.—Bristol, "The Cathode Ray Tube and its Applications," Dr. Wilson.

Tuesday, April 3.

I.E.E., N.W. CENTRE, INSTALLATIONS GROUP.—Manchester, "Organisation of Industrial Electrical Maintenance," J. C. B. Nicol. 6 p.m.

COVENTRY ELECTRIC CLUB.—Electricity Show-rooms. "Automatic Control Devices," A. M. Craig. 6.30 p.m.

Wednesday, April 4.

I.E.E., RADIO SECTION.—London, W.C.2. "Studio Technique in Television," D. C. Birkinshaw and D. R. Campbell. 5.30 p.m.—N.W. CENTRE.—Sheffield, Lecture, "Insulating Materials," E. B. Moullin. (Joint meeting with N. Mid. Centre and Sheffield Sub-Centre.)

JUNIOR INSTITUTION OF ENGINEERS, MIDLAND SECTION.—Birmingham, "Modern Underground Electric Traction," F. Mather. 6.30 p.m.

Thursday, April 5.

I.E.E.—London, W.C.2. "The Place of Radiant, Dielectric and Eddy-Current Heating in the Process Heating Field," L. J. C. Connell, O. W. Humphreys and J. L. Rycroft. 5.30 p.m.

Friday, April 6.

I.E.E., MEASUREMENTS SECTION.—London, W.C.2. Discussion, "Are Engineers Losing their Sense of Proportion on the Accuracy of Industrial Measurements?" H. D. Hawkes. 5.30 p.m.—N.W. STUDENTS' SECTION.—Manchester, "Electrical Computing," R. B. Quarumby. 6.30 p.m.

Saturday, April 7.

I.E.E., LONDON STUDENTS' SECTION.—Visit to St. Bartholomew's Hospital, E.C.1. 2.30 p.m. JUNIOR INSTITUTION OF ENGINEERS, N.W. SECTION.—Manchester, "Roll Grinding Machines," J. Gradwell. 2.30 p.m.

Metal Prices

	Monday, March 26.	
	Price.	Inc. Dec.
Copper—		
Best Selected (nom.) per ton	£60 10 0	—
Electro Wirebars ...	£62 0 0	—
H.C. Wires, basis ... per lb.	9½d.	—
Sheet	10½d.	—
Phosphor Bronze—		
Wire(Telephone)basis "	1s. 0½d.	—
Brass (60/40)—		
Rod, basis	—	—
Sheet	—	—
Wire	10½d.	—
Iron and Steel—		
Pig Iron (E. Coast Hematite No.1)... per ton	£7 13 6	15s. *
Galvanised SteelWire (Cable Armouring) basis 0.104 in. ...	£28 5 0	15s. —
Mild Steel Tape (Cable Armouring) basis 0.04 in. ...	£20 0 0	—
Galvanised SteelWire No. 8 S.W.G. ...	£26 0 0	—
Lead Pig—		
English	£26 10 0	—
Foreign or Colonial	£25 0 0	—
Tin—		
Ingot (minimum of 99.9% purity) ...	£303 10 0	—
Wire, basis... .. per lb.	3s. 10d.	—
Aluminium Ingots ... per ton	£35 0 0	—
Spelter... ..	£25 15 0	—
Mercury (spot) Ware—		
house per bott.	£69 15 0	—

Prices of galvanised steel wire and steel tape supplied by the C.M.A. Other metal prices by B.I. Cables Ltd.

Electricity Supply

Darlington.—Sanction has been received by the T.C. to borrow £20 000 for the purchase of eight trolley buses.

Stockton-on-Tees.—Nearly £1 000 is to be spent by the Corporation in laying service cable to serve 62 houses to be built by the R.C.

Southport.—The Electricity Committee is to improve supply and strengthen the cable networks in some districts at a cost of £3 686.

Glasgow.—Sanction to borrow £4 000 000 for the erection of the new generating station is being sought by the Electricity Committee.

Harrow.—The Middlesex Education Committee is to replace gas by electricity at the Harrow County School for Boys at a cost of £480.

Bedford.—The Health Committee is to overhaul the electrical installation at the offices of the medical officer of health at a cost of £107.

Glasgow.—The Baths Committee is to change over from steam driven to electricity driven units at the Maryhill and the Springburgh baths.

Burton-on-Trent.—The Electricity Committee has approved a post-war scheme for new mains, sub-stations and meters at a cost of £85 150.

Stockton-on-Tees.—Twenty-eight circuit breakers are to be ordered for the new sub-stations to be built in Outram Street, West Row and Norton High Street.

Scarborough.—The Electricity Committee is to purchase a 300 kVA transformer at £345 and switchgear at £283 for a new sub-station in the Scholes Park area.

Bedford.—Sanction is to be sought by the Electricity Committee for a loan of £137 666 for developments. The appointment of Messrs. Merz and McLellan to supervise the major works has been recommended.

Hull.—The Electricity Committee reports that it has been placed second on the list of 31 undertakings in the order of preference for the manufacture of plant and machinery for extensions. With reference to plant at Sculcoates it is stated that the estimated direct cost of repair and replacement is £23 750, the insurance claim providing for £15 000.

Contracts Open

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

Southend-on-Sea, T.C., March 31.—Supply and delivery over a period of 18 months of 5 000 house service meters. Specifications from Mr. A. C. Johnson, Electricity Works, Southend-on-Sea.

Manchester Electricity Department, April 3.—Supply, delivery and erection of (a) automatic voltage variation equipment and reactors (Spec. 821), (b) mercury and rectifier equipment (Spec. 822), and (c) 660 V d.c. traction switchgear (Spec. No. 823). Particulars from Mr. R. A. S. Thwaites, Town Hall, Manchester; deposit £1 ls.

West Midlands J.E.A., April 4.—Supply, delivery, erection and testing of two 5 000 kVA, 33 000/3 300 V, three-phase, 50 cycle outdoor type transformers, and two 600 kVA, 3 300/400 V, three-phase, 50 cycle indoor type transformers, at Ocker Hill, Generating Station, Tipton, Staffs. Specification from the Authority, Phoenix Buildings, Dudley Road, Wolverhampton.

Keighley T.C., April 6.—Supply and delivery of four 40 kVA 6 600/400 V 3 phase

transformers. Specification from Mr. G. F. Moor, Electricity Offices, Coney Lane, Keighley.

Manchester Electricity Department, April 7.—Supply and delivery during a period of 12 months of service cut-outs (Spec. 819), and cables (Spec. 820). Particulars from Mr. R. A. S. Thwaites, Town Hall, Manchester; deposit £1 ls.

Littleborough U.D.C., April 10.—Supply and delivery of one 500 kVA indoor type transformer. Specification from Mr. G. Hill, Council Offices, Littleborough.

Glasgow Lighting Department, April 14.—Supply of electrical fittings, from June 1, 1945, to Mar. 31, 1946. Specification from the Lighting Department, 20, Trongate,

Tees-side Railless Traction Board, April 20.—Supply of two 300 kW mercury arc rectifiers and associated equipment. Specification from the Clerk to the Board, Municipal Buildings, Middlesbrough; deposit, £5 5s.

Cleethorpes T.C., April 21.—Supply, delivery (and erection of high tension, low tension switchgear) for the following: (a) H.t. switchgear; (b) l.t. switchgear; (c) 500 kVA transformer and (d) h.t. cable. Specification from Mr. B. S. Lord, Electricity Showrooms, Grimsby Road, Cleethorpes.

Industrial Information

Fuel Efficiency.—Bulletin No. 38 issued by the Ministry of Fuel and Power, deals with the maintenance of industrial boiler plant.

A.E.I. News.—The March number contains a vivid description of a flying bomb incident in Southern England in June last and a picture of the scene in the street after the explosion. The photograph was taken from the shattered window of the personal office of Sir Felix J. C. Pole, chairman of A.E.I. Ltd.

War Damage Insurance.—The Board of Trade announce that all policies under the Business Scheme which are in force on March 31, will be extended until June 30, without further payment of premium or further action on the part of policy holders. For new or additional insurance under the scheme the rate of premium for the three months April 1 to June 30, 1945, will be 1s. 8d. per cent. with a minimum premium of 5s.

Lighting a Clothing Factory.—The illustration shows part of a factory in the north of England engaged upon the production of utility clothing. Experience has proved that the characteristics of the Osram fluorescent tubular lamp are particularly suitable for this class of work. Its ability to provide high intensity light with virtually no shadow or excessive heat is a valuable feature for the prevention of eye strain and fatigue. This installation comprises 86 Osram tubular lamps in five rows of continuous troughing, suspended 10 ft. from floor level (i.e., about 7 ft. from the sewing benches), each row being spaced

8 ft. 6 in. apart. The lighting intensity on the working plane is 25 f.c.

Earthing Equipment.—Under the title "Earthing," British Insulated Cables, Ltd., have published an attractive booklet, admirably produced and illustrated, dealing with the general principles of earthing and design of systems and giving details of earthing equipment and its applications. The subjects covered include soil resistivity, resistance of electrodes, the effect of time-delay protective devices, voltage gradient, choice of electrodes, and earthing conductors.

Shellac.—It has been decided to resume the importation of shellac on private account into the United Kingdom. Accordingly, the Ministry of Supply will cease to buy shellac in India on public account as from March 31, next, and thereafter private traders may purchase in India for shipment to this country, subject to the Government of India Lac Export Control Order, 1944. Applications for import licences should be made to the Import Licensing Department, Board of Trade, 1/6, Tavistock Square, London, W.C.1. The existing arrangements for the distribution of Ministry of Supply stocks through the Shellac Distributing Agency, Ltd., will remain unchanged for the time being.

Safety Electrical Equipment.—With the object, to some extent, of helping to spread knowledge of flameproof and kindred apparatus, Mr. S. W. Richards has written a series of informative articles which have been published in the form of a booklet entitled "Safety Electrical Equipment and



Osram fluorescent lighting in a clothing factory

its Use." As manager of the mines department of the General Electric Co., Ltd., Mr. Richards has an intimate knowledge of the comparatively wide range of flameproof and intrinsically safe equipment available to industry to-day, embracing lighting and signalling fittings, switchgear and conduit, motors, transformers, ventilating and loud-speaker equipment, etc., He reviews and illustrates many of these in his booklet, a copy of which can be had, free, on application to the G.E.C. Head Office, Kingsway, London, W.C.2.

Electronic Control for Welding Machines.

—The British Thomson-Houston Co., Ltd., who have had long experience in the development of control equipments for weld-

ing machines, have published the first four of a new series of descriptive lists. D.L. 5851-1 Edition D, summarises the types of B.T.H. electronic control equipments for resistance-welding machines now available, and also contains a glossary of technical terms which are not always clearly understood by those who use electronic control in the workshops. The other lists are: 5851-3, Electronic Timers—Type F.W. 19 F5B for Control of Resistance-Welding Contactor Units; 5851-8 Ignitrons for a.c. Resistance-Welding Applications; and 5851-9 Ignitron-Contactor Units, Type F.W.224-A for Resistance-Welding Control Equipments.

Notes for Contractors

THE National Joint Industrial Council for the electrical contracting industry announces that the hourly rates payable on and from the third pay day in April, 1945 (and for the pay period covered by that pay day), will be as under. To these rates is to be added the current amount of the Cost of Living (War) Adjustment applicable to the age groups concerned.

Category II.	Grade	Grade	Mersey	Grade
	"A."	"B."	Dist.	"C"
	s. d.	s. d.	s. d.	s. d.
Age 16 (15%*) ...	0 3½	0 3	0 3½	0 3
Age 17 (20%*) ...	0 4½	0 4	0 4½	0 4
Age 18 (30%*) ...	0 7	0 6	0 6½	0 5½
Age 19 (45%*) ...	0 10½	0 9	0 9½	0 8½
Age 20 (60%*) ...	1 2	1 0½	1 0½	0 11½

Category III.	Grade	Grade	Mersey	Grade
	"A."	"B."	Dist.	"C."
	s. d.	s. d.	s. d.	s. d.
Age 16 (20%*) ...	0 4½	0 4	0 4½	0 4
Age 17 (27½%*) ...	0 6½	0 5½	0 5½	0 5½
Age 18 (40%*) ...	0 9½	0 8	0 8½	0 7½
Age 19 (55%*) ...	1 0½	0 11½	0 11½	0 10½
Age 20 (70%*) ...	1 4½	1 2½	1 3	1 1½

* Of Journeyman's Rate.

The Council decided on March 13 that there shall be an increase of ½d. per hour on the basic Grade "A" (London) rate. This increase, which comes into operation on the third pay day in April, 1945, for the pay period covered by that pay day, has the effect of increasing the Grade "A" (London) stabilised rate to 1s. 11½d. per hour. To this rate the appropriate Cost of Living (War) Addition must be added. The amount of the present Cost of Living (War) Addition is applicable up to and including the second pay day in April, 1945. A declaration as to the hourly rate as from the third pay day in April will be circulated as soon as the appropriate Ministry of Labour return is available.

Subject to the overriding needs of the war situation and the claims of production of essential services: (a) industrial agree-

ments and common practice in relation to the annual holiday should continue in general to be observed; (b) on the occasion of public holidays in England and Wales the following days should be approved holidays: Saturday, March 31, Easter Monday, April 2; Saturday, May 19, Whit-Monday, May 21; Monday, August 6; Monday, December 24, Christmas Day, and Wednesday, December 26, or, alternatively, Wednesday 31, January 1, 1946, and Wednesday, January 2.

The Director and Secretary of the N.F.E.A. brings to the notice of members the fact that the Board of Trade have withdrawn control over the supply of lighting fittings, thus permitting new manufacturers to commence production. Should members contemplate taking advantage of this relaxation, not only will they require to notify the Board of Trade when they begin manufacture, but also they will become liable to registration for Purchase Tax purposes if their gross takings from the sale of chargeable goods of their own manufacture are likely to exceed £500 per annum.

The new arrangements designed to facilitate the disposal of Government surplus machine tools in the interests of industrial re-equipment came into operation on March 15. Stock records will be maintained in each of the Machine Tool Control offices in Birmingham, Bristol, Glasgow, Leeds and Manchester, as well as in London, and will be open for inspection between the hours of 10 a.m. and 4 p.m. from Monday to Friday in each week. Permits may be obtained to inspect machines where they are stored. Contractors should address any inquiries relating to Government-owned machines in their possession to the department with whom they hold an agreement.

Company News

BELL TELEPHONE OF CANADA.—Qtrly div. \$2.

PYE (IRELAND).—Fst. and fin. div. 7½% (same).

GLOBE TELEGRAPH AND TRUST.—Qtrly. intm. 1% net on ord. (same).

RENOLD AND COVENTRY CHAIN CO. LTD.—Intm. div. on ord. 3% (same).

SALISBURY ELECTRIC LIGHT CO., LTD.—Fin. div. 6% (same), mkg. 10%.

S. SMITH AND SONS (ENGLAND).—Intm. 7% on pref'd. ord., payable June 12 (same).

J. SAMUEL WHITE AND CO., LTD.—Intm. on ord. 2½% tax free (same).

NIGERIAN ELECTRICITY SUPPLY CORPORATION LTD.—Intm. 3% (same), less tax, payable Apr. 14.

ORIENTAL TELEPHONE AND ELECTRIC.—Fin. div. 4% (same), less tax. Pft. 1944, £20 482 (£19 431).

SIR WM. ARROL AND CO., LTD.—Div. on ord. 15%, and bonus 10%, mkg. 25%, less tax, for 1944 (all same).

ANGLO-AMERICAN TELEGRAPH CO., LTD.—Qtrly. intm. 15s. % on ord. and £1 10s. % on pref'd. ord. (both same).

NORTHERN GENERAL TRANSPORT LTD.—Fin. div. 6% (same), mkg. 10% (same). Net pft. 1944, £112 542 (£98 488).

BRITISH ROPES LTD.—Co. announces that whole outstanding 4½% fst. mort. deb. stk. will be redeemed at 102½% on July 1.

LONDON ASSOCIATED ELECTRICITY UNDERTAKING LTD.—Div. on ord. for 1944, 4%, less tax (same). Net pfts. £238 211 (£244 423).

DAVIS AND TIMMINS LTD.—Fin. 20% (same) mkg. 30% (same). Net pft. 1944, £52 202 (£50 733), after taxatn., war damage, etc.

GENERAL HYDRAULIC POWER CO., LTD.—Fst. and fin. div. 5% for 1944 (4%). Pfts. for yr., £22 856 (£20 216). Carry-fwd., £24 861 (£24 504).

BROOM AND WADE LTD.—Co. have secured provisional consent to issue of 132 000 5s. ord. shs. at 18s. 9d. each in proportion of 22 for every 100 held on Mar. 31.

ASSOCIATED ELECTRICAL INDUSTRIES LTD.—In connection with the offer to exch. 10 £1 8% A.E.I. cum. pref. shs. for every 11 £1 7% B.T.H. cum. pref. shs. it has been decided to extend the closing date to Ap. 18.

SWANAGE GAS AND ELECTRICITY LTD.—Rev. 1944 £24 055 (£18 585), less expend. £23 475 (£17 350). lvg. £580 (£1 235). brot. in £11 216 (£12 536). To loan int. £980 (£975), pref. divs. £647 (same), ord. divs. nil (£583), fwd. £10 169.

OAKHAM GAS AND ELECTRICITY CO., LTD.—Pft. on electricity £3 248. To income tax £2 499, E.P.T. £570, war dam. £200,

deb. int. £337, leavg. avail. balce. £406, plus £808 brot. in. Fixed div. on 5% and 6% pref. declrd., on orig. ord. 3% and 2.4% and 2.1% on 8% and 7% new ord. respectively, fwd. £433.

LANCASHIRE UNITED TRANSPORT AND POWER CO., LTD.—Net pft. 1944, after dirs.' fees, war dge., pensions and grants £175 461 (£163 801), plus investmt. inc. £30 697 (£36 361). To taxatn. £115 854 (£126 355), deb. redemptn. £3 501 (£3 334) gen. res. nil (£1 669), amal. div. 6% (same) mkg. 10% (same), fwd. £13 158 (nil).

COMPANIA DE ELECTRICIDAD DE LA PROVINCIA DE BUENOS AIRES.—Accts. for 1943 show gross income £775 691 (£643 979), less wkg. exes., provns. and fees £692 956 (£599 498), lvg. net £82 735 (£48 481). To res. £7 388 (£4 634), 8% pre-pref. div. £43 847 (same), 6% div. on 8% partg. pref. £31 500 (nil).

WEST KENT ELECTRIC CO. LTD.—Rev. 1944 £738 807 (£674 191), less expend. £583 494 (£521 088), lvg. £155 313 (£153 103). To deprecn., etc., £47 500 (£50 000), tax £55 000 (£48 000), contings. £10 000 (£15 000), to gen. res. £10 000 (nil), pref. div. £11 250 (same), ord. div. 8% £20 000 (same), fwd. £39 072 (£37 509).

MIDLAND ELECTRIC MANUFACTURING CO. LTD.—Trdg. pft. 1944 (after tax) £46 462 (£44 385), int. and fees £2 161 (£2 209), mkg. £48 623 (£46 594). To dirs.' fees £200 (same), leavg. net pft. £48 423 (£46 394). Pref. div. £2 813 (£2 812), to gen. res. £20 000 (same), ord. div. 10% £7 500 (same), ord. bonus 15% £11 250 (same), fwd. £35 820 (£28 960).

BRITISH ROPES LTD.—Trdg. pft. for 1944 includg. divs. and int. and after providg. for E.P.T. and defd. repairs £604 074 (£527 588). Deduct deb. int. £33 452 (£33 971), dirs.' fees £1 1436 (£1 499), deprecn. £116 227 (£124 833), deb. stk. redemptn. £12 069 (£11 544), inc.-tax £230 000 (£200 000), war damage £2 500 (£5 000), gen. res. £75 000 (£50 000), fwd. £242 119 (£215 873).

CLAYTON DEWANDRE CO. LTD.—Trdg. pft. 1944 after E.P.T. £80 113 (£85 339), plus int. £253 (£404). After inc.-tax £26 350 (£22 350) and £16 933 (£19 971) off bldgs., plant, etc., dirs.' fees £1 100 (same), net pft. £35 984 (£42 322), plus £14 552 (£13 582) brot. in. Fin. div. 6%, mkg. 10%, to gen. res. £7 500 (same), written off patents nil (£6 552), fwd. £15 736.

AUTOMATIC TELEPHONE AND ELECTRIC CO. LTD.—Fin. div. on ord. 7%, and cash bonus 2½% (both same). Div. on defd. 10% and cash bonus 2½%, both less tax

(same). Pfts. amt. to £299 800 (£280 952), dirs.' fees £2 453 (same), deprecn. £67 418 (£60 467), cap. premiums war damage £3 251 (£5 720), to inc.-tax on 1944 pfts. £128 907 (£127 478), to war contings. £30 000 (£20 000), fwd. £124 934 (£130 348).

ENGINEERING COMPONENTS LTD.—Net divs. from subsids. £18 938 (£19 075), int., etc., £315 (£228) and E.P.T. surplus £4 065 (£7 468), mkg. £23 518 (£26 771). To fees £1 174 (£1 008), exes. £774 (£887), inc. tax £1 098 (£2 776), lvg. £20 472 net (£22 100), plus £16 501 (£12 276) brot. in mkg. £36 973 (£34 376). To pref. div. £2 250 (same), ord. 10% intm. £6 250, fin. 15% £9 375 (both same), again mkg. 25%, less tax, fwd. £19 098.

BOURNEMOUTH AND POOLE ELECTRICITY SUPPLY CO. LTD.—Rev. 1944 £765 197 (£664 990), less expend. £529 482 (£449 994), lvg. £235 715 (£214 996). Brot. in £7 944 (£9 834). To deb. int. £14 000 (same), sinkg. fund £12 237 (£11 881), deprecn. £63 000 (£62 000), tax £88 000 (£70 000), contings. £5 000 (same), to investmt. res. £460 (nil). Pref. divs. £7 396 (same), ord. div. 12½% £46 609 (same), fwd. £6 957.

SOUTH METROPOLITAN ELECTRIC LIGHT AND POWER CO. LTD.—Rev. 1944 £1 103 534 (£1 039 165), less expend. £767 635 (£722 993), leavg. £335 899 (£316 172), plus £25 000 (nil) transfd. from taxn. res. To deb. int. £57 480 (£56 459), off deb. issue exes. £1 000 (same), deprecn. £174 122 (£174 682), tax £80 000 (£44 000), contings. £500 (same), pref. divs. £18 250 (same), ord. div. 7% £27 125 (same), fwd. £38 047 (£35 625).

BRITISH MECHANICAL PRODUCTIONS LTD.—pft. to July 31 £39 550 (£35 434). To dirs.' fees £1 117 (£950), war dam. £500 (£750), taxn. £22 500 (£18 200), defd. reprs. nil (£3 500), off patents £2 053 (£2 850), leavg. £13 380 (£9 184), plus £2 203 (£2 660) brot. in and res. written back nil (£1 623). Intm. div. 3% (same) absorbed £1 875, fin. div. 7% (same) mkg. 10% (same), gen. res. £5 000 (£2 315), contng. res. £2 300 (£2 700), fwd. £2 033.

S. GUITERMAN AND Co., LTD.—Tradg. pft. 1944 £32 588 (£26 321). To deprecn. £298 (£368), fees £547 (£583), lvg. net pft. £31 743 (£25 370). Tax £19 000 (£13 500), pref. div. £1 787 (same), ord. div. 10% £2 750 (same), ord. bonus 5% £1 375 (nil), ptpg. pref. div. 3½%, £962 (same), to gen. res. £2 000 (same), war contng. £1 000 (same), benefit fund £1 000 (£500), fwd. £16 658 (£14 790).

NORTEAMPTON ELECTRIC LIGHT AND POWER CO.—Rev. 1944 £220 081 (£200 496) plus other inc. £9 491 (£8 220), mkg. £229 572 (£208 716). Deduct charges incldg. E.P.T., etc., net rev. £158 365 (£146 198), plus £95 738 (£94 130) brot.

in. Pref. div. absorbs £1 313 (same), inc.-tax, incldg. £19 244 to complete prov. on pfts. of yr. £96 000 (£79 777), to gen. res. £15 000 (£20 000), fin. ord. div. 6% mkg. 10% (same), fwd. £98 290.

SCOTTISH POWER Co., LTD.—Tradg. pfts. of owned and operated cos. for 1944 £1 052 435 (£1 082 103), or after tax £552 955 (£535 509). To deprecn., renewals and res. or carr. fwd. by these cos. £245 368 (£202 465). Gross rev. to parent co. £575 175 (£626 088), mkg. total income £582 916. To admin. exes., fees and int. £31 212, tax £278 347 (£315 753), to gen. res. £22 750 (contings. £25 000), fin. ord. div. 5%, mkg. 8% (same), fwd. £17 607 (£15 000).

KENT ELECTRIC POWER Co., LTD.—Receipts 1944 from sale of current and meter rentals £1 946 323 (£1 765 152) and sundries £14 530 (£17 413), mkg. £1 960 853 (£1 782 565). Generatn. cost £722 243 (£610 945), purchase of current £563 268 (£551 083), distributn. £27 968 (£26 147), rates and insur. £65 337 (£63 962), sals. and wages £39 149 (£38 037), and miscell. charges £39 808, leavg. net rev. £453 080 (£454 130), plus £150 012 brot. in (£131 451), mkg. £603 092 (£585 590).

CLYDE VALLEY ELECTRICAL POWER Co. LTD.—Accts. show rev. (incldg. int. divs., etc.), £731 861 (£671 684), less int. paid and accrued £342 (£765), leavg. pft. £731 519 (£670 919), plus £189 949 brot. in. mkg. £921 468. To pref. divs. £58 000, ord. div. 5%, mkg. 8% £252 000 (all same), contng. fund £275 000 (£250 000), war dmge. £25 000 (same), superann. specl. contributn. £15 000 (£10 665), taxn. £100 000 (£130 000), defd. reprs. £10 000 (nil), fwd. £186 468.

LANCASHIRE ELECTRIC LIGHT AND POWER Co., LTD.—Pft. for 1944 £369 588 (£370 466), after chargg. fees and deb. int. £75 313 (£74 288). Deb. redemptn. takes £13 241 (£12 611), inc.-tax £184 872 (£187 653), fixed divs. on 6% pref. and 7% partieg. pref. £59 489 (same), int. 2½% on ord. £36 250 (same). Dirs. recommend additional ½% £2 500 (same) on partieg. pref., mkg. 7½%, fin. of 5% (same) on ord. £72 500, mkg. 7½%, less tax, (same), carryg. fwd. £15 613 (£14 877).

INDIA RUBBER GUTTA PERCHA AND TELEGRAPH WORKS.—Net tradg. pft., after E.P.T., £175 096 (£169 333). To deprecn. £50 410 (£45 352), deb. int. £16 683 (£17 134), fees £2 529 (£2 927), inc.-tax £45 000 (same), spec. deprecn. £10 000 (same), war dmge. contrbn. £5 990 (£7 016), leavg. net blee. £44 484 (£31 904). To pref. div. £6 875 (same), contng. £5 212 (nil), gen. res. £100 000 (nil), fixed 6% on pref. ord. plus 2% addtnl. £6 000 (same), fixed 6% plus 3% addtnl. on ord. £4 500 (same). Fwd. £129 384 (£207 487).

NORTH SOMERSET ELECTRIC SUPPLY CO., LTD.—Fst. and fin. on ord. 7% (same). Net pft. 1944 £62 880 (£62 234).

GREENGATE AND IRWELL RUBBER CO., LTD.—Pft. to Dec. 24 (after tax) £68 427

(£63 609). To deprecn., fees, etc., £22 283 (£23 454), lvg. net pft. £46 144 (£40 155). Pref. div. £14 250, ord. div. 2s. 6d. per 16s. sh. £23 438, defd. div. 3d. per 1s. sh. £1 719 (all same), fwd. £55 069 (£48 332).

COMPANY MEETING

BRITISH THOMSON-HOUSTON COMPANY

Efficiency of Plant Maintained—Post-War Prospects—Mr. Henry N. Sporborg on Cost of Coal

THE fiftieth ordinary general meeting of the British Thomson-Houston Co., Ltd., was held on March 23 at Crown House, Aldwych, London, W.C.

Mr. Henry N. Sporborg, the chairman, who presided, said "Before dealing with the accounts it is necessary for me to refer to the changes which have taken place in the membership of the board since our meeting a year ago.

In June of last year we lost the services of Mr. P. S. Turner, who died after bravely enduring several months of severe illness. I have already expressed to his family our deep appreciation of his services, and our sincere sympathy in their loss.

In December last Mr. D. Abel Smith found it necessary to resign his seat on the board. Mr. Abel Smith did much valuable work for the company during his membership of the board, and I have expressed to him our sincere regret at its termination.

Additions to Board

During the year the board has been strengthened by the election of three new members; Mr. E. H. Ball, Mr. E. S. Little and Mr. W. W. Vinsen. Mr. Ball joined the company in 1923 and has had valuable experience of its business, both overseas and at home, in the Commercial Organisation. Since 1932 he has been manager of the transformer department, which position he still holds. Mr. Little, who joined the company in 1912, has had many years' experience in the accounting department, and has held his present position as Comptroller of the company since 1936. Mr. Vinsen has been actively associated with the manufacturing organisation since entering the company's service in 1923. For the past 10½ years he has acted as the manager of our Coventry works, and has now undertaken the additional duties of assistant director in charge of manufacture. All three of these gentlemen, by reason of their long association with the company's business, will greatly assist the board in its direction of the company's affairs. I therefore have no hesitation in recommending that

their appointments to membership of the board should be confirmed.

As will be seen from the report of the directors which is in your hands, the profit for the year, after deducting all expenses and charges other than interest on debentures and loans and after providing for taxation, was £596 527, as compared with £580 362 for the previous year. In accordance with our usual practice, the words "after providing for taxation" mean after providing for the taxation arising from the profits for the year covered by the report, including the taxation applicable to dividends, and the dividends are accordingly shown net after deduction of the tax applicable to them.

After deducting interest on debentures and loans, £87 716, and depreciation, £228 975, there is a balance left of £279 836, as compared with £266 697 for the previous year. To the balance of £279 836 there is to be added the amount brought forward from the previous year, £248 368, making the total to be dealt with £528 204, as compared with £520 868 for the previous year.

It has been decided to transfer to the general reserve account £150 000, thereby raising it to £1 300 000. The dividend on the seven per cent. preference shares, less income tax, amounting to £52 500 has been paid, and your directors recommend the payment of a dividend on the ordinary shares at the rate of 7 per cent. for the year, less income tax, £70 000, leaving £255 704 to be carried forward to the new account, as compared with £248 368 brought in from the previous account. The other items of the accounts call for no special comment. The amount of our 5 per cent. debenture stock outstanding has been reduced by drawing the amount required by the Trust Deed.

Our manufacturing plants have been maintained during the year in as high a state of repair and productivity as possible under the existing conditions.

Capital Expenditure

Our capital expenditure on manufacturing equipment and buildings during the past year has again been curtailed by the prevailing conditions, but we have fully

maintained our established practice by writing off to depreciation of our plant account the sum of £228 975. We have also extensive plans for replacement and extension of plant at our various factories to meet the coming demand, when conditions are such as to permit the plans to proceed.

The company has continued to assist its employees to maintain their contributions to the National Savings movements, and the payments to employees who have joined H.M. Forces have been carried on and have increased as more of our staff have joined the Services. We have ample evidence that these arrangements have been helpful, and are greatly appreciated.

The company has every wish to continue its long established policy in regard to the education and training of apprentices and young engineers required in our technical organisation, and active steps have been taken to organise on a comprehensive basis arrangements for re-training and rehabilitation of those employees now in the Forces who will return to us when hostilities cease.

Re-absorption of Returning Employees

Re-absorption in the company's service of employees now serving in H.M. Forces is being actively studied by a committee appointed for the purpose, and such employees are already being communicated with individually, as opportunity permits, to ensure that they return to positions where they will be best able to use their training and ability in post-war activities.

The time has not yet arrived, nor is this the place, to recount the contributions of our organisation to the needs of the Forces for the war effort, but it can be stated that throughout the past year, as in previous years, we have devoted our resources to the maximum possible extent to the needs of the Services, and this we will continue to do to the utmost of our ability until victory is achieved both in the West and in the East.

Our work covers such a wide range of products that it is not possible for me to refer to any one section of it without appearing to neglect others of equal importance, but I can refer to the satisfaction that was felt throughout the organisation at the honour that was done us when H.M. the King conferred distinctions upon Mr. G. S. C. Lucas, O.B.E., and Mr. T. H. Kinman, M.B.E. Both of these gentlemen hold responsible positions in our research organisation.

With regard to the future, there is ample evidence of the demand for the products of our company, and there can be no question of the potential capacity of the electrical industry to meet this demand and contribute substantially toward the great national need for increased exports.

Overseas purchasers, however, have made

it clear that, both as regards technical performance and price, our products must be competitive with those offered by foreign manufacturers, and it remains to be seen whether under existing conditions this test can be met.

As regards technical performance, I think it is recognised that our products can compete in efficiency with those obtainable in any foreign country; but in regard to price, our position is less favourable. This is not due to any excessive charge on capital account or to unreasonable demands for profit, but results entirely from the cost of raw materials used in the manufacture of our products, and the rate of productivity of our labour.

Over many years there has been steady improvement in the technical efficiency of the apparatus manufactured by our industry for use in power stations for the generation of electricity. This improvement has resulted in a very substantial increase in the amount of electricity produced per ton of coal consumed. Unfortunately, however, the price of coal to-day has increased to such an extent that the entire economic benefit of this improvement in efficiency has been nullified.

Effects of High Coal Prices

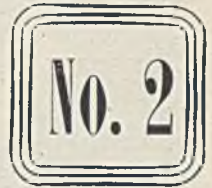
This handicaps not only the electrical industry, but every industry that depends upon coal for the production of its output. It reacts again on the electrical industry in the price of steel, which enters so largely into our products, since the price of steel has risen in proportion to this great increase in the price of coal.

It is, I think, important to realise that the National plans for the improvement of social conditions, standard of living, and educational facilities, are all dependent upon our ability to secure the great increase in exports necessary to maintain the policy of full employment. A fundamental condition for accomplishing this is our ability to secure the raw materials required for our industries at prices which will enable our manufactured products to be competitive both in price and performance with those offered by overseas manufacturers.

We are indebted to our staff and work-people for their continued loyal service, rendered so much more onerous and exacting by war-time conditions, and I am happy to pay a well deserved tribute, not only to our regular employees, but also to those men and women who have come forward as temporary workers, and have so ably assisted in carrying the burden."

The report of the directors together with the company's accounts to December 31, 1944, were approved and adopted. The retiring directors were re-elected and the auditors re-appointed.

MARSHALL
RICHARDS
WIRE
ECONOMY



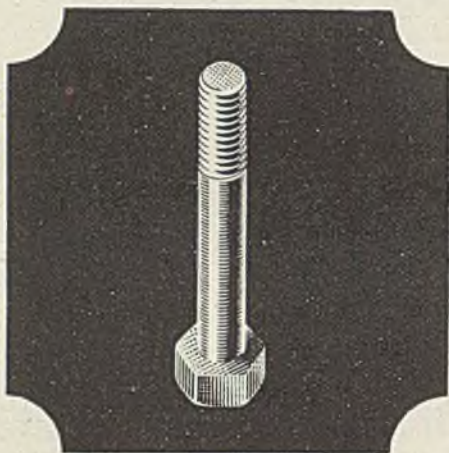
The Marshall Richards infinitely variable speed drive ensures the maximum output of every single size of wire at the lowest cost per ton.

THE MARSHALL RICHARDS
MACHINE CO. LTD.

Britannia Works
Gainsborough, Lincs.



FAMOUS FASTENERS



HIGH TENSILE HEXAGON BOLT

Three distinct tests ensure the standard of Linread Bolts. The first is checking of raw material, the second is specialised Quality Control during manufacture, and the third, inspection of finished products.

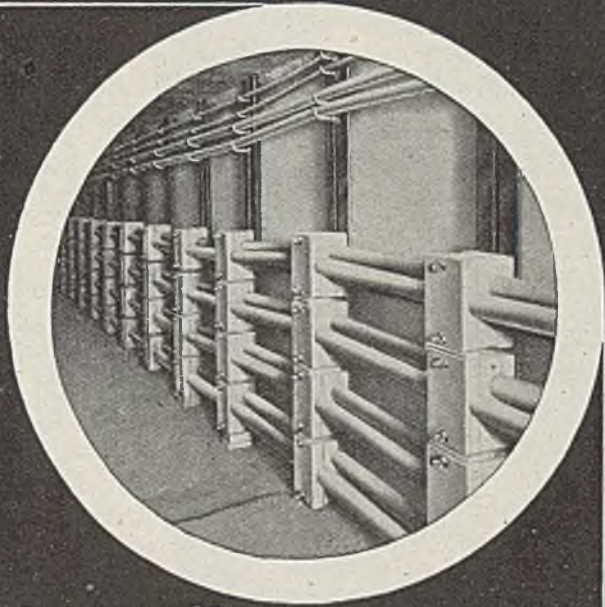
Specialists in Cold Forging; Roll Threaded Screws; Solid and Tubular Rivets; Nuts and Bolts in all metals; Small Pressings; Auto and Capstan turned Parts.

LINREAD LTD., STERLING WORKS, COX STREET, BIRMINGHAM 3.
TELEPHONE No. CEN. 3951 P.B.X. TELEGRAMS: "LINREAD BIRMINGHAM."
London Office: Clifton House, Euston Road, London, N.W.1. Tele. No. Euston 6385.

Linread
SPECIALISTS IN COLD FORGING

ENFIELD CABLES

HAVE A REPUTATION FOR



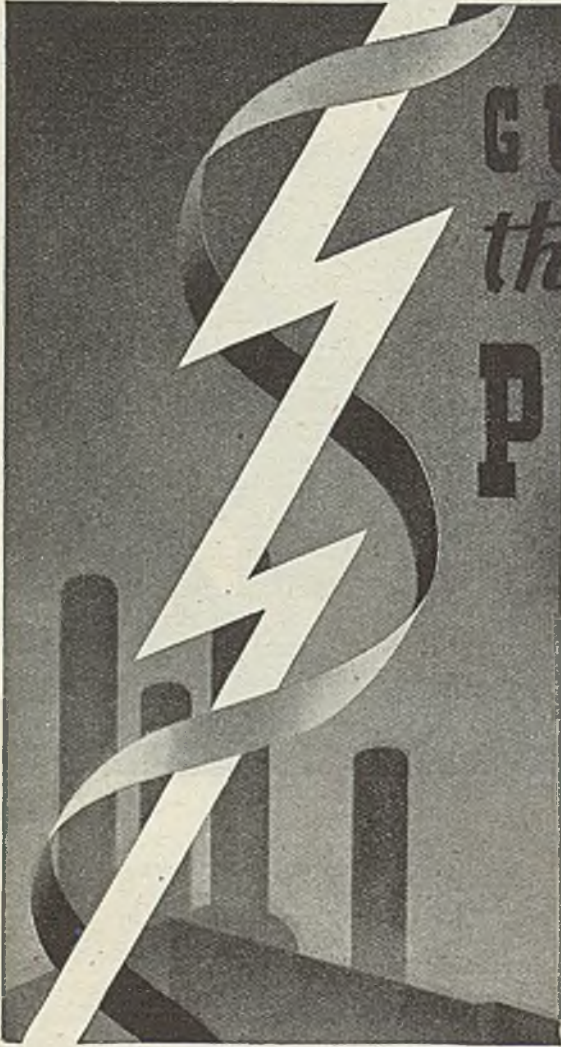
Paper Mains...

A group of plain lead-sheathed 33 kV. cables, made and laid by Enfield, connecting the two switch-houses at an important Generating Station in Southern England; the installation shown consists of two 3-phase circuits, each circuit comprising two 1.0 sq. in. single core cables per phase.

THE ENFIELD CABLE WORKS LTD.

Telephone : Howard 2661 (10 lines)

BRIMSDOWN • MIDDLESEX



GUARDING
the Nation's
POWER

Electric **POWER** is a mighty sinew of the nation's effort. It must be **GUARDED** against leakage.

Tullis Russell Rothmill Cable Insulating Papers are called upon by leading cable manufacturers to perform this task, and it is carried out admirably by these renowned, uniformly high-quality insulating papers.

Rothmill Papers are guaranteed free from metals and grit.

Write for details of the complete range.



ROTHMILL

CABLE INSULATING PAPER

Tullis Russell & Co. Ltd.

Archnutty & Rothes Paper Mills, Markinch, Scotland

LONDON	MANCHESTER	BIRMINGHAM
1 Tudor St., E.C.4	372 Corn Exchange Bldgs., Corporation St.	118 Colmore Row



MASTERPIECES OF METICULOUS ACCURACY



Cooper Stewart

TACHOMETERS

The COOPER-STEWART ENGINEERING Co. Ltd.,
136-7, Long Acre, London, W.C.2

DURAWIRES

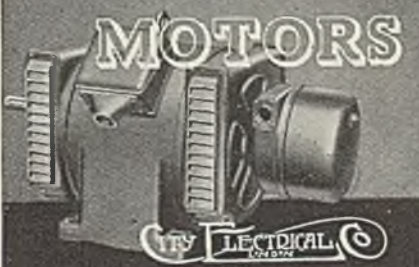
Ergetz Substitute

DURAWIRES & DURACABLES ARE NOT A WAR EMERGENCY SUBSTITUTE

They are not a substitute at all in the sense in which this irritating word is generally used. DURAWIRES AND DURACABLES have their own OUTSTANDING PROPERTIES and will play their part in building the New World as they are helping to win the war.

DURACABLES

MOTORS



CITY ELECTRICAL

EMERALD STREET, LONDON, W. C. 1. TELEPHONE HOLBORN 8922



CERAMITE

CERAMIC EMBEDDED RESISTANCE UNITS

★

THE ZENITH ELECTRIC CO. LTD.
LONDON W.2.

ZENITH

(Regd. Trade-Mark)

Improved Type

CERAMIC EMBEDDED RESISTORS

of the highest quality, complying with all Government Specifications

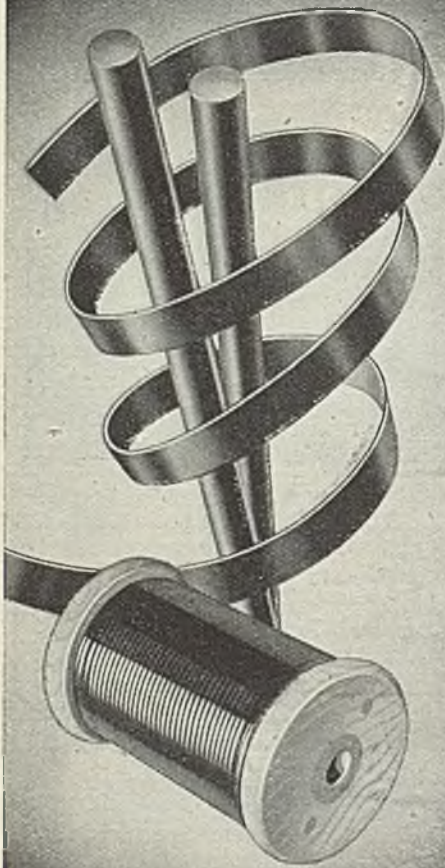
Please allow us to send you a copy of our descriptive catalogue

THE ZENITH ELECTRIC CO., LTD.

Zenith Works, Villiers Road
Willesden Green, London, N.W.2

Phone: WILlesden 4087-8-9
Grams: "Voltaohm, Phone, London"

DRAWING ATTENTION



COPPER & BRASS
WIRE & STRIP

R. H. SYMONDS L^{TD}
39, VICTORIA STREET,
WESTMINSTER, S.W.1

SORDOVISO

Street Lighting
Control



THE forms of control for Street Lighting are many and varied, but now **CENTRALISED CONTROL** is generally accepted as essential.

Sordoviso Street Lighting control units embodying the Sordoviso non-filting Mercury Switch with its inherent features of non-burning contacts, low energising current, silence in operation and freedom from climatic effects, provide a most efficient remote, or automatic control with low installation and maintenance costs.

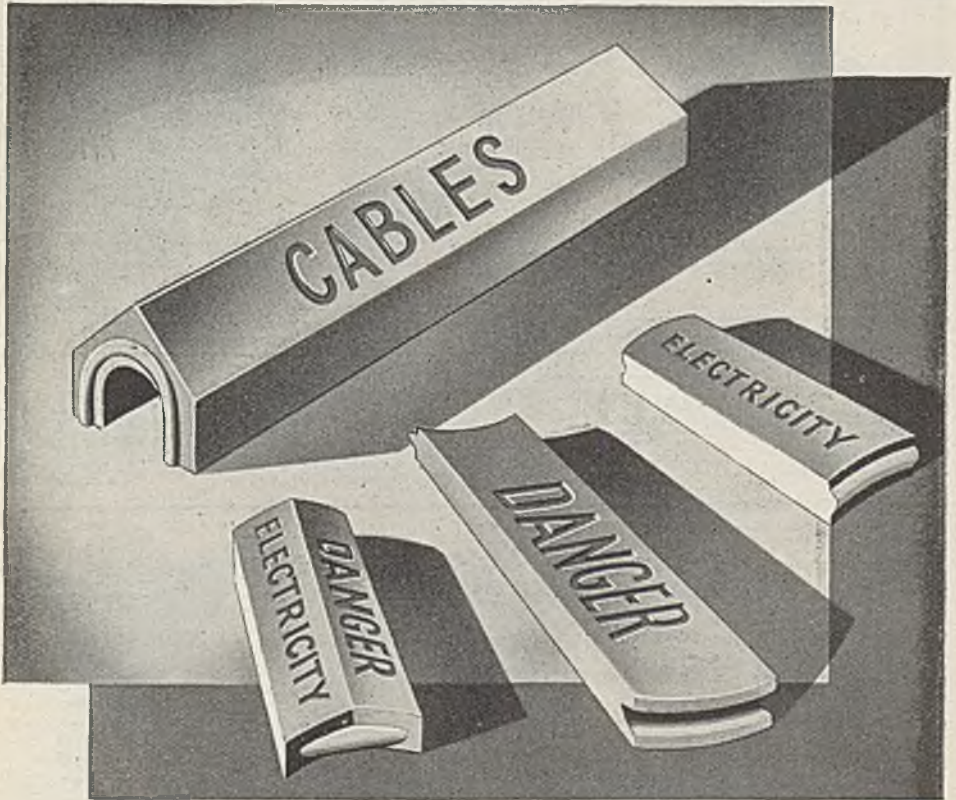
If you are contemplating a new scheme or modifications to an existing one, the advice of our Technical Staff is always available.

We should be pleased to forward, on application, our brochure, "Controlled Street Lighting."

SORDOVISO SWITCHGEAR LTD.

Falcon Works, Loughborough
LOUGHBOROUGH 3131

VINCULUM



CONCRETE CABLE COVERS

"Brook" type, "Peaked" and "Flat" patterns are shown above. In each case a joggled joint renders the covers firm and rigidly interlocked when laid. The ends of Flat and Peaked covers are respectively convex and concave, so enabling the many obstacles met with to be easily overcome.

Lengths, 18" and 36"; widths, 4½" to 12".

Details of reinforcements and other information are contained in a booklet which will be posted to you on request.

**TARMAC LTD., VINCULUM DEPT.,
ETTINGSHALL, WOLVERHAMPTON.**

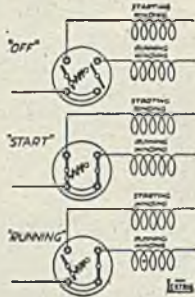
Telephone :—BILSTON 41101/8 (8 lines).

(Regd.)
**“TWINOB” A.C. SINGLE-PHASE
 MOTOR-STARTING SWITCH**

Split-Phase Control 3, 5 & 10 amps. at 250 volts



STANDARD



ALL-INSULATED

LEAFLETS EI. 41, 52 & 60

This advertisement does not necessarily imply that the above product is available.

Established
in 1882.



A.P. LUNDBERG & SONS
 LIMITED

TELEPHONE NORTH 3381 ELECTRICAL ACCESSORIES TELEGRAMS LUNDBERG, LONDON.
 PIONEER ELECTRICAL WORKS
 491 to 493 LIVERPOOL ROAD, HOLLOWAY, LONDON, N.7



**Three
 operations
 in one!**

... and the "patients" are well again almost before being diagnosed! ("you lucky 'patients'"). Three operations by one movement of the hand! Incredible, isn't it? Nevertheless, that's the Hellermann operation! So easy — so simple to carry out, even by unskilled workers. Hellermann and 'Helsyn' Cable Markers enable cable ends to be bound neatly, safely and rapidly — the job's done in a trice! They insulate, too, these Sleeves, and can be indelibly marked with any specified identification code. For waterproofing and sealing cable junctions, you'll need 'Helvin' Sleeves made from a new plastic.



To operate? Simply fit under Tension with the Hellermann Tool Illustrated below — it's available with Treadle Attachment for foot manipulation, too. And here are just a few of the advantages the Hellermann Binding and Marking System offers: — Prevents unravelling. Excludes Moisture. Doubly insulates Cable ends. Allows for Colour Circuit-coding.

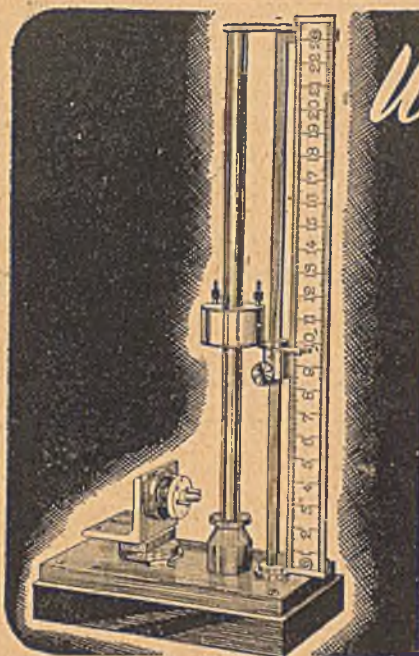
Hellermann
 BINDING AND MARKING SYSTEM



**bound to be
 neat and safe**

HELLERMANN ELECTRIC LTD. GOODTRIC WORKS OXFORD

PHONE OXFORD 2403



Wylex Testing

MOULDING TEST—Wylex mould their own mouldings and prove for themselves the strength of every one. Here is shown the Impact Test Machine, designed and made at Wylex Works. Wylex mouldings must satisfy the exacting demands of this machine.

"Wylex must be good"

GEORGE H. SCHOLLS & CO. LTD.

WYLEX WORKS, WYTHENSHAW, MANCHESTER.

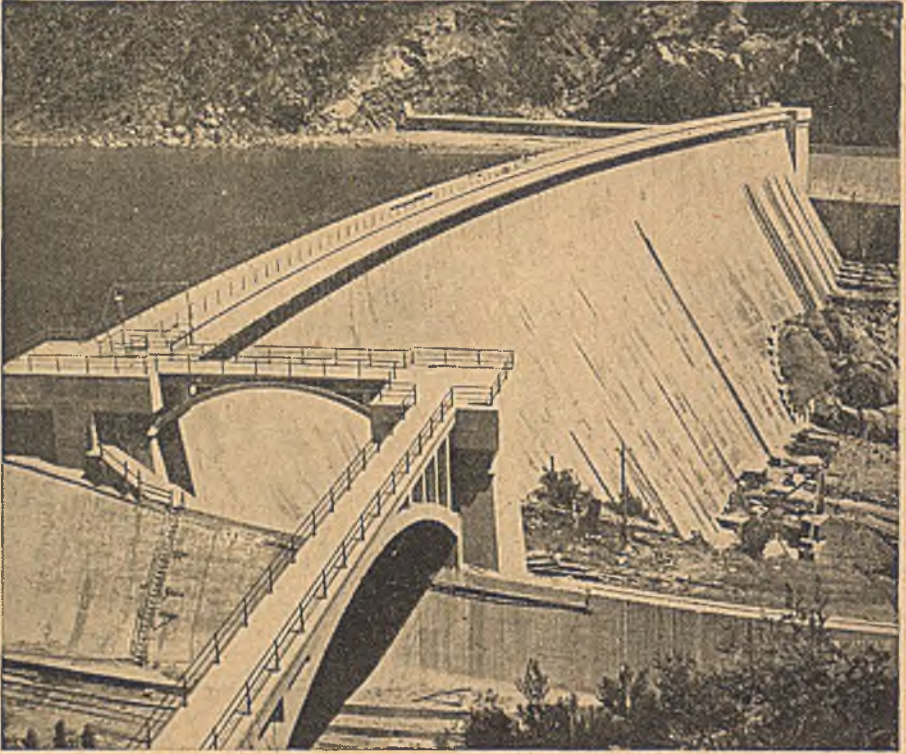
Tel: Wythenshawe, 2251 2.
Grams: "Kilowatt," Manchester.

ELECTRICAL APPLIANCES

Dowsing's

THROUGHOUT the years of peace and war Dowsing's have pursued a progressive policy in the manufacture of all types of electrical appliances. This policy has brought us customers in industry as well as domestic traders, and we look forward to serving them all with even more interesting equipment in the future.

DOWSING CO. (ELECTRICAL MANUFACTURERS) LTD. KANGLEY BRIDGE ROAD, LOWER SYDENHAM, S.E.26.



FAMOUS HYDRO-ELECTRIC STATIONS.

The Burrinjuck Dam, situated on the Murrumbidgee River, New South Wales, Australia, and originally called the Barren Jack Hydro-Electric Scheme, is a fine example of engineering progress in the Antipodes. The capacity of the reservoir is 33,612,617,000 cubic feet with a maximum storage depth of 200 feet, the electrical power generated has an ultimate capacity of 26,800 H.P.



MEASUREMENT LIMITED

Electricity and Water Meters of Quality

TERMINAL HOUSE, LOWER BELGRAVE ST., LONDON, S.W.1