FOUNDRY TRADE JOURNAL

EST. 1902

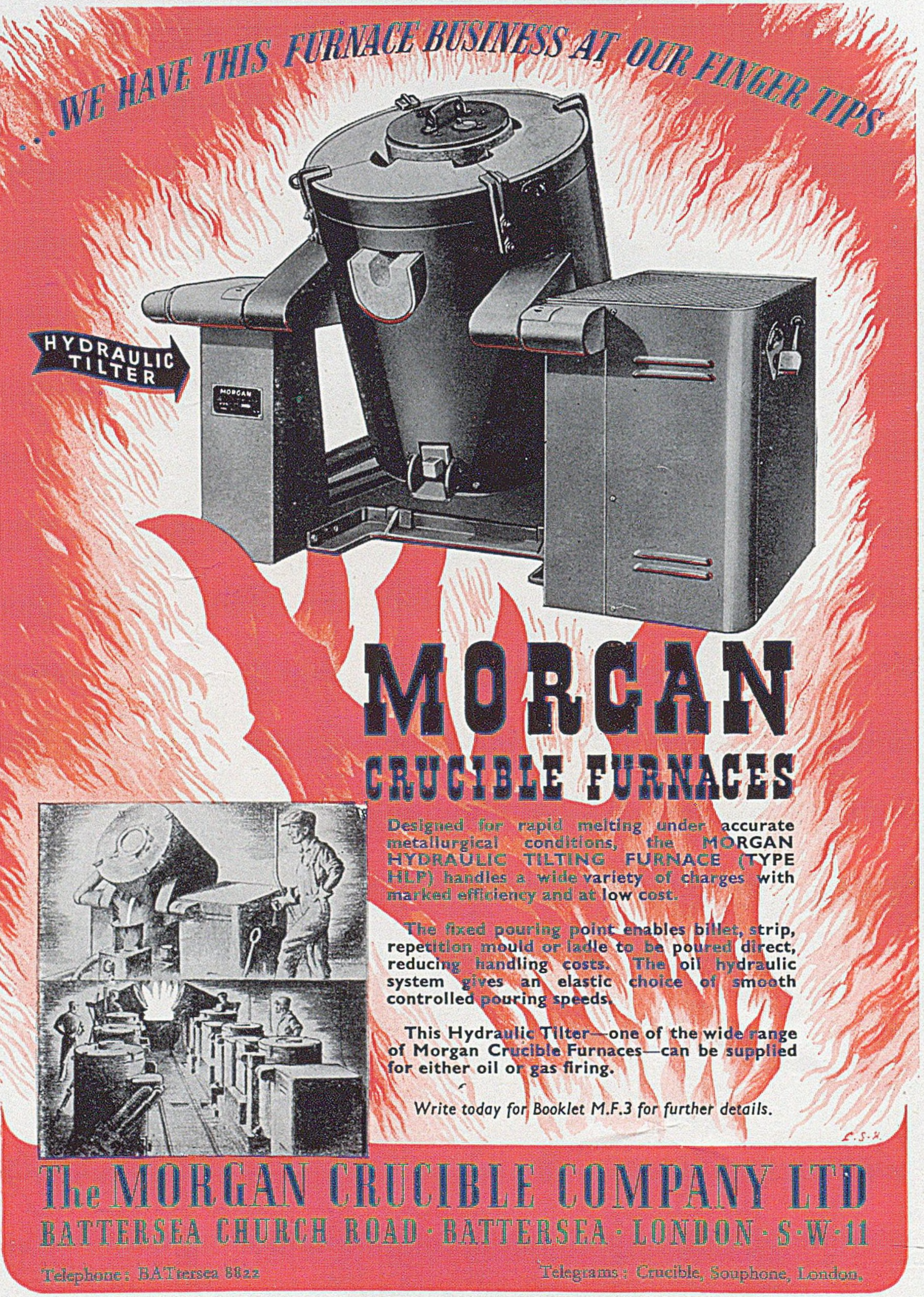
VOL. 90
No. 1816
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

JUNE 21, 1951

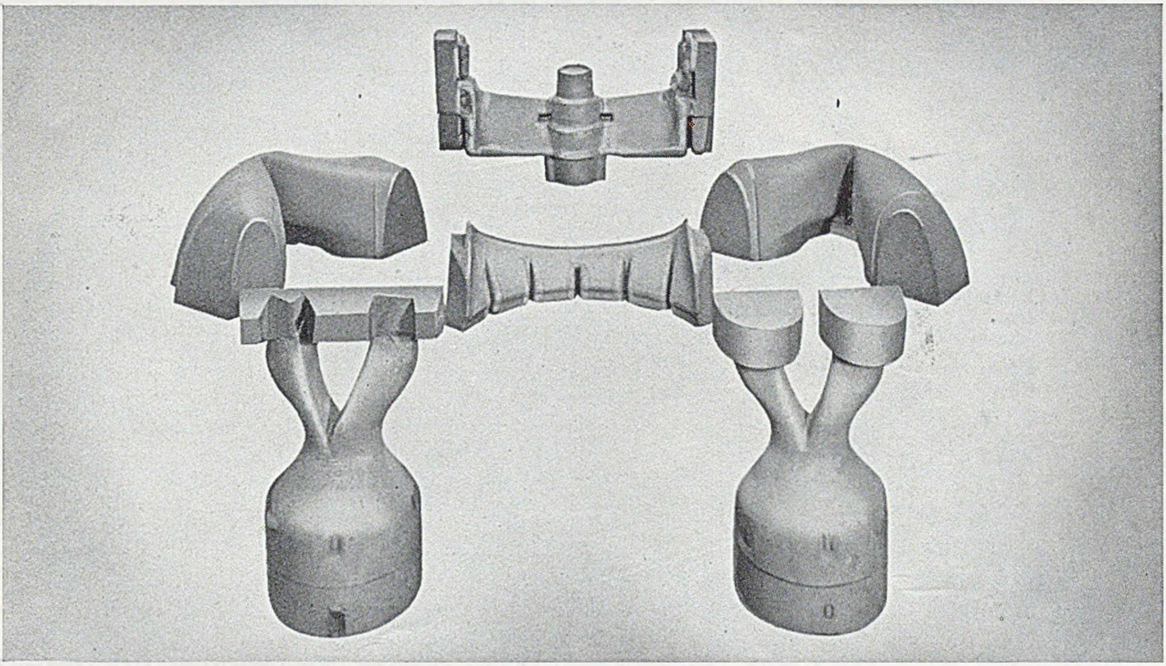
Offices: 49, Wellington Street, Strand, London, W.C.2

Single Copy, 9d. By Post 11d. Annual Subscription, Home 40/-, Abroad 45/- (Prepaid)


...WE HAVE THIS FURNACE BUSINESS AT OUR FINGER TIPS
HYDRAULIC TILTER
MORGAN
MORGAN
CRUCIBLE FURNACES
Designed for rapid melting under accurate metallurgical conditions, the MORGAN HYDRAULIC TILTING FURNACE (TYPE HLF) handles a wide variety of charges with marked efficiency and at low cost.
The fixed pouring point enables billet, strip, repetition mould or ladle to be poured direct, reducing handling costs. The oil hydraulic system gives an elastic choice of smooth controlled pouring speeds.
This Hydraulic Tilter—one of the wide range of Morgan Crucible Furnaces—can be supplied for either oil or gas firing.
Write today for Booklet M.F.3 for further details.
The MORGAN CRUCIBLE COMPANY LTD
BATTERSEA CHURCH ROAD · BATTERSEA · LONDON · S·W·11
Telephone: BATtersea 8822
Telegrams: Crucible, Souphone, London.

A

Modern Development



IN a decade characterised by great Metallurgical advances, the emergence and development of Aluminium and its Alloys has been an achievement ranking high in the annals of Engineering.
Aluminium is one of the most abundant elements found in nature and occurs as silicate in clays, felspars, etc., and the metal is chiefly extracted from bauxite in many parts of the world.
Despite this generous dispensation, it is only in recent years that it has been brought into the service of the great industries where it now holds a commanding place, and the great air armadas which hurtle through the skies is one evidence of this triumph.
The manufacture of Aluminium Alloy castings has had its share in the creative work and research associated with this great progress and to-day Foundrymen are engaged in an output of thousands of tons of this light alloy with so many applications.

Sterling Metals, Ltd., Coventry, is a name closely linked with this branch of Foundry enterprise and from the earliest days they have engaged in the production of sand and die cast Aluminium products of the highest repute.

On this page we reproduce a photograph taken at the Nuneaton Foundries of Sterling Metals Ltd., showing cores for castings for the de Havilland Engine Company.

These cores are made with G.B. KORDEK to which a small proportion of Oil has been added, and this combination has been associated with the routine practice in this Foundry with success for many years.

We are indebted to Messrs. Sterling Metals, Ltd., for their kind permission to reproduce the photograph and for assistance rendered.

KORDEK Binders FOR ALL CLASSES OF WORK

CORN PRODUCTS CO. LTD., WELLINGTON HOUSE, 125-130 STRAND, LONDON, W.C.2
BRANCHES AT BIRMINGHAM, MANCHESTER, NEWCASTLE AND PAISLEY
A member of the Brown & Polson Group

KORDEK G.B KORDEK G.B KORDOL

G.B. KORDEK and G. B. KORDOL are Manufactured under British Letters Patent Nos. 515470, 543202

PRODUCTION

WITH THE 'MINOR' SANDRAMMER

FE for Foundry Efficiency

TRADE MARK

The ALLIANCE FOUNDRY CO. LTD.
ICKNIELD ROAD WORKS.
LUTON.

Messrs. Foundry Equipment Ltd.
Linslade Works,
LEIGHTON BUZZARD. Beds.

Our Ref. KCM/DEH

Date. 28th May, 1951.

Dear Sirs,

We have now had the 'Minor' Sandrammer Unit in operation for four months, and we thought you may like to know the results.

For every £1 we spend in wages on the 'Minor' Unit, the sales value of the castings produced is £4. 9s. 6d. For every £1 we spend in wages on hand floor moulding, the sales value of the castings produced is £2. 15s. 0d., therefore the output in relation to wages paid is increased by 76.6% over hand floor moulding.

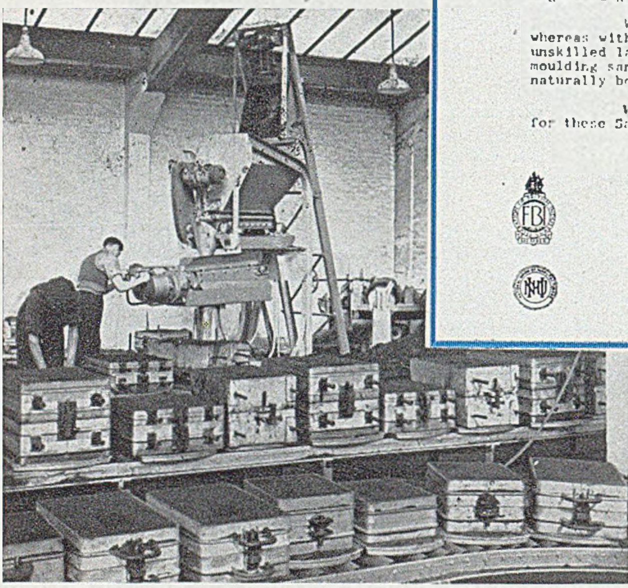
The types of castings produced are general jobbing engineering castings, of an average weight of 6½lbs. each.

With the 'Minor' Unit, we use 60% unskilled labour whereas with hand floor moulding we use 85% skilled and 15% unskilled labour. In addition, we save 7s. 6d. per ton on moulding sand, through the use of synthetic sand, against naturally bonded sand for hand moulding.

We hope to shortly place further orders with you for these Sandrammers.

Yours faithfully,
For and on behalf of
THE ALLIANCE FOUNDRY CO. LTD.

K.C. MORRIS.
Works Manager.



Reproduction of a letter received from the Alliance Foundry, concerning results achieved with the installation illustrated on the left.

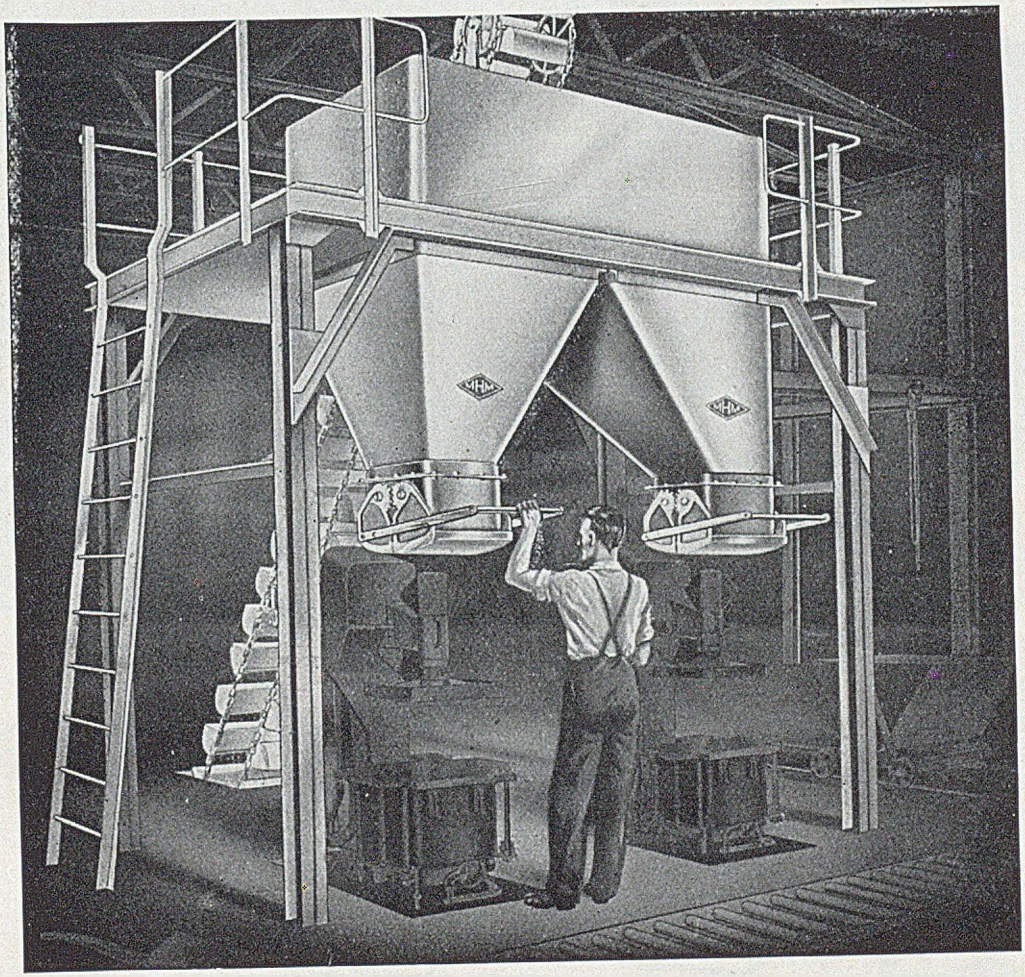
AS SHOWN BY THE FIGURES IN THE ABOVE LETTER, THE 'MINOR' SANDRAMMER IS A FIRST-CLASS PROPOSITION FOR SMALL JOBBING WORK. IT IS PARTICULARLY SUITABLE FOR SINGLE OR SHORT RUN PRODUCTION FROM LOOSE WOOD OR METAL PATTERNS.

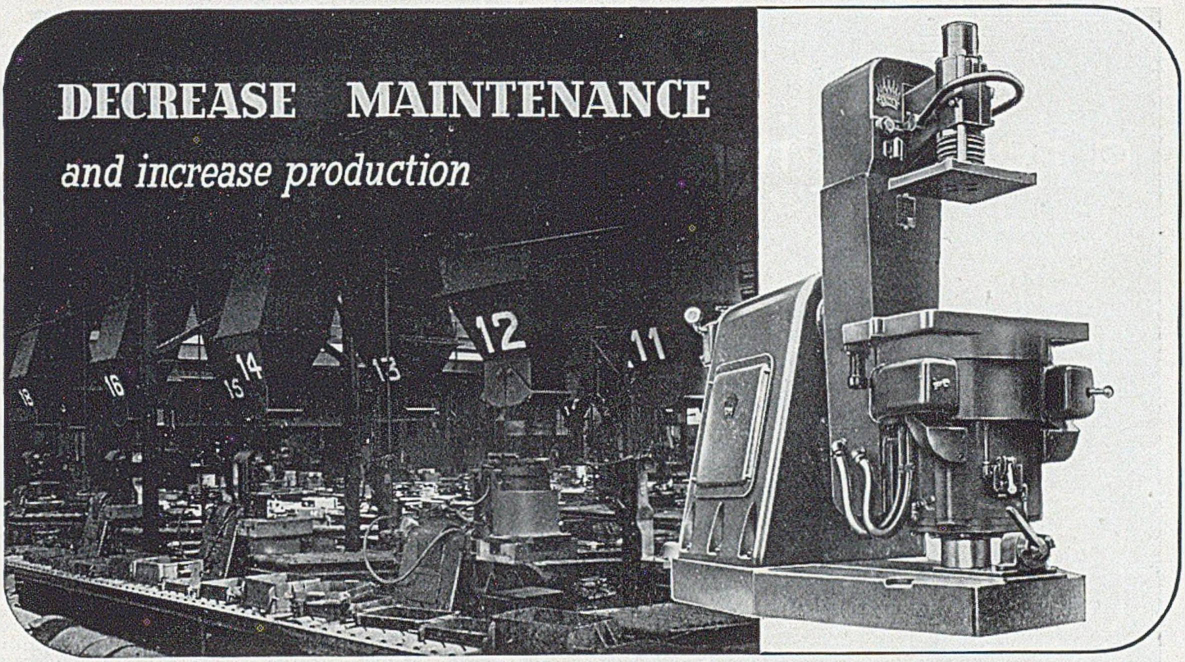
THE 'MINOR' IS A MACHINE WHICH SHOULD BE USED TO CAPACITY—ACHIEVED ONLY BY REALLY GOOD ORGANISATION.

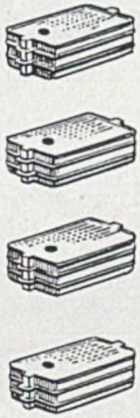
FOUNDRY EQUIPMENT LTD

LEIGHTON BUZZARD, BEDFORDSHIRE, ENGLAND.

PHONE: LEIGHTON BUZZARD 2206-7. GRAMS: 'EQUIPMENT' LEIGHTON BUZZARD




DECREASE MAINTENANCE
and increase production



INDEX TO ADVERTISERS

FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

The FOUNDRY TRADE JOURNAL is the Official Organ of the following :—

INSTITUTE OF BRITISH FOUNDRYMEN

PRESIDENT : **Colin Gresty,** North Eastern Marine Engineering Company (1938), Ltd., Wallsend-on-Tyne.
Secretary : **T. Makemson, M.B.E.,** Saint John Street Chambers, Deansgate, Manchester, 3. 'Phone and 'Grams : Blackfriars 6178.

BRANCHES

Birmingham, Coventry and West Midlands : E. R. Dunning, 16, Hay Lane, Monkspath, Shirley, Birmingham. *Bristol and West of England :* W. A. Hares, 29, Brentry Road, Fishponds, Bristol. *E. Midlands :* S. A. Horton, 163, Morley Road, Chaddesdon, Derby. *Lancs.:* R. Yeoman, 11, Sumner Road, Salford, 6. *Lincs. :* T. H. North, 46, Mildmay Street, Lincoln. *London :* W. G. Mochrie, Tyseley Metal Works, Limited, Balfour House, Finsbury Pavement, London, E.C.2. *Middlesbrough :* F. Shepherd, Head, Wrightson & Co., Ltd., Teesdale Iron Works, Thornaby-on-Tees. *Newcastle-upon-Tyne :* F. Robinson, Sir W. G. Armstrong Whitworth & Co. (Ironfounders), Ltd., Close Works, Gateshead. *Scottish :* J. Bell, 60, St. Enoch Square, Glasgow. *Sheffield :* J. H. Pearce, 31, Causeway Head Road, Dore, Sheffield. *Wales and Monmouth :* A. S. Wall, 14, Palace Avenue, Llandaff, Cardiff. *West Riding of Yorkshire :* H. W. Griffiths, 46, Peckover Drive, Thornbury, Bradford. *South Africa :* Secretaries, S.E.I.F.S.A., Barclays Bank Buildings, Cr. Commissioner and Harrison Street, Johannesburg.

SECTIONS

Burnley : H. Buckley, 33, Newcastle Street, Burnley. *Cape Town :* S. Wade, P.O. Box 46, Salt River. *East Anglia :* L. W. Sanders, Lake and Elliot, Limited, Braintree, Essex. *Falkirk :* A. Bulloch, Jones & Campbell Limited, Torwood Foundry, Larbert, Stirlingshire. *Scottish-North Eastern :* R. Leeks, Alexander Shanks & Son Limited, Arbroath. *Slough :* P. Hoesli, Light Production Co., Ltd., Slough, Bucks. *West Wales :* J. D. F. Yuile, 85, Vicarage Road, Morriston, Swansea.

BRITISH STEEL FOUNDERS' ASSOCIATION

Chairman : **F. W. Rowe, B.Sc.,** K. & L. Steelfounders and Engineers, Limited, Letchworth, Herts. *Secretary :* **Robert Barber,** Broomgrove Lodge, 13, Broomgrove Road, Sheffield 10. 'Phone and 'Grams : Sheffield 63046.

RESEARCH AND DEVELOPMENT DIVISION

Chairman : **F. N. Lloyd,** F. H. Lloyd & Co., Ltd. *Director :* **J. F. B. Jackson, B.Sc., A.R.I.C., F.I.M.** *Secretary :* **Robert Barber, A.C.I.S.,** Broomgrove Lodge, 13, Broomgrove Road, Sheffield 10. 'Phone and 'Grams : Sheffield 63046.

ASSOCIATION OF BRONZE AND BRASS FOUNDERS

President : **G. F. Mundell,** Knowsley Cast Metal Company, Limited, Manchester. *Secretaries :* **Heathcote & Coleman,** 25, Bennetts Hill, Birmingham, 2. 'Phone : Midland 2901. 'Grams : "Clarify," Birmingham.

LIGHT METAL FOUNDERS' ASSOCIATION

Chairman : **A. H. Sturdee, M.B.E., Wh.Ex., M.I.Mech.E.** *Secretary :* **Eric L. Heathcote,** 25, Bennetts Hill, Birmingham, 2. 'Phone : Midland 2901/4. 'Grams : "Clarify," Birmingham.

FOUNDRY TRADES' EQUIPMENT AND SUPPLIES ASSOCIATION

President : **W. E. Aske,** William Aske & Co., Ltd., Waterside, Halifax. *Secretaries :* **Peat, Marwick, Mitchell & Company,** 94/98, Petty France, London, S.W.1. 'Phone : Abbey 7515. 'Grams : "Crusades, Sowest," London.

INSTITUTE OF VITREOUS ENAMELLERS

President : **Dr. J. E. Hurst, J.P.,** Bradley & Foster, Limited, Darlaston, Staffs. *Chairman :* **S. Hallsworth,** Metal Porcelains, Limited, Cornwall Road, Smethwick 40, Staffs. *Secretaries :* **John Gardom & Company,** Ripley, Derbyshire. 'Phone : Ripley 136.

COUNCIL OF IRONFOUNDRY ASSOCIATIONS

Chairman : **N. P. Newman,** Newman Hender and Company, Limited, Woodchester, nr. Gloucester. *Director :* **K. Marshall,** *Secretary :* **J. W. Butler,** Crusader House, 14, Pall Mall, London, S.W.1. 'Phone : Whitehall 7941.
Participating Associations : British Cast Iron Research Association (affiliated) ; Institute of British Foundrymen (affiliated) ; and the following :—

Automobile Ironfounders' Association.—Secretaries : Heathcote and Coleman, 25, Bennetts Hill, Birmingham, 2. 'Phone : Midland 2901 ; 'Grams : "Clarify," Birmingham.
British Ironfounders' Association and British Bath Manufacturers' Association.—Director and Secretary : J. Galbraith Sneddon, C.A., 145, St. Vincent Street, Glasgow, C.2. 'Phone : Central 2891 ; 'Grams : "Groundwork," Glasgow.
British Grit Association.—Secretary : J. Campbell MacGregor, 10, Bank Street, Airdrie, Lanarkshire.
British Malleable Tube Fittings Association.—Secretary : F. B. Ridgwell, 196, Shaftesbury Avenue, London, W.C.2. 'Phone : Temple Bar 3261 ; 'Grams : "Brimatufie," London.
Cast Iron Chair Association.—Secretaries : Peat, Marwick, Mitchell & Co., The Cast Iron Chair Association Queen's Square, Middlesbrough, Yorkshire.
Cast Iron Axlebox Association and National Ingot Mould Association.—Secretaries : Peat, Marwick, Mitchell & Company, 301, Glossop Road, Sheffield. 'Phone and 'Grams : Broomhill 63031.
Cast Iron, Heating, Boiler and Radiator Manufacturers' Association.—Secretary : Stanley Henderson, 69, Cannon Street, London, E.C.4. 'Phone : City 4444.
Cast Iron Pipe Association.—Secretary : T. Clark, Crusader House, 14, Pall Mall, London, S.W.1. 'Phone : Whitehall 7941.
Cast Iron Segment Association.—Secretary : H. A. D. Acland, 5, Victoria Street, London, S.W.1. 'Phone : Abbey 3194.
Greensand Pipe Founders' Association.—Secretaries : McClure Naismith Brodie & Company, 77, St. Vincent Street, Glasgow, C.2. 'Phone : Central 8476 ; 'Grams : "Lycidas," Glasgow.
National Association of Malleable Ironfounders.—Secretary : Miss L. Verity, Chamber of Commerce Offices, Tudor House, Bridge Street, Walsall. 'Phone : Walsall 5671.

IRONFOUNDERS' NATIONAL CONFEDERATION

Chairman : **D. Graham Bisset,** Enfield Foundry Co., Ltd., Waltham Cross. *Director :* **R. Forbes Baird,** 117, Church Lane, Handsworth Wood, Birmingham, 20. 'Phone : Northern 0343 & 0037 ; 'Grams : "Irocast," Birmingham.

LOCAL BRANCH ASSOCIATIONS

East and West Ridings.—Secretary : O. Gibson, Oliver Gibson & Sons, Ltd., Leeds. 'Phone : Leeds 21226. *North Midland.*—Secretary : E. A. Phillips, Harper, Phillips & Co., Ltd., Albion Foundry, Eastgate, Grimsby. 'Phone : Grimsby 2541. *North Western.*—Secretary : E. Morris, F. Morris & Sons, Ltd., Whaley Bridge. 'Phone : Whaley Bridge 98. *Scottish.*—Secretary : A. F. Ure, Allen Ure & Co., Ltd., Keppochill, Glasgow. 'Phone : Glasgow, Douglas 2641.

NATIONAL IRONFOUNDING EMPLOYERS' FEDERATION

President : **C. Gresty,** North Eastern Marine Engineering Co. (1938), Ltd., Wallsend-on-Tyne. *Secretaries :* **Mann, Judd & Co.,** 8, Fredericks Place, Old Jewry, London, E.C.2. 'Phone : Metropolitan 8613 ; Grams : "Manjudca Phone," London.

LOCAL ASSOCIATIONS

Cardiff and District Founders' Association.—Secretary : G. Morris, 12, West Bute Street, Docks, Cardiff. 'Phone : Cardiff 4356-7.
Leeds and District Ironfounders' Association.—Secretary : F. Bowling, John Bowling & Co., Ltd., Cyclops Foundry, Kirksall Road, Leeds, 3. 'Phone : Leeds 25183.
Leicester and District Ironfounders' Employers' Association.—Secretary : C. S. Bishop, 8, New Street, Leicester. 'Phone : Leicester 58842.
Liverpool and District Ironfounders' Association.—Secretary : J. S. Hassal, 15, Victoria Street, Liverpool. 'Phone : Central 0114.
Manchester and District Ironfounders' Employers' Association.—Secretaries : Webb & Hall, 90, Deansgate, Manchester. 'Phone : Blackfriars 8367 ; 'Grams : "Sound," Manchester.
Midland Ironfounders' Association.—Secretary : R. Forbes Baird, 117, Church Lane, Handsworth Wood, Birmingham, 20. 'Phone : Northern 0343 & 0037 ; 'Grams : "Jacelace," Birmingham.
Monmouthshire Founders' Association.—Secretary : F. Lawton, Gould Foundries, Limited, Newport, Mon. 'Phone : Newport 4275 ; 'Grams : "Rogerwinch," Newport.
North of England Ironfounders' Association.—Secretaries : Mann, Judd, Gordon & Co., 61, Westgate Road, Newcastle-upon-Tyne. 'Phone : Newcastle 20836 ; 'Grams : "Mannca," Newcastle.
North Staffordshire Ironfounders' Association.—Secretary : R. Pepper, 4, St. Anthony's Drive, Westlands, Newcastle, Staffs. 'Phone : Stoke-on-Trent 87303.
Scottish Ironfounders' Association.—Secretaries : Mann, Judd, Gordon & Co., 142, St. Vincent Street, Glasgow, C.2. 'Phone : Central 8563 'Grams : "Mannca," Glasgow.
Sheffield and District Ironfounders' Association.—Secretary : T. Goddard Mander, 59, Clarkehouse Road, Sheffield, 10. 'Phone : Sheffield 60047 ; 'Grams : "Emplofedra," Sheffield.
South of England Ironfounders' Association.—Secretaries : Mann, Judd & Co., 8, Fredericks Place, Old Jewry, London, E.C.2. 'Phone : Metropolitan 8613. 'Grams : "Manjudca Phone," London.
Welsh Engineers and Founders' Association.—Secretary : W. D. M. Davis, 1, St. James Gardens, Swansea. 'Phone : Swansea 59166 ; 'Grams : "Iron," Swansea.
West of England Ironfounders' Association.—Secretary : R. Forbes Baird, 117, Church Lane, Handsworth Wood, Birmingham, 20. 'Phones : Northern 0343 & 0037 ; 'Grams : "Jacelace," Birmingham.
West Riding Ironfounders' Association.—Secretary : C. D. Buckle, 13, Cheapside, Bradford. 'Phone : Bradford 25346.

BRITISH CAST IRON RESEARCH ASSOCIATION

Alvechurch, Birmingham. 'Phone and 'Grams : Redditch 716.
Scottish Laboratories.—Blantyre Industrial Estate, Blantyre, Lanarkshire. ('Phone 486.)

FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

Vol. 90 Thursday, June 21, 1951 No. 1816

CONTENTS

PUBLISHED WEEKLY: Single Copy, 9d. By Post 11d. Annual Subscription, Home 40s., Abroad 45s. (Prepaid).

49, Wellington Street, London, W.C.2. 'Phone: Temple Bar 3951 (Private Branch Exchange) Grams: "Zacatecas, Rand, London"

Newcastle Conference

This year, the Institute of British Foundrymen, after an interval of two years, returned to an industrial centre for the holding of its annual gathering. The choice of Newcastle-upon-Tyne was excellent, as it is about nineteen years since the last convention was held in that city. A still earlier one took place in 1924 and the three events might well be associated with the *mise au point* of "semi-steel," high-duty pearlitic and nodular cast irons in the major field of foundry practice. At the 1932 Conference there was held the first session specially devoted to steel castings, a subject this year examined in the light of dust production. We noted with real interest that the policy of including sessions covering light alloys is gaining in popularity and is producing much of real worth. As would be expected, an industrial venue attracted a somewhat higher attendance of members, but fewer were accompanied by their ladies.

The newly-elected president, Mr. Colin Gresty, has been actively associated with the three conventions and speaks authoritatively for both the Institute and the industry. We have followed with admiration the noteworthy progress he has made in his profession, where he has successfully combined practice and theory for the benefit of the industry. He, more than most, appreciates the part that craftsmanship still plays, for he is responsible for the production of high-grade marine-engineering castings. Dr. Dadswell has well deserved his elevation to the position of senior vice-president, for he has been assiduous in his duties over a long period. The position of junior vice-president has been filled by the election of Mr. E. Longden, who, on account of his investigations into camber, has achieved an international reputation.

The Institute recognised the important researches on the basic-lined cupola carried out by Mr. Renshaw and Mr. Sargood by the award of the British Foundry Medal. Because of recent metallurgical developments, this work is assuming an importance probably exceeding that which the Authors had in mind when they initiated their experiments. By the bestowal of the E. J. Fox Medal upon Mr. Morrogh, the Institute has shown its appreciation of his fundamental work in the discovery of nodular cast iron. Mr. Morrogh is fast becoming the world's premier metallurgist in the field of cast iron. The third award was made to Mr. Worcester, who received the Meritorious Services Medal. His life has been spent in acquiring technical or commercial knowledge, testing it in his own business and then making it available for his fellow foundrymen. Practised over many years, this is indeed "meritorious service." The organisation of the Conference was undertaken jointly by the Institute's efficient head office and a local committee headed by Mr. Lashly, to whom every participant is indebted.

Institution of Metallurgists

Induction of New President

The memories of the past rather than promises for the future formed the theme of the annual general meeting of the Institution of Metallurgists, held on June 7 at 4, Grosvenor Gardens, London (referred to briefly in last week's JOURNAL), at which the president, Dr. C. J. Smithells, was inducted. The retiring president, Mr. E. W. Colbeck, spoke of the achievements during his term of office. The success of the exhibition, "Metals in the Service of Mankind" (for which he was so much responsible), had been invaluable in bringing the work of the Institution to the attention of the public, and it might quite easily be repeated in the future without any treasurer's pessimism. He drew attention to the proposed publication of a revised set of rules and regulations in the form of a handbook No. 2, which should be ready later this year.

Introducing the new president, Mr. Colbeck referred to the skilful handling of the financial affairs during Dr. Smithells' five years' office as honorary treasurer of the Institution, and also as a metallurgist he was well-known for his work on tungsten, gases in metal, and his work in building up the new research laboratories of the British Aluminium Company at Chalfont.

Five Years' Progress

DR. SMITHELLS, in his presidential address, reviewed the progress made since the formation of the Institution in 1946. Total membership had very nearly doubled, although many felt that it should eventually approach the 4,000 mark. Certainly, the steady growth of the Institution showed that its formation was fully justified and that it could perform useful services to the professional metallurgist.

During his term of office as treasurer, he had seen the reversal of the one-time adverse balance-sheet, and now the Institution was able to show an excess of income over expenditure. He pointed out, however, that economy in expenditure must be shown for some years.

Recalling the growth of the activities of the Institution, Dr. Smithells referred to the improvement in the bulletins, and increased interest of the articles since the early numbers; the popularity of the refresher courses (another course is to be held in October this year on the joining of metals); the increasing number of meetings; and the exhibition organised at the Science Museum last year.

Turning to the Institution's examinations, Dr. Smithells reported an increased number of candidates, and that the percentage of successful ones might be expected to increase as the standards required by the Institution became known more widely in the schools. These examinations and qualifications were now recognised by the Treasury and the Civil Service Commissioners for the experimental officer class in the Scientific Civil Service, also the Associateship was accepted as qualifying for the Burnham Scale by the Ministry of Education, and quite recently the Government of India and the Union Public Service Commission of India had accepted the L.I.M. as equivalent to a pass degree, and the A.I.M. as equivalent to an honour degree for Central Government posts.

The new president then referred briefly to a number of services which the Institution was able to render to its members, including the appointments register. In 1947 there were 65 members on the register, which now averaged nearly 400, with an annual turnover of about 150. A register of those members who wished to act as consultants was maintained, so that they could be put in touch with anyone requiring their services. Finally, another service which had been inaugurated was the provision of free legal advice by the Institution's solicitors on matters of general interest to the profession.

After the meeting, members enjoyed another opportunity to get together during a pleasant buffet tea and conversazione in the library.

Birthday Honours List

In addition to the lists published last week, the following awards to men connected with the iron and steel industry figure in the Birthday Honours:—

B.E.M.

MR. F. G. ALSOP, erector, National Smelting Company, Limited, Avonmouth; MR. A. APPLEBY, shop convenor, Rolls-Royce, Limited, Derby; MR. R. T. ARKLEY, toolmaker, Projectile & Engineering Company, Limited, London; MR. H. L. DAVIES, tool-room grinder, Folland Aircraft, Limited, Southampton; MR. T. DAVIES, foreman, Sheppard & Sons, Limited, Bridgend; MR. W. E. EDMUNDS, chargehand, Ministry of Supply Storage Depot, Coleford; MISS H. E. GARWOOD, forewoman, E. N. Mason, Limited, drawing-office equipment manufacturers, of Colchester; MR. A. HAGGART, foreman steel erector, Alex. Findlay & Sons, Limited, Motherwell; MR. T. HEY, chief inspector, Yorkshire Copper Works Limited, Leeds; MR. H. W. HOPE, foreman electrician, Cowans, Sheldon & Company, Limited, engineers, etc of Carlisle; MR. J. S. HOWARTH, foundry chargehand, Magnesium Elektron, Limited, Manchester; MR. F. A. LOVETT, superintendent, insulation factory, British Thomson-Houston Company, Limited, Rugby; MR. W. MCMILLAN, leading hand fitter, David Rowan & Company, Limited, marine engineers, etc., of Glasgow; MR. P. MYERS, chief blast-furnace foreman, Gjers, Mills & Company, Limited Middlesbrough; MR. G. H. NORTON, tool-room foreman, Brecknell Munro & Rogers, Limited, of Bristol; MR. W. G. G. PINFOLD, temporary mechanic, National Physical Laboratory, London; MR. H. R. G. REEVE, station engineer Aeronautical Inspection Directorate Test House, Ministry of Supply, Harefield; MR. J. G. SMITH, driller, Albion Motors, Limited, Glasgow; MR. H. D. SWANN, foreman, Laurence Scott & Electromotors, Limited, Norwich; MR. W. SWINNERTON, shift foreman, John Summers & Sons, Limited, Shotton, Chester; MR. J. THOMPSON, chargehand fitter, Lostock Gralam Works, Imperial Chemical Industries, Limited; MR. W. WRIGHT, assistant foreman bricklayer, Workington Iron & Steel Company.

MR. W. E. A. REDFEARN, of the English Steel Corporation, Sheffield, was president of the convention of the National Association of Drop Forgers and Stampers which opened at Torquay on June 8.

I.B.F. Awards 1951

Presentation of the following awards took place at the Annual General Meeting of the Institute of British Foundrymen at Newcastle-upon-Tyne.

E. J. Fox Medal

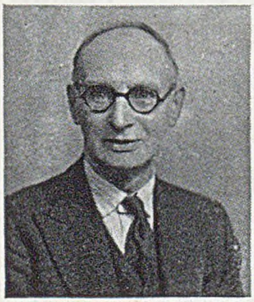
The E. J. Fox Medal for 1951 was awarded to Mr. H. Morrogh in recognition of his pioneer work on nodular cast iron and of his elegant contributions to research on cast iron over a period of years.

MR. H. MORROGH

Mr. Morrogh was born in 1917 and joined the staff of the British Cast Iron Research Association in 1934, at the age of 16. He worked in the metallographic departments until 1938 and then assisted in work on high-duty cast irons until 1939. Subsequently he carried out work on the metallography of graphite flakes and on inclusions in cast iron. In 1942 he was appointed senior research officer and he became the Association's research manager in 1945. A year earlier he commenced work on graphite formation in cast iron and from 1946 onwards his energies were devoted to the development of nodular cast irons. Other work has included the neutralisation of sulphur in cast iron by alloying elements, the effect of tellurium in cast iron, and the influence of residual elements in malleable cast iron. He was awarded the Andrew Carnegie Gold Medal by the Iron and Steel Institute in 1947. Mr. Morrogh has presented several Papers to the Institute, his most recent being entitled "Nodular Cast Irons, Their Production and Properties," read jointly with Mr. J. W. Grant at the London conference in 1948.

Meritorious Services Medal

The Institute decided to award the Meritorious Services Medal for 1951 to Mr. A. S. Worcester in recognition of his valuable services to the Institute in many capacities over a long period of years. Mr. Worcester was born at Thames Ditton, Surrey, and was educated at Thames Ditton and Kingston - on - Thames Technical School. Following his apprenticeship, which was served at the works of Willans & Robinson at Thames Ditton and afterwards at Rugby, Mr. Worcester worked as a moulder at the Brush Electrical Company, Geo. Fletcher's, Derby, the Lilleshall Company, and Siemens Bros. He then became foundry foreman and manager of Gimson & Company, and later foundry manager to Taylor & Hubbards, of Leicester. For the past twenty-five years he has been managing director of Kaye & Company (Huddersfield), Limited. Mr. Worcester joined the Institute in 1913 and served on the East Midlands branch council in 1923-24. He transferred to the West Riding branch in 1925 and served as president in 1931-32 and 1932-33. He was again elected branch president in 1938, the year the 35th Annual Conference of the Institute was held in the West Riding of Yorkshire. He was an original member of the technical committee and since then he has been an active member of the education committee and a member of both the advisory and moderating committees of the City and Guilds of London Institute examinations in foundrywork and patternmaking. He has put in a lot of work for the education and training of foundry apprentices. Mr. Worcester is also chairman of the foundry committee of the Huddersfield Engineering employers' Federation, and was president of the West Riding Ironfounders' Employers' Federation from 1941 to 1946. He served as an assessor for the student's grant of the Institute in 1949, 1950 and 1951, and has been a West Riding delegate to the national Council of the Institute for over twenty years.



MR. A. S. WORCESTER

British Foundry Medal and Award

The British Foundry Medal and Prize of £10, which may be given annually by the Institute to the author of the paper adjudged to be the best presented to the Institute during the preceding year, has this year been awarded as follows:—The British Foundry Medal to Mr. E. S. Renshaw and the British Foundry Prize of £10 to Mr. S. J. Sargood for their joint authorship of the paper "Some Modifications in Cupola Design."* Mr. Renshaw received his metallurgical training at Sheffield University and his works training at the Sheepbridge Coal & Iron Company, Limited, Chesterfield. He was then employed for three years as assistant metallurgist with the Sheepbridge Stokes Centrifugal Castings Company, Limited, followed by a period with a firm of metallurgical consultants. In 1929, Mr. Renshaw joined Henry Ford & Son, Limited, Cork, Eire, as metallurgist, and transferred to the Ford Motor Company, Limited, Dagenham, in 1932, and since that time has been head foundry metallurgist. He has visited the United States on two occasions and in 1936 made

MR. E. S. RENSHAW

* Printed in the JOURNAL, October 13, 1949.

I.B.F. Awards

a prolonged study of American foundry production methods. Mr. Renshaw has been a member of the Institute since 1934 and has served on various technical sub-committees. He has also served on technical committees of the British Iron and Steel Research Association. He is an associate of the Institution of Metallurgists.

Mr. S. J. Sargood, following a three-year engineering training at the Beaufoy Technical Institute, London, was engaged for several years on chemical analysis and works investigations, while pursuing part-time studies. In 1931 he was awarded a senior science scholarship at University College, London, where he read chemistry and physics for three years. After a short period at the chemical defence research station of the War Department, he joined the Ford Motor Company, Limited, Dagenham, Essex, in 1935 as assistant foundry metallurgist. He has been engaged on production control of the range of ferrous alloys melted in the Ford foundry and on technical development, including work on the design and operation of basic and acid cupolas.

MR. S. J. SARGOOD

Conference Paper Author

Dr. Victor Paschkis is the author of the Exchange Paper from the American Foundrymen's Society entitled "Thermal Considerations in Foundrywork," printed in this issue. Born in Vienna in 1898 Dr. Paschkis obtained his higher education at the Institute of Technology in that city. In 1921 he received his M.E. degree and in the two succeeding years was awarded his E.E. and D.Sc. degrees. From 1922-38 he worked with various European companies, including some years as a consulting engineer. Going to the United States in 1938 he began his industrial career with A. F. Holden Company, New Haven, Connecticut, as head of the furnace department. The following year he was connected with the Ajax Electric Company, Philadelphia, Pa., as research and design engineer. In 1940 he suggested to Columbia University the erection of the heat- and mass-flow analyser laboratory. He joined the staff of the University, designed and supervised construction of the equipment, and since then has been in charge of this laboratory. Dr. Paschkis has written

DR. V. PASCHKIS

(*Continued at the foot of column 2*)

Import Certificates for Strategic Goods

The Board of Trade announces that in future an exporter in another country may, in cases where his own Government requires to be satisfied that strategic goods ordered by an importer in the United Kingdom will in fact be imported into the United Kingdom, ask his customer to produce an import certificate. Any importer who receives such a request should apply to the Board of Trade Import Licensing Branch, Romney House, Tufton Street, London, S.W.1.

If an import certificate is issued to him, the importer will be bound by the provisions of the Control of Goods (Import Certificates) Order, 1951 (SI 1951, No. 1016, H.M. Stationery Office, price 2d.), which came into force on June 14, and will be liable to penalties if the goods are diverted to any other destination without the approval of the Board of Trade.

Unwrought Cobalt Metal

A proposal that the existing Customs and Excise Tariff Exemption Heading, Group VII (9), should be amended to read "Cobalt metal, unwrought, but not including alloys of cobalt" is being considered by the Board of Trade. The proposal arises out of an application received by the Board of Trade for the addition to the free list under the Import Duties Act, 1932, of cobalt metal in shapes not covered by the terms of the existing Tariff Exemption Heading relating to certain forms of unwrought cobalt and which are at present liable to the 10 per cent. general *ad valorem* duty.

Any representations which interested parties may desire to make in regard to this proposal should be addressed to the Board of Trade, Industries and Manufactures Department, Division 1B, Thames House North, Millbank, London, S.W.1, not later than July 6.

May Exports at High Level

Provisional figures show that United Kingdom exports in May at £229,700,000 were only just below the high April figure. With re-exports at £11,400,000, the total of exports and re-exports for the first five months of the year was £1,095,900,000, equivalent to an annual rate of £2,630,000,000, 17 per cent. above the total for 1950.

Imports again increased in May to £338,200,000, £48,300,000 above the average for the first four months, bringing the total for January to May to £1,497,800,000, equivalent to an annual rate 38 per cent. above 1950.

By the end of May the excess of imports (valued c.i.f.) over total exports (valued f.o.b.) this year (£401,900,000) was already more than for 1950 as a whole (£347,900,000).

AMONGST SEVEN EMPLOYEES of Ruston & Hornsby, Limited, of Lincoln, to receive gold medals and other gifts were Mr. John Snell, M.B.E., the assistant works manager of the ironworks; Mr. Frank Porter, for many years a core maker, and Mr. J. S. Leverton, who for many years was the foundry department clerk.

for the trade press and for meetings of technical societies, both in the United States and abroad, on subjects which included heat flow and electric furnaces. He is a member of the American Society of Mechanical Engineers and the American Association for the Advancement of Science, as well as of the American Foundrymen's Society.

Institute of British Foundrymen

ANNUAL GENERAL MEETING

Newcastle-upon-Tyne, June 13

The annual general meeting of the Institute of British Foundrymen was held at Newcastle-upon-Tyne on June 13, with Mr. John J. Sheehan, retiring president, in the Chair.

Mr. V. Delport proposed, Mr. G. L. Harbach seconded, and it was agreed that the minutes of the annual general meeting held at Buxton on June 7, 1950, be taken as read, approved, and signed as a correct record of the proceedings.

Report of the Council

The Annual Report having been printed and circulated, the chairman proposed that it be accepted.

MR. P. H. WILSON, O.B.E., in seconding the proposition, said that the increase in membership during the year was satisfactory but he hoped that as soon as the associate members qualified they would apply for full membership and would appreciate the status which that particular class of membership carried. In his opinion technical development and education should be extended, particularly in regard to the young foundrymen, and also the foundry foremen's training course which had apparently been very successful. On the social side Mr. Arnold Wilson, the secretary of the I.B.F. Golfing Society, was very anxious that the present year should be a great success at Woodhall Spa.

The proposal that the Report be adopted was put to the meeting and was carried.

Accounts

In the absence of the honorary treasurer, the balance sheet and statement of accounts were introduced by the secretary MR. T. MAKEMSON, M.B.E., who said there had not been a great deal of change between the 1950 and 1951 accounts: there was a slight increase in expenditure in some directions and a decrease in others, but the two years had run pretty well parallel and the net result of the year's working was that they had a credit balance of £541 19s. 3d.

Such a favourable position could not be anticipated for the year 1951 because during the past few months expenses had started to rise, particularly in printing, and that was where they would benefit from the increased revenue due to the higher subscriptions. The new subscriptions, which were about to come into force, would influence the present year's accounts but on the other hand the expenditure would also go up during the year, thus fully justifying the increase which members had agreed the previous year.

The accounts showed that the technical and educational development fund, which derived its funds from the Joint Iron Council by direct payments, had reimbursed the Institute for certain expenditure on approved research, development and educational work. The fund had two most beneficial effects: first, it enabled them to continue with the work of the Technical Council which might otherwise have had to be shelved on account of the rising costs, and secondly, it had enabled them to extend that work and also the educational work. All expenditure under that heading was reimbursed up to a sum of £2,500 a year, and were it not for that, the main fund would have shown a loss or alternatively the Institute might have had to reduce some of the expenditure on technical work.

Turning to the balance sheet, it showed first a statement of various purposes for which the accumulated funds were earmarked, and the opposite page showed exactly where the money was—whether it was in the Bank or in investments, and what those investments actually were. The item, "accumulated fund, £8,498 0s. 10d.", represented the "life" savings and was what the Institute had put aside for a rainy day: it was not a great deal but they were hoping not to draw upon it because it was all that stood between them and disaster if they should be overtaken by a bad time.

The adoption of the balance sheet and statement of accounts was proposed by MR. N. P. NEWMAN, past-president, and seconded by MR. JOHN BELL, who paid tribute to Mr. BIGG for the work which he had done as treasurer during a very difficult period of the Institute's history. The proposal was carried and the chairman promised that the thanks of the meeting would be conveyed to Mr. Bigg.

Technical Council Report

DR. A. B. EVEREST, in proposing the adoption of the nineteenth annual report of the Technical Council* said it had been included in the booklet which had been circulated to all members and he hoped they had found time to study the details. The adoption of the report should have been proposed by the chairman of the Technical Council, Mr. ARTHUR E. PEACE, and all regretted that he was unable to be with them on that occasion, due to ill health. It was generally accepted that the success of the work undertaken by the Technical Council during the past few years had depended very much on the enthusiasm and personal leadership given by Mr. Peace, and members would wish to pay tribute to him on that account.

Unfortunately there had been another change, the vice-chairman, Mr. L. W. BOLTON, had found it

* Printed elsewhere in this issue of the JOURNAL.

I.B.F. Annual General Meeting

necessary to retire, due to general pressure of business. Mr. Bolton also had been a tower of strength to the Technical Council and during some of Mr. Peace's absences, either abroad or through ill-health, Mr. Bolton had taken on his shoulders the complete control of technical affairs, and had done it admirably, and all were very sorry to be losing his services in that capacity.

As had been stated in the report, the outstanding item of the year was the fact that, due to several of the sub-committees finishing their work, an appeal had been made to the branches for suggestions for further work which could be carried out by the Council, and the response had been most gratifying. Between fifty and sixty suggestions had been made as to items which members felt could usefully be studied. Most of the suggestions had grouped themselves under various headings and had been dealt with by the formation of five new sub-committees to study those problems. Several of the questions had referred to cupola operation and maintenance, and so it had been possible to form a very strong new sub-committee on cupolas which would deal with nearly all the outstanding questions. It was worth noting that those new sub-committees, which had been formed only two or three months previously, had all met and had started work with the sort of enthusiasm expected of members of the Technical Council.

Future

The Technical Council was also going from strength to strength in other directions. The secretary had just referred to the financial help which they were getting, within limitations, and that had enabled them to carry out work which cost money, and in that connection one of the most gratifying features was the extent to which sub-committees were now able to initiate work and obtain assistance from the universities and similar institutions. If members were to go to Birmingham University, in the Department of Industrial Metallurgy, they would find several men working on jobs for the I.B.F. Technical Council, and all being paid out of the fund to which the secretary had referred.

Finally, increasing recognition was being given to the Technical Council in the international sphere. During the last year or two, technical committees on an international plane had been formed and were trying to carry out work on an international basis, and the I.B.F. Technical Council was strongly represented on those committees and was doing a great deal of work.

Mr. A. Tipper, in seconding the proposal, said that the Technical Council could not have carried out their work without the help of the members of the Institute and the financial aid which had been given so freely in the past few years. In addition, on behalf of all those members present who took part in the work of the Technical Council and the sub-committees, he wished to pay tribute to the sterling work of the secretarial staff, and in particular to Mr. G. Lambert, the assistant secretary of the Institute. Without his help all the sub-committees would often be groping in the dark and there would not be those very well-prepared reports that would be discussed during the following two days. The proposal that the annual report of the Technical College be adopted was put to the meeting and carried unanimously.

Presentation of Awards*

E. J. Fox Medal

The chairman presented the medal and parchment for 1951 to Mr. H. Morrogh for his pioneer work in nodular cast iron and for his many contributions to the metallurgy of cast iron, and said that it gave him a double pleasure to do so because quite apart from deserving such recognition Mr. Morrogh had been a great personal friend of his for a very long time. About fifteen fundamental contributions had been made in the world of metallurgy, and this country had been responsible for thirteen of them, and they were proud to know that Mr. Morrogh, who was one of the younger men in the Institute, had made the latest contribution.

Mr. H. Morrogh said he felt greatly honoured at being the recipient of that award. The chairman had referred to important activities in the field of research, but the time had long since passed when any one individual could contribute effectively in any research activity without the assistance of an elaborate organisation and without the assistance of many colleagues. He had always received very effective and willing support from his own colleagues and very encouraging assistance from his director, Dr. Pearce.

To some extent research could be accomplished by planned effort, but new ideas frequently required a type of intuitive thinking and it was frequently very difficult for an organisation to provide facilities for outlets for that sort of effort, and he could honestly say that he had been given every facility for realising experimentally his intuitions. It was probably true to say that very few ideas were truly original, and throughout his work he had benefited greatly from contacts within the British ironfounding industry, where information had always been given to him most freely.

Meritorious Services Medal

The chairman then declared that the Council had decided to award the medal for 1951 to Mr. A. S. Worcester, past-president of the West Riding of Yorkshire branch, for his devoted services to the Institute in many capacities during his long membership. Unfortunately Mr. Worcester was unwell and Mr. Griffiths of the West Riding branch received the medal on his behalf.

Mr. Griffiths, in promising to present the medal to Mr. Worcester with the congratulations of the members, said how very proud Mr. Worcester would be to receive the medal and how conscious he would be of the honour thus bestowed upon him.

British Foundry Medal

The chairman announced that the 1951 British Foundry Medal was awarded to Mr. E. S. Renshaw

* Brief biographies of the recipients are printed elsewhere in this issue of the Journal.

and the Foundry Prize of £10 to Mr. S. J. Sargood for their Paper on "Some Modifications in Cupola Design." He said that he had known Mr. Renshaw for about 25 years; he had come to the Ford Motor Company in Cork under what might be called hazardous circumstances, for they had to step up the foundry output from something like 200 tons a week to 450 tons a day. Mr. Renshaw had helped to make that foundry at that time the largest mechanised foundry in Europe, and in doing so he had learned so much about cupolas that he now was receiving some measure of reward for that effort.

MR. BARRINGTON HOOPER, C.B.E., on behalf of the FOUNDRY TRADE JOURNAL, presented the British Foundry Medal to Mr. Renshaw and the Foundry Prize to Mr. Sargood.

MR. E. S. RENSHAW said how extremely grateful he and Mr. Sargood were to the Institute for considering that their work was worthy of an award of that kind. Indeed, if it served to stimulate some interest in what they considered was quite a fascinating subject, then they were fully compensated for the effort which they had put into their work. It was particularly pleasing to him that he should receive the medal during Mr. Sheehan's term of office.

MR. S. J. SARGOOD said there was not very much he could add to what had been said except that he would like to mention the assistance they had received from their colleagues in the carrying out of the work. In a sense an award of that type was a secondary reward in that the first satisfaction came from any success which might be achieved in the work itself at the time, but nevertheless he was very grateful for the honour which he had received.

Diplomas

The secretary announced the award of Diplomas for 1951 to the following:—Mr. G. E. Fearfield for the Paper "Core-blower Application and Operation," read before the East Midlands and Lancashire branches; Mr. K. H. Wright for the Paper "Chilled-roll Manufacture," read before the Birmingham branch; Mr. D. Redfern for the Paper "Loam and Dry-sand Moulding in the Jobbing Foundry," read before the Lancashire branch; Dr. E. Scheuer for the Paper "History and Development of Aluminium/Silicon Alloys," presented to the Slough section; Mr. M. M. Hallett for the Paper "Practical Experiences in Producing Nodular Cast Iron," read before the London branch, and Mr. J. Currie for the Paper "Intricate Castings from a Durable Loam Mould," read before the Scottish branch.

Election of President

The chairman said that the morning had provided a succession of very pleasant duties (which was only as it should be after a year of office which had been very pleasant indeed, although at times a little strenuous) and the greatest of those pleasant duties was to propose that Mr. Colin Gresty should be elected president. Most members, both old and young, would know Mr. Gresty, for he had been a faithful servant of the Institute for a very long time and latterly had been a tower of strength in his able and willing fulfilment of the duties of senior vice-president. A good deal of the work of the Institute was done on committees and in Council, and Mr. Gresty had an accuracy of mind on procedure and a philosophy in debate which guided all their undertakings to the greater benefit of the Institute.

MR. LASHLY, president of the Newcastle branch, in seconding the proposal, said the members of the Newcastle-upon-Tyne branch were very proud indeed to know that their highly-esteemed member, Mr. Colin Gresty, had been proposed as president of the Institute for the ensuing year.

The proposal was put to the meeting and was carried with prolonged acclamation and the chairman invested Mr. Gresty with the presidential badge.

MR. COLIN GRESTY said he felt very greatly honoured and rather overwhelmed by his election and by the splendid way in which he had been received. The Institute had always been very dear to him, and he had been a member for 34 years and so it was a very proud day for him to be elected president. He could assure them all that he would do whatever was in his power to maintain or to enhance the prestige and dignity of the Institute. In thanking Mr. Sheehan and Mr. Lashly for the kind things which they had said about him, he said that later on in the meeting he would have the opportunity of saying a few words about Mr. Sheehan and his year of office. He then presented Mr. Sheehan with a past-president's badge and asked him to continue in the chair until the end of the annual general meeting.

Election of Senior Vice-president

The chairman then proposed that Dr. C. J. Dadswell be elected to the office of senior vice-president for the coming year. If it were not for the fact that it would be unfair to the two elegant past-presidents who sat before him, he would have liked to say that the members were being more fortunate than those who had gone before! Altogether they had been sound in their choice of presidents.

MR. J. G. BAILES, president of the Sheffield branch, in seconding the proposal, said that in Sheffield they knew Dr. Dadswell as one of the younger school. Sometimes they were inclined to think it was time they had some youth at the helm, and in Dr. Dadswell they had that adaptability for new ideas, combined with forcefulness, which would make him the ideal person for the office of senior vice-president.

Upon being put to the meeting, the motion was carried unanimously and the chairman invested Dr. Dadswell with the senior vice-president's badge.

DR. C. J. DADSWELL said he was deeply honoured by his election to the office of senior vice-president. Those who worked out the seniority of officers of the Institute must have thought in terms of training; they obviously realised that vice-presidents needed training and therefore there was the office of junior vice-president, through which he had just passed. That was a cheerful office which did not involve so much work as the senior officials had to do, but it was one which gave the junior vice-president an opportunity of attending many committees

I.B.F. Annual General Meeting

of the Institute. Thus he had come to learn the huge field of activities and had realised, much more than he had done as an ordinary member and as an ordinary member of Council, just how much work was involved, and his regard for fellow members had been increased by that realisation. At the same time his regard had increased for Mr. Sheehan and Mr. Gresty, and he only hoped that he could live up to the traditions set by them.

Junior Vice-president

MR. V. C. FAULKNER, in proposing the election of Mr. E. Longden to the office of junior vice-president, said that in the course of an association with the Institute which dated back more than 40 years he had, he hoped on some occasions, been able to do something good for the Institute; perhaps one of the best things he had ever done was to initiate Mr. Longden into the Institute some 30 years previously. During that period of 30 years Mr. Longden had participated most fully in the activities of the Institute; he had given many papers, both at home and abroad, and had materially enriched the literature of foundrywork throughout the world. He had taken a leading part in the activities of the Lancashire branch and had filled the office of president of that enterprising branch with great distinction, and he well merited the position which the Institute was offering to him.

MR. C. R. VAN-DER-BEN, president of the Lancashire branch, in seconding the proposal, said that there was little he could usefully add to what Mr. Faulkner had already said. His personal contact with Mr. Longden extended over some 16 years, and even before that he had been very familiar with his name, and he knew that Mr. Longden was a very worthy leading member of the Lancashire branch and that he had the welfare of the industry and the interests of the Institute very much at heart.

The proposal was put to the meeting and carried and the chairman invested Mr. Longden with the junior vice-president's badge.

MR. LONGDEN said that it gave him great pleasure to receive that emblem of honour at the hands of their worthy retiring president, Mr. Sheehan, and he could not have wished to receive it at other hands. He appreciated the very kind words spoken by Mr. Faulkner and Mr. van-der-Ben and echoed by the meeting, as to what he had done in the past. He was fully aware of the obligations and duties which were attached to that very high office of the Institute and it was his full intention, even if he could not emulate the very brilliant men they had known in the past who had conducted the Institute's business with such skill and such pleasure to the members, at least to attack the duties and obligations with full vigour and enthusiasm.

Election of Auditors

Mr. S. Unsworth, past-president of the Newcastle branch, proposed that the firm of J. & A. W. Sully & Company, Parliament Mansions, Abbey Orchard Street, London, S.W.1, be appointed auditors for the year 1951-52. The motion was seconded by Mr. Delport and carried by the meeting.

Election of Five Council Members

The secretary announced, in alphabetical order, the results of the ballot for the election of five members of council for two years ending June, 1953, as:—Mr. L. W. Bolton; Mr. N. C. Charlton; Mr. E. Longden; Mr. P. A. Russell, and Mr. G. R. Shotton. As Mr. Longden had since been elected as junior vice-president there was still a vacancy, and that was filled by the election of the sixth candidate in the number of votes cast, Mr. V. Delport.

Thanks to the Retiring President

MR. COLIN GRESTY said that it was not only a great privilege but a pleasure to propose that the thanks of the Institute be accorded to their retiring president, Mr. John Sheehan. Those members of the Institute who knew Mr. Sheehan well, knew that he was a very lovable character; he had a very philosophical turn of mind, as had already been mentioned by one or two speakers during the meeting, and a fine sense of humour and, what was also very important, a capacity for hard work. The Institute had received the full benefit of all those characteristics during the past year, and in fact for several years, and they were very greatly indebted to Mr. Sheehan.

He felt almost certain that Mr. Sheehan had enjoyed his year of office and he would like to assure him that the Institute as a whole also had enjoyed that year.

MR. J. P. NEWMAN, J.P., past-president, said it gave him great pleasure to second that proposal because for once he could say of Mr. Sheehan what he could not say to his face, and that was that he had brought to the Institute not only all his technical ability but also the great charm of his character, and the greatest compliment that could be paid to him was that somehow he had the secret of enjoying life and imparting that joy to others. In every way the Institute had greatly benefited from his year of office.

The motion was carried with prolonged acclamation.

MR. JOHN J. SHEEHAN (chairman) in replying to the vote of thanks asked who would not be proud to be the president of such an Institute. He had brought to the task all that he had and he had received the satisfaction of the reciprocal appreciation and help of all the members of the Institute. There was something about it, as Mr. Longden had so ably said—something from toil to moil but also something very much of heart, and there could be no going back for an Institute with all those characteristics.

Finding this the hardest speech he had ever had to make he felt all he could say was that he had got a great deal of enjoyment out of being president.

Other Business

The chairman announced that there were many distinguished visitors to the Conference,

(*Continued on page* 660, *column* 2)

Institute of British Foundrymen

ANNUAL BANQUET

Extracts from the Newcastle Speeches

THE ANNUAL BANQUET for the forty-eighth Conference of the Institute of British Foundrymen was held in the Old Asembly Rooms, Newcastle-upon-Tyne, on June 13, the new president, Mr. Colin Gresty, being in the Chair.

After the Loyal toast, proposing the toast of "The City and Commerce of Newcastle-upon-Tyne", MR. J. J. SHEEHAN the immediate past-president said he found himself in proposing that toast with a plenitude of material and a paucity of words. He knew that their principal business on that occasion was to enjoy themselves so he proposed to keep his speech as short as possible.

Newcastle-upon-Tyne

Newcastle was more than a city, it was part of an idea, historical, commercial and industrial which had profoundly affected its nature and development and which in its turn had had a profound impact on their lives. Therefore anything that might be said about Newcastle had to be related to those facts. As time on the occasion was very limited it demanded generalisations, but the town deserved a lot of historical study.

Newcastle was created a county borough in the year 1400 and a city in 1882, when Newcastle and Northumberland were separated from the see of Derby. It was essentially and had all the characteristics of a border town. It was the right flank of the Roman Wall against the Picts and Scots (and the Irish). It was an outpost of the Normans and they found difficulty in conquering it. Through the activities of the monks of Lindisfarne it was, during the Saxon period, converted to Christianity and thereby connected with the civilisation of the Mediterranean. Its Celtic name, given by the monks meant " Mount Chester ".

To-day it had all the vigour of a border town for in the past it had stood against the courage of the North and the culture of the south and was beholden to neither. It had developed a character of its own. Romans, Celts, Saxons, Normans, Norwegians, Danes had all been absorbed by Newcastle and had become that delightful sturdy, solid mass of people eloquently summarised by the name " Geordie."

The Geordies took the materials at hand and fashioned them to their needs. The first actual miners were the Geordies. They took the coal and solved the problems of mass transport, selling coal even in far-away London. He believed it true to say that there were at one time 20,000 horses taking coal from the mines to the ships or railways. From that, it should not be forgotten, there arose our railways, and from our railways we in this country had a very important heritage. By them we had opened up continents and countries that would never otherwise have been opened up. There was a further persistence in Newcastle which he thought was not adequately recognised. The city had been called " Newcastle " around the period 1088—" Neuovo Castellum "—Newcastle it was still called as it had been for the past nine centuries, and, persistent as was the character of its people, it would be " Newcastle " for centuries to come.

With the toast had to be coupled the name of Alderman William McKeag, the Lord Mayor, a worthy mayor of a border town. The previous night he had been their charming host. Now he was their honoured guest.

Lord Mayor's Reply

Responding to the toast, the LORD MAYOR (Ald. Wm. McKeag) said Mr. Sheehan had started his speech with the statement that he had plenty of material but a paucity of words. He had included in that speech, however, much about Newcastle which was valued history. Some of the things which had been mentioned he had almost forgotten!

There was, however, one thing to which he took immediate exception. He had described the inhabitants of the locality as a " solid mass of people." He did not like that (laughter). He would have much preferred him to have said that they were a mass of solid people! And he really thought that was what he meant.

Mr. Sheehan had also mentioned the fact that he had been with them only last night, when as Lord Mayor of Newcastle he had welcomed them to the city. Now on this occasion he was, together with the Lady Mayoress and the Sheriff and his lady and Lord Eustace Percy, their guest, and he was sure they had all enjoyed the magnificent hospitality which their president had so kindly provided.

The city throughout its history had been closely associated with English progress and the citizens as coal miners, shippers, merchants, legislators, and as members of the armed forces of the land had played no uncertain part in the well-being of the realm and of the Empire.

The North raised a pioneering, courageous and fearless breed of men, as both the Scots and the Irish knew to their cost. Wherever they went, whether it was to Manchuria or to Manhattan, there they would find men and women from that part of the country. It was to be hoped that the trend of things as they now saw them would not result in stifling the individual who had initiative and that enterprise would not be entirely unrewarded. After all, the worth of a city in the long run was the worth of the individuals comprising it. A city which controlled its men in order that they might be docile instruments in its hands, even for beneficial

I.B.F. Annual Banquet

purposes, would find that with them no great thing could be done.

As Lord Mayor of the City, he was delighted to see Mr. Colin Gresty nominated to the position of president of so important an Institute. That he was no sort of a man to permit himself to be trifled with was abundantly evident from his presidential address. He had only had the opportunity of read- a brief extract from it, but from that he had seen that the president had said that foundrymen were in danger of losing their pride in craftsmanship. That was a courageous statement to make.

He knew that Lord Mayors were supposed not to indulge in anything controversial, but he was prepared to take his courage in both hands and to say that he completely endorsed what the president had said in that regard. Not only must the nation preserve its craftsmen, but they must preserve their pride in that craftsmanship. He was certain that the visit of the British foundrymen's Institute would do all it could to foster that pride in real craftsmanship. He hoped he might be permitted to say as Lord Mayor of the City that that was one of the reasons why the conference was so welcome and why they would welcome foundrymen whenever they found it convenient to come.

"The Institute"

Proposing the toast of "The Institute of British Foundrymen," Mr. John Neill, director of the North Eastern Marine Engineering Company (1938), Limited, said it was a great honour to him to have to propose that toast, especially as the Institute had elected as its president one of his own colleagues, Mr. Colin Gresty. Mr. Gresty had been associated with him since the year 1912, when Mr. Gresty had started in the firm's laboratories at Wallsend under Mr. Horace J. Young. After 40 years of close collaboration with Mr. Gresty, he had seen him rise step by step to his present high standing, and he was in a position to testify that the Institute had made a wise choice in its president.

The affairs of the Institute were in very capable hands, and he would also say that in that district they were very pleased that the conference was being held there. Those who worked and lived in the district appreciated to the full the important place which it held in the industrial activities of the country. They counted it a high honour that the Institute had come to Newcastle in the year 1951, the year of the Festival of Britain—the year when the nation were out to show the world what the industries of Britain could do and were doing.

The work of the Institute was nationwide; in fact, it was more than that, for its activities went as far as South Africa, but, unlike other organisations which, when nationwide, tended to concentrate in London, the Institute had always kept intimate contact with the districts in which the work was carried on and had so kept the interest of the members. That was one of the most important points in the activities of the Institute.

The Institute's work in connection with education was, of course, well known. The foundry foreman's training course and the grants to students were examples of what had been done in that direction. He would suggest that there was scope for even more extensive educational work to-day. In fact, it should adopt the modern technique and do real propaganda work in these days of full employment. If they were to recruit adequate personnel for the foundry industry, the general public, and even the school children, must be interested in what went on in the modern foundry.

It might be said that the whole of the engineering industry was largely dependent on the product of the foundry, and he had been very pleased to find that the president had elaborated that idea in his inaugural address. It was sure to have very beneficial results for the industry.

The industry had many problems to solve, but the Institute was fortunate in having a capable secretary who could devise ways and means, so important for the success of any organisation. He was sure the president would forgive him when he said that presidents might come and presidents might go, but the secretary remained at least long enough to keep the whole succession going along the right lines, which was one of his true functions.

President's Reply

The president, Mr. Colin Gresty, responding to the toast, said Mr. Neill had made him feel very embarrassed after all the nice things he had said, but he did appreciate them very much indeed and thanked him for them. When he came to the Institute, however, he felt that he was on firmer ground and would first thank him for his tribute to the secretary, Mr. T. Makemson. He would also thank him for his appreciation of the Institute's work and various points he made in drawing attention to it.

It was a rather remarkable organisation—he knew he was speaking to many members, but there were also many present who were not members, and he hoped the members would therefore forgive him. It was a remarkable organisation in so far as it embraced in its organisation every grade of foundry worker whether owner, works manager, craftsman or even the youngest apprentice. That was a most unusual set-up for a technical body.

Mr. Neill had also referred to the technical committees and he took the opportunity as president to thank the numerous individual members who devoted their time and thought to the work of the technical committees, and not only the members, but also the firms which made it possible for their technical staffs to do that work.

Coming to the question of materials, one could deal with it in a few words. All they wanted was enough of them, or perhaps, to vary the famous words of Mr. Churchill, "give us the materials and we will make the castings." Then there was the question of membership, and he referred to the tremendous growth of the Institute membership over the years. He had joined the Institute in 1917, at which time the membership was just over 1,021. Since then there had been three conferences held in Newcastle. In 1924 (the first one) the membership was 1,556. In 1932 (the second), the membership had risen to 1,919, and now the membership was no less than 4,773, so it had really grown very considerably.

"The Guests"

DR. CYRIL J. DADSWELL, who proposed the toast of "The Guests," said there was always great satisfaction in giving hospitality whether it was in their homes and private lives or in their public functions, and on the present occasion the Institute was temporarily making its home in Newcastle. It therefore gave them great pleasure to have among them in their temporary home such a number of distinguished guests.

It gave particular pleasure to have the Lord and Lady Mayoress as the Institute's guests, particularly after their cordial hospitality of the previous night. The Lord Mayor was a man of very wide experience professionally, in business, in politics and in public service. He had hoped to say a lot more about him, but Mr. Sheehan had said it all much better than he could have hoped to do.

They were, indeed, honoured to have with them the Rt. Hon. Lord Eustace Percy, who was director of the Newcastle division of the University of Durham. The University was fortunate in having a man of such experience in affairs as Lord Eustace Percy. He had been both diplomat and politician. He could not help wondering whether as a Member of Parliament there was any significance in the fact that Hastings was his constituency, because he had an idea that Lord Eustace's family was of Norman extraction and in all probability had landed at that town. Lord Eustace Percy had published a number of works, among which might be mentioned "Democracy on Trial" and "Government in Transition," titles which might make them feel like sitting down and writing, but surely not with the skill and in the manner of Lord Percy.

They welcomed the Sheriff and his Lady.

There was no need for him to introduce Dr. Bailey, who had that day given them the Edward Williams Lecture. Dr. Bailey was one of the most eminent applied scientists in the country. He had been described as an engineer who knew his business, but in his opinion he was distinguished by being one of the few engineers who was a Whitley exhibitioner and a Whitley Scholar. There were few engineers who had started by serving their apprenticeship in the works and had become fellows of the Royal Society.

Dr. Dadswell also referred to most others of the principal guests by name, together with a brief word as to their principal claim to note in foundry matters and concluded his presentation of the toast by saying that they all hoped the ladies enjoyed their stay in Newcastle. They had to leave them from time to time to do a little work, but the presence of the ladies during the social functions enlivened them and made them enjoyable.

Lord Percy's Response

LORD EUSTACE PERCY responding said he counted it an honour to be able to thank members on behalf of the guests for the magnificent hospitality with which they had been entertained. He had to confess that he had had rather a shock at the beginning of the evening when Mr. Sheehan had described Newcastle as a "border town"—a more polite way of telling them that they were, to use a current vulgarism "the ruddy limit"—yet probably he did not mean all that.

He was very glad to have the opportunity in replying to the toast and to welcome the Institute to Newcastle on behalf of the University. In his capacity of representing the University he was a little frightened of the Institute because when they had just got their department of metallurgy fully going and equipped there were certain representatives of the foundry industry who urged them to turn it into a specialist foundry department—a temptation which had been avoided. He had to confess that he was then very puzzled to know quite what the difference between a foundryman and a metallurgist might be. He had gathered that the main difference was that a foundryman took an unholy interest in sand, a sort of interest which had become very familiar to the University from the activities of the professor of civil engineering, who took an equally unholy interest in concrete. His experience both of such foundry instruction as they had been able to give in their department of metallurgy and what his friend of civil engineering had taught him for the first time what being "as happy as a sand-boy" really meant. He was sure that that evening their Institute was characterised by that particular kind of jollity, whether directly derived from its sand interest or not he did not know. He had to remember, however, that he was the last skeleton in the cupboard and it was his duty to retire to the seclusion of the cupboard in order that more interesting and much more active proceedings might ensue. He thanked the Institute once again on behalf of the guests for the hospitality and a very pleasant evening.

Presentation to Mrs. Sheehan

Before dismissing the company to the dancing which was due to follow the dinner, the president announced that he had one more and a very pleasant duty to perform. It was to make a small presentation to Mrs. Sheehan, the wife of their immediate past-president, coming from the vice-presidents and past-presidents of the Institute. It was just a memento to her for what he hoped had been a very happy year of presidency. Mrs. Sheehan had, he knew, supported her husband in every way and had carried out the duties of president's wife with unfailing charm and distinction. He asked her to accept a coffee set with the thanks and appreciation of the Institute.

Mrs. Sheehan acknowledging the gift and good wishes said she thanked the past-presidents of the Institute of British Foundrymen very much for their lovely gift. She would always treasure it and it would be a reminder of a very happy year of office. She thanked the vice-presidents and their good ladies for their kindness during the past year. She had enjoyed it all very much and was most grateful.

I.B.F. Civic Reception at Newcastle

Members of the Institute of British Foundrymen attending the forty-eighth annual conference at Newcastle-on-Tyne, were entertained at a reception and dance in the Old Assembly Rooms, on June 12, by the Lord Mayor and Lady Mayoress of Newcastle, Alderman and Mrs. William McKeag. They were supported at the reception by the Sheriff of Newcastle, Alderman R. Mould-Graham and Mrs. Mould-Graham and the president and Mrs. John J. Sheehan.

The Lord Mayor in a brief speech of welcome to the members commented on the very long period of time that had elapsed since the previous visit of the Institute and said he hoped they would not leave it so long again before they returned. He had heard from the president that the last two years had been held in a non-industrial area and he could not help wondering why.

It was fitting that their conference should be held in Newcastle, for from that part of the country and through the Tyneside the foundrymen's craft and skill had been carried to all parts of the earth, but while the town and Tyneside generally had so much to interest them, he hoped they would not stay all their time in the town itself but would get out into the surrounding country which he regarded as being the most beautiful in England.

The Lord Mayor was thanked by the president for the Civic Reception and the welcome which had been accorded the Institute. (The Lord Mayor and Lady Mayoress remained for some time and took part in the dancing which immediately followed the speech of welcome.)

Australian Foundrymen Visitors

During the last few weeks, we have been delighted to receive three prominent Australian foundrymen. The first to arrive was Mr. K. S. Duncan, who has recently acquired an interest in the Grimwade Foundry, N.S.W. He has visited some foundries in the Newcastle area, and participated in the Meehanite conference at Cheltenham. Next came Mr. J. Mason, of Mason & Cox, Limited, steelfounders, of Adelaide. His father was a founder member of the British Foundrymen's Association, and at the time of his death last year was the last of the original eight founder members. The third visitor was Mr. W. A. Harrington, of Sydney. He is a Londoner who went to Australia some 40 years ago, and now operates a foundry making marine and industrial piston rings. We wish these three visitors a happy holiday in this country.

PLANS ARE BEING PREPARED by the Trussed Concrete Steel Company, Limited, for modernisation and extension of the Manchester works, states Mr. H. W. L. Reddish (chairman) in the 1950 report. With the present high rate of tax on the company's profits, however, he says that it is going to be exceedingly difficult to finance this expenditure "without raising additional capital sooner or later." No immediate action is contemplated, but recently the authorised capital was increased by £450,000 to £825,000. The present issued ordinary capital is £250,000.

Coltness Iron Company's Scheme

Resolutions for the withdrawal of the Coltness Iron Company's capital repayment scheme of July, 1950, will be placed before shareholders at an extraordinary general meeting to-morrow. The scheme was approved by shareholders, but failed to obtain court sanction. The court decided that it was not sufficient for the directors to state that they had no interest in the scheme other than as members. They should, it was stated, have disclosed the extent of their holdings.

Since the scheme was initiated, further funds have become available to the company and it is understood that a new scheme of capital repayment will be placed before shareholders in due course.

AN INVITATION has been extended to industry, trade, and commerce to put forward specific requirements for improved early-morning passenger train services which will enable business men to travel between London and certain provincial towns and back within the same day, and which will also permit of a reasonably early arrival at destinations. These proposals will receive the sympathetic consideration of British Railways with a view to securing any necessary improvements as early as possible.

I.B.F. Annual General Meeting

(*Continued from page* 656)

among whom they were particularly pleased to welcome Mr. Sissener, who was a member of the Institute and also the president of the Norwegian Foundrymen's Association and who brought with him his charming wife. They also appreciated the visit of Mr. G. Lauterjung and Mr. A. Müller from Germany and Mr. Elijah from India.

MR. J. SISSENER, speaking on behalf of the foreign visitors and on behalf of the Norwegian Foundrymen's technical association, of which he had the pleasure of being the President, said he wished to convey the most sincere greetings of his fellow-countrymen, who had been taken such splendid care of, both before and since the War. There was no country in the whole world where the Norwegians felt so much at home as in England. The Norwegian foundrymen also wished to congratulate the British foundrymen and tell them that they had followed with great interest all their progress and achievements and work for the foundry industry, and it was a great incentive to them in Norway to try and follow a little of that splendid work. If it was possible for any of the members of the Institute of British Foundrymen to visit Norway they would find a hearty welcome awaiting them and his fellow countrymen would be delighted to try and return some of the great hospitality and friendship which they always found in this wonderful country.

The Chairman proposed that a cable of greeting should be sent to their sister association, the American Foundrymen's Society, and this was agreed unanimously by the meeting.

The annual general meeting then terminated, but after a short interval members reassembled to hear the presidential address and the Edward Williams Lecture both of which were printed in last week's issue of the JOURNAL.

Thermal Considerations in Foundrywork*

By Dr. Victor Paschkis

Every human endeavour which persists over long periods of history creates a pattern of tradition which becomes the more set in its way—or may one say ruts?—the older it becomes, the longer it is practised. Progress is achieved not so much by ruthlessly abandoning time-honoured traditions, as by the willingness to hold up to critical examination by the best available gauges the traditional patterns of action; and to maintain only those which prove to be acceptable by this test, while discarding all methods which in the light of present insights are no longer the best suited for the ultimate goal.

In these times of continued danger of war, one might be tempted to consider the possibility of applying this method of progress to the field of human relations, particularly regarding the pattern —much too much ingrained by tradition—of settling differences of group opinion by force instead of reason. But members are gathered at a foundry conference for a different purpose, and therefore have to limit their considerations to the application of these thoughts to the art of casting, to the foundry industry.

Introduction

As soon as man knew how to melt metals, the pouring into a desired shape—casting—became the natural way to obtain complex shapes of great strength. Only in modern times has foundrywork found serious competition in the form of welding and brazing. In order to meet this competition, progress is needed; and progress involves, as stated before, the critical review of the situation. This Paper presents such critical review in one aspect of the casting field; that of heat flow and heat transfer. The foundryman is so accustomed to work with heat, that he is hardly aware of the heat—or thermal—laws with which he is dealing. But only by becoming aware of them, and recognising them, can he hope to improve his methods in a systematic and economical way. Lacking such knowledge he has to rely on guessing and intuition, both of which have their place in industrial life, but are frequently all too unreliable.

It is known often that an outsider looking at a problem may find suitable gauges and remedies, because he is less hampered by tradition than the person who is in continuous touch with the problem. The Author is aware that he is an outsider in the field of foundrycraft—not having ever made a casting or even a mould; but for the past seven years he has been looking at foundry problems with the eyes of a heat-transfer man, and thus the views and impressions of a heat-transfer man regarding foundry practice will form the main part of this Paper. In modern industry, results can be obtained only by teamwork and co-operation between many specialists, one of whom, in foundry work, should be a heat-transfer expert. Thus it is hoped that the Paper may not only serve as a gauge, but have some usefulness in building a science of metal casting gradually to replace the well-perfected foundry art.

FUNDAMENTALS OF HEAT TRANSFER

Analogy to Flow of Liquid Metal

The foundryman, who in the field of thermal relations finds it difficult to accept the difference between "heat" and "temperature" and to visualise the rather abstract happenings of heat flow, may be helped by thinking of some well-accepted observations with regard to the liquid metal. Everyone will expect to see liquid metal flow from a ladle, when the latter is tilted above the shop floor, and would not expect to see metal flowing out, if the ladle were tilted within a bath of liquid metal. For example consider (Fig. 1) tilting a small spoon ladle full of metal within a large transfer ladle, also full of metal: there is no difference of level between the metal in the spoon ladle and that in the transfer ladle. Metal will flow, if unobstructed, as long as there is a difference of level. Similarly, heat flow will occur always, if there is a difference of temperature levels. But, still referring to Fig. 1, the level difference between the transfer ladle and the floor in the position shown does not lead to a flow of metal, because the ladle with its lining forms a complete barrier to the flow of metal (until a hole is burned in the lining and ladle). No such complete barriers to heat flow exist. Whereas in the case of the ladle and the metal contained therein, the resistance to metal flow is infinite, there does not exist any material or arrangement which results in an infinite resistance to heat flow. Thermal resistance can be large or small, but can never be either zero or infinite.

The resistance to heat-flow increases with length of path to be traversed by heat and decreases with the cross-sectional area of the heat path (similar to the way in which the resistance to metal flowing out of a melting furnace increases with the length of the spout, and decreases with the cross-section of the latter). Moreover, the resistance to heat flow depends on the material in which heat flow occurs. The property expressing this dependence is called the thermal conductivity. The thermal conductivity indicates how many B.Th.U. (British thermal units) flow through a body having a cross-section of "one" (say square foot), and a length of "one" (say foot), if the two faces are exposed to a temperature difference of "one" (degree F.).

* Official Exchange Paper from the American Foundrymen's Society, presented at the 48th Annual Meeting of the Institute of British Foundrymen at Newcastle-upon-Tyne earlier this month. The Paper was read by Mr. J. F. B. Jackson on behalf of the Author.

Thermal Considerations in Foundrywork

The significance of this concept of thermal conductivity (usually denoted by " k ") and the dimension B.Th.U. per ft.-hr., deg. F., will be made clear in discussing the various thermal problems in the foundry.

Another concept of heat flow, which is important, is fortunately much more familiar to the foundryman, *viz.*, specific heat. The latter indicates the amount of heat absorbed by the unit weight (one pound) of a material, if its temperature is raised one degree. It is expressed in B.Th.U. per lb., deg. F. More conveniently one should refer the specific heat to unit volume, instead of to unit weight. This figure is called " volumetric specific heat " (B.Th.U. per cub. ft., deg. F.), and is found by multiplying the value of specific heat (B.Th.U. per lb., deg. F.) by that of the density of the body (lb. per cub. ft.). The volumetric specific heat will be denoted by c. The heat problems in which the foundryman are interested are almost all of the " transient type," which is better known as the " unsteady-state "; in such problems temperatures vary with time. In transient type phenomena, both k and c enter; in most instances only their ratio (k/c) is important, and in some instances their product (k.c.).

During solidification of metals the so-called " latent heat of fusion " is given off. This " latent heat of fusion " acts in a similar way as if temporarily, that is over the range of solidification, the specific heat were increased. The heat of solidification is expressed to B.Th.U. per lb.; but in heat-transfer considerations the product of latent heat × density enters; this has the dimension of B.Th.U. per cub. ft.

There is still one concept which has to be introduced. It was stated above that whenever there is a level (temperature) difference, heat flow is bound to occur. Normal concepts of conductivity and specific heat take care of the heat flow within a body. But if the surface of the body is at a temperature elevated above that of the surroundings, the body will lose heat to the surroundings: a casting, after the shake-out may have a surface temperature of 1,400 deg F. (660 deg. C.) and face a shop atmosphere at 80 deg. F. Heat flows from the casting to the air; the rate of heat flow depends on a number of items: the velocity of the air surrounding the casting, the nature of the surface (clean or scale) and the temperature level of the surface influence this rate. Moreover, the rate of heat flow is greater if the temperature difference between surface and atmosphere is higher. Thus it is customary to characterise the rate of heat flow from the surface to the surrounding by a proportionality factor, h, called in the heat transfer language the " boundary conductance "; it is represented by the letter h, and expressed in B.Th.U. per sq. ft.-hr., deg. F.

Actually, as mentioned, the boundary conductance is not a constant, but depends on a number of variables, mainly on temperature. However, this relationship is taken care of by a number of mathematical operations, which need not be of concern here.

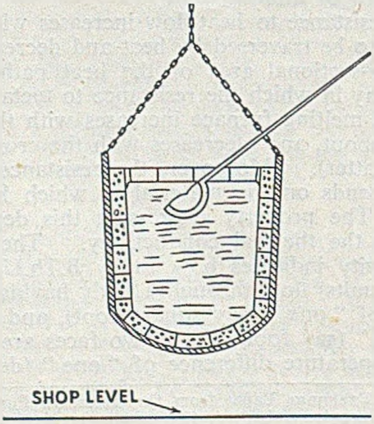


FIG. 1.—*Fluid Flow in Ladles.*

Practical Consequences of Heat-transfer Theory

The properties introduced in the previous section are those which determine the nature of the thermal occurrences in foundrywork, but only through complicated mathematical functions. Without going here into any theoretical considerations, it may be of interest to state one result of the science of heat transfer, which has applications in many fields of the foundry.

The time required for a thermal occurrence in bodies of the same material and the same shape, but different size varies with the size in a definite relationship; this relationship lies between linear and square proportionality. What does that mean? Suppose two castings are made: both have exactly the same shape; the larger one has all dimensions exactly twice that of the smaller one. Similarly the mould dimensions for the larger casting are exactly twice as large as the corresponding ones for the smaller casting. Then solidification of the larger casting will occur in a time which is between twice and four times the time required for solidification of the small casting. In most practical cases the figure " four " (square of the length ratio) is so close to the correct result that one can work with this figure. Similarly, if it is known that a core of a given shape and size takes, for example, two hours to dry, then a core with all dimensions trebled as compared with the first one, will take six to nine times as long to dry than the small one.

The usefulness of this approximate rule is further enhanced, if one introduces the concept of " critical dimension." Assume (Fig. 2) that a car-bottom-type electric annealing furnace resulted in a satisfactory anneal. The heating resistors were placed on the four sidewalls, but not in the car bottom or roof. Now a larger furnace is being considered. A change of height will not call for a change in heating cycle; with only the sidewalls serving as heat sources, the height is not a " critical dimension." But if length and width of the hearth are increased proportionally, let us say to 1.5 times their

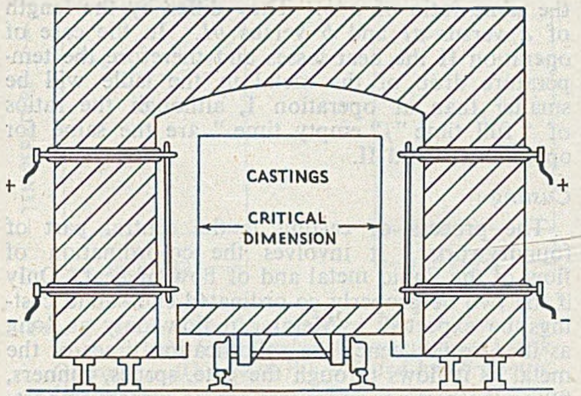


FIG. 2.—*Illustration of a Critical Dimension*

original values, the situation is different. Length and width are the critical dimensions, and hence the heating time has to be increased to between 1.5 and $1.5^2 = 2.25$ times the original value.

The critical dimension, then, is that in which the heat flow occurs principally. By disregarding the non-critical dimensions, a small inaccuracy is introduced, because there is practically never a dimension in which there is "no heat flow." The closer one approximates the condition, *i.e.*, the smaller, percentage-wise, the heat flow in the non-critical dimension is, compared to that in critical ones, the closer the approximation holds.

SURVEY OF HEAT PROBLEMS IN THE FOUNDRY

Flow Diagram

Thermal problems are much more widespread in the foundry than might be commonly expected. Fig. 3 is a flow diagram of a foundry using sand moulds; operations which should be based at least in part on thermal considerations are marked by a star. One important item is omitted from the diagram, namely, the design of the casting; in designing a casting, thermal considerations should very definitely enter, although in most instances the designer is not aware of this. Also, some of the parts of the production process are not customarily recognised as representing "heat-flow problems." Therefore a brief review of the processes from a thermal angle may not be amiss. Inasmuch as a good deal of work has been done during the past several years on thermal aspects of solidification, the Paper will deal primarily with this field.

Design

Thermal considerations here include the difference in solidification times of sections of different thickness and shape, limits of thickness which can be cast and stresses to be expected as results of differences in solidification and cooling pattern. Inasmuch as these problems reappear below in various other sections, further discussion here is unnecessary.

Melting

With a few noticeable exceptions, one may say that the two predominant types of melting equipment in this country are the cupola and the arc furnace. For producing malleable iron, a reverbatory type furnace is widely used, known as the "air furnace."

The cupola is considered, and rightly so, as the least expensive means of melting. But that does not mean that for the quality obtained in the cupola, no lower melting costs can be obtained than at present. Utilisation of waste heat for preheating of the air charge and fuel are already at least partly under consideration. Factors influencing the selection of wall thickness includes:—(1) The mechanical strength of the cupola; (2) the life of the refractories, governed in part by the inside surface temperature as well as the steepness of the temperature gradient in the wall, and (3) the heat losses through the lining. The last two items are essentially thermal problems. Similarly, selection of size of the pieces of the charge and coke is in part a thermal problem. Means of temperature measurement and elimination of errors incurred in such measurements are but a few examples of points of possible further progress.

In arc furnaces the electrode size is selected (mostly by the furnace builder) based on experience. It is not known if the sizes which are selected are the most economical ones. Changes in size might result in more than power savings and in increased output. Spacing of the electrodes, length of arc, insulation of the lining, thickness of the lining, and also the electric connected load (rate of power input), all have bearing on the furnace

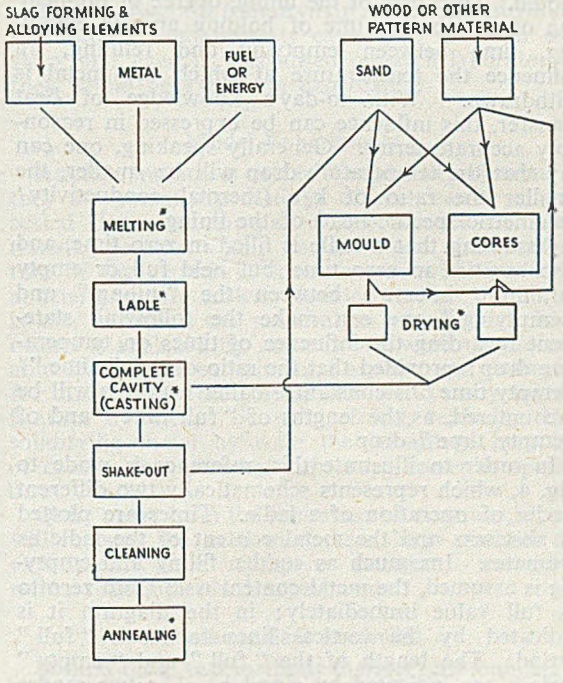


FIG. 3.—*Flow Diagram of a Foundry using Sand Moulds.*

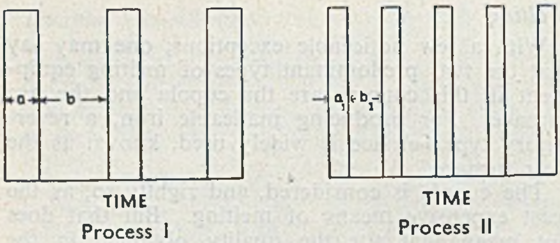


FIG. 4.—*Operating Schedule for Ladles.*

$\frac{a}{b} = \frac{a_1}{b_1}$ is the expression for equal ratio of "full times" (a and a_1) to "empty times" (b and b_1). Process II results in smaller heat losses in the ladle than in Process I.

operation and economy and all are thermal problems. Core-type induction furnaces, as used for melting in brass and aluminium foundries, operate frequently only during one or two shifts; but it is not practical to shut them down for the balance of the 24-hr. day; hence they "idle" during one or two shifts, and thus the problem of heat losses becomes quite important. Yet next to nothing is known about them. A foundryman might argue that this is the responsibility of the furnace builder, but this is a typical case of the responsibility being tossed back and forth between supplier (furnace builder) and user (foundry), with the problem remaining unsolved to the final detriment of both.

Ladle

Ladles serve to hold the metal after tapping, and of course also for transfer of the metal to the mould. Thickness of the lining, degree of pre-heating of the lining, time of holding and/or emptying, time between emptying and refilling, all influence the temperature at which the metal is withdrawn. With to-day's knowledge of heat transfer, this influence can be expressed in reasonably accurate terms. Generally speaking, one can say that the temperature drop will be smaller, the smaller the ratio of k/c (thermal conductivity/volumetric specific heat) of the lining.

Assuming that a ladle is filled in zero time, and also emptied in zero time, but held full or empty for finite intervals between the "filling" and "emptying," one can make the following statement regarding the influence of times on temperature drop: provided that the ratio of "full time"/"empty time" is constant, smaller heat loss will be encountered, as the lengths of "full time" and of "empty time" drop.

In order to illustrate this, reference is made to Fig. 4, which represents schematically two different modes of operation of a ladle. Times are plotted as abscissas and the metal content of the ladle as ordinates. Inasmuch as sudden filling and emptying is assumed, the metal content rises from zero to its full value immediately: in the diagram it is indicated by the vertical lines for each "full" period. The length of the "full" and "empty" periods are indicated by *a* and *b*. The two modes of operation are indicated by I and II, both having the same ratio of *a*/*b*. They differ by the length of *a* versus *a1* and *b* versus *b1*. In the case of operation II the heat losses and therefore the temperature drop of the metal in the ladle will be smaller than at operation I, although the ratios of "full time"/"empty time" are the same for operations I and II.

Casting

The process of casting is the central part of foundrywork. It involves the co-ordination of flow of the liquid metal and of flow of heat. Only if the two be properly co-ordinated can sound castings be expected. Metal can flow only as long as it is liquid; hence the solidification times of the metal as it flows through the gate, sprues, runners, filling the casting, and risers are of utmost importance. As metal freezes along these paths, it decreases the available feeding area for liquid metal, and thus interacts directly with the problems of liquid flow. Small wonder, therefore, that this part of the foundrywork has received most attention from a thermal point of view. Some aspects of this work are discussed in Section IV and no more will be said about it here.

Drying of Moulds and Cores

Drying of cores and moulds consists in raising their temperature so that either (in case of oil binders) oxidation takes place, which increases greatly with the temperature obtained, or the vapour pressure (water) is increased, to drive the vapour through the interstices between the individual grains of the sand. It is known that an attempt to dry too rapidly will result in a hardened shell, which prevents the moisture of the layers at some distance from the surface to escape and the final result is a spoiled mould or core. Qualitatively the foundryman is aware of these conditions, but he probably does not know, that heat transfer is advanced enough, to give some quantitative answers to the problems involved.

Two remarks may be appropriate here. One refers to the apparently quite successful attempts to apply di-electric heating to the baking of cores. Di-electric heating results in a temperature distribution in the core, basically different from that obtained in conventional baking operations. Fig. 5 shows schematically the temperature distribution in baking a core of thickness L; Fig. 5(*a*) shows the distribution in case of conventional heating: the highest temperature prevails at the outside, the lowest at the centre. Hence the outside will dry first, forming a relatively hard crust with low permeability. As the thickness of the dry layer increases, complete drying of the wet centre becomes increasingly difficult. A remedy is possible by drying in an atmosphere of controlled moisture content, thus delaying the drying of the outside.

In case of di-electric heating (Fig. 5(*b*)) heat is generated within the core; the temperature drop towards the surface is caused by the heat losses from the surface, and the highest temperature exists at the centre. Because no hard, dried crust of low permeability is formed on the outside, much higher heating rates can be applied.

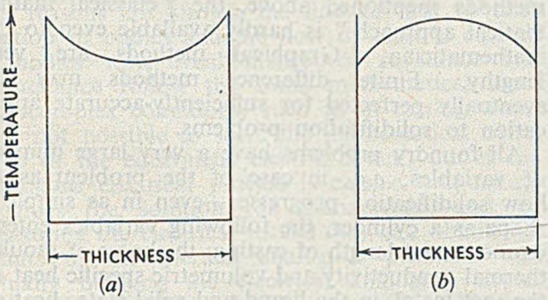


FIG. 5.—*Schematic Temperature Distribution in a Core. ((a), left) During Conventional Drying Operation. ((b), right) When Dried by Di-electric Heating.*

The second remark refers to a comparison of the heat flow in the sand while drying with that after pouring. When drying by conventional heating (Fig. 5(*a*)), the flow of moisture and that of heat are in opposite directions: heat flow towards the centre, and moisture towards the outside. Hence, the moisture carries part of the heat which had reached the inner parts of the mould back towards the surface. A decreased apparent thermal conductivity of the sand results. In case of the metal in the mould, the inside surface temperature of the mould increases very rapidly, and drives the moisture towards the outside. The heat flow is in the same direction; consequently the flow of moisture supports the heat flow; an apparent higher thermal conductivity of the sand results (Fig. 6).

SOME METHODS OF MAKING THERMAL STUDIES

On Thermal Studies

It was stated earlier that all too little is known about heat flow in foundrywork. This becomes understandable indeed, when the various methods are surveyed, which could be used in making thermal studies. Before making such a survey, one should consider what is meant by "thermal studies." The ultimate goal of thermal studies is, of course, the production of better and/or less-expensive castings. In order to approach this goal, it is first necessary to know present conditions; for example, with reference to solidification, how, thermally, the casting behaves under the prevailing operating conditions: how long does it take different parts of the casting to solidify.

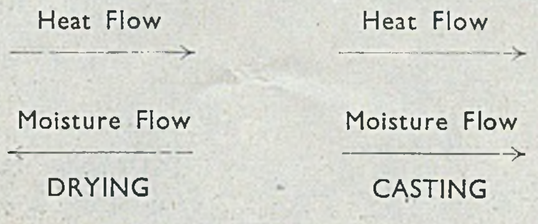


FIG. 6.—*Heat and Moisture Flow in a Mould during Drying and during Solidification of the Metal.*

After establishing present conditions one has to find out which changes are required to obtain a more-desirable thermal pattern. Obtaining of directional solidification, then, is a thermal problem. Knowledge and observation of temperatures at prevailing conditions is a step in the right direction, but not sufficient; it might be followed up by an attempt to change conditions—an attempt best based on heat-transfer knowledge.

Direct Observation

Thermal studies, by direct observation, imply therefore the possibility of measuring temperatures, and to change conditions at will. Both requirements are very difficult to meet. Proper temperature measurements at very high temperatures and particularly of molten metal are very difficult; most measurements are too inaccurate for any quantitative conclusion, to be drawn therefrom. Change of conditions—*e.g.*, providing moulds of various thermal conductivity—is, for economic reasons, next to impossible. The same casting would have to be made over and over again. Because in shop practice it would be almost impossible to avoid secondary influences (*e.g.*, minor changes in pouring temperature) which might cloud the results, a large number of tests would have to be run, that is, a large number of castings made, repeating tests with supposedly identical conditions. Thus a statistical average can be made, and then the various averages compared to detect the desired influence, *e.g.*, the influence of mould conductivity on solidification rates. A list of these difficulties should include that of providing the desired variations (*e.g.*, sands of varying conductivity).

To any practical foundryman it becomes obvious, that such systematic tests cannot be made in the shop; and even in specialised research laboratories they would be extremely expensive.

Model Experiments

Another method is that of "model experiments"; they are essentially castings of the desired shape, scaled down as to size. The science of heat transfer permits, within certain limits, the correlation of the geometric scale factors with the time and temperature scales. Related to this technique is one in which the material in which heat flow occurs is replaced by another one which is preferable from some experimental aspect. An example for this latter method is the attempt to study solidification by means of wax models, replacing the solidifying metal by wax; the advantage here is, of course, the working with much lower temperatures.

Quite apart from the limitation of accuracy, there still remains the need to make a large number of experiments, and compare statistical averages, rather than individual experiments.

Mathematical Methods

Besides these two methods there is only one left: that of mathematical analysis. However, there are a great number of different techniques, of greatly

Thermal Considerations in Foundrywork

varying practicability. What might be called the " classical mathematical approach " includes setting up a general equation, covering a problem, and solving this equation. Mathematical science does not as yet permit a general solution for the complete range of conditions prevailing in solidification.

In case of solidification, approximate solutions have been developed, which either disregard the finite thickness of the casting and/or mould[1]; the difference of thermal properties between liquid and solid state[2] (let alone the fact, that actually these properties vary continuously, but irregularly, with temperature, so that the assumption of " a value " for liquid and another value for solid metal already represents a simplification); formation of the airgap, etc. In fact, there are so many simplifications as to make the results, practically, next to useless. But notwithstanding these simplifications the mathematics becomes in many instances too involved for the foundryman, who has but little time to spare for such theoretical work.

Another group of mathematical techniques includes graphical analysis, probably first introduced by E. Schmidt[3] and then elaborated by Nessi and Nisolle[4]; and finite difference methods, worked out in detail by R. V. Southwell[5] and applied to thermal problems particularly by H. Emmons[6] and G. M. Dusinberre[7]. All these techniques are rather lengthy, and require considerable familiarity on the part of the user so that they are hardly useful to the foundryman, who lacks daily touch with mathematical technique.

If then no research methods are available which the foundryman can apply directly, he has to use the help of heat-transfer specialists. Of the methods mentioned above, the " classical mathematical approach " is hardly available even to the mathematician. Graphical methods are very lengthy. Finite difference methods may be eventually perfected for sufficiently-accurate application to solidification problems.

All foundry problems have a very large number of variables; *e.g.*, in case of the problem as to how solidification progresses—even in as simple a shape as a cylinder, the following variables enter: diameter and length of casting; thickness of mould; thermal conductivity and volumetric specific heat of the cast metal, in the liquid and solid state: heat of fusion of metal; pouring temperature; liquidus and solidus temperatures; thermal conductivity and volumetric specific heat of mould; width of airgap between casting and mould; time when this airgap forms; boundary conductance between the outside of the mould and the surrounding air. Such a list makes it understandable that for most foundry problems the mathematical solution is not known.

All the methods mentioned before, even when developed, would be cumbersome in solving for a sufficient number of values all the variables involved. Therefore a method should be described which has proved successful in studying thermal problems in foundries: that of using an Analogue Computer. Because of the importance which this technique has gained, it will be dealt with in a separate section, although it is a " mathematical method."

Analogue Computer

Certain groups of phenomena in nature follow the same mathematical laws, although they seem to be physically quite unrelated. In all such cases it is possible to carry out measurements in one physical field, and apply the result to the other field, which follows the same laws. This,

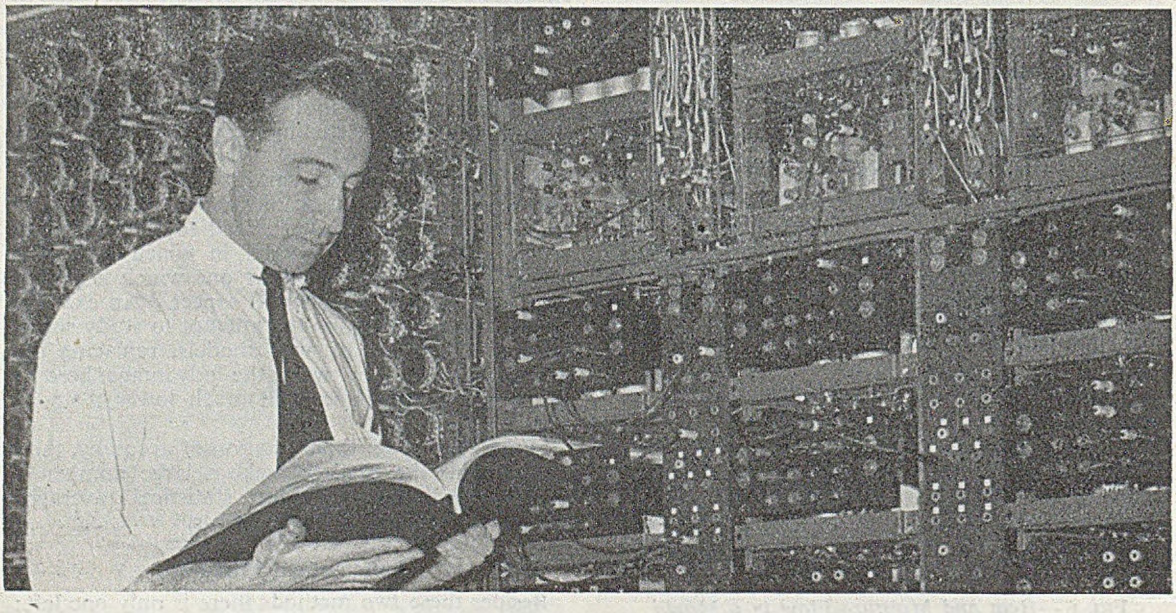


FIG. 7.—*Part of the Frames with Capacitances and Resistances in the Heat and Mass Flow Analyser Laboratory, Columbia University.*

essentially, is the basis for the Analogue Computer. For reasons not known, the flow of heat by conduction in bodies and the flow of electric current in bodies with evenly-distributed resistance and capacitance follow the same mathematical laws. For complex conditions, such as in casting work, it is not possible to solve the mathematical equations of the equivalent electric circuit; but if the analogous electrical process is carried out, nature provides the solution for foundrymen, and by measuring the electrical results they can obtain the results of the thermal analogous problem. In actually building the electrical analogous circuit one " trick " is used, which is common in electrical engineering: that of sectioning or " lumping." One thinks of the body, in which heat flow occurs—casting and mould—as being divided into a number of sections or lumps; and within each lump one considers the thermal properties to be concentrated in axis and centre (the specific heat and heat of fusion in the centre; the thermal resistance in the axis).

Some details of the technique are shown in the Appendix, and can be omitted by the reader not interested in them: he need no more understand the intricacies of this computing device in order to make good use of its results, than he need to know the details of the working of an omnibus, before boarding it to get to his destination.

Here several general aspects of this method should be considered.

(*a*) The method allows one to apply a time scale. The length of the individual electric " computation " experiments is usually in the order of magnitude of between 5 and 15 minutes. The solidification of very thin castings, which freeze in much shorter times (*e.g.*, die castings) can be studied, by " blowing up " the time by taking a " slow-motion picture " of the happenings; by applying a time scale, studies of very large castings, which may freeze only in hours, are reduced to last a few minutes.

(*b*) As in any computing technique, one can arbitrarily limit variations of conditions in any one computation to one variable, whereas in direct experiments accidentally more than one variable changes; if, for example, the influence of pouring temperature is to be studied, variations of composition, of dryness, of the mould and of sand properties mar the picture; a number of castings have to be made to obtain a statistical average. In any computing technique this need of many tests, required to allow statistical averaging, is eliminated.

(*c*) As in any computing technique, one can introduce values for the variables, independent of their occurrence in nature. For example, one can introduce " complete insulation " (no heat transfer) across any desired face; or " zero thermal resistance " as another limit. Thus one can establish what happens in limiting cases; moreover, this possibility of selecting any arbitrary value for the different properties enables one to explore desirable materials. Consider the previous example of sand conductivity, in case of the Analogue Computer one need not attempt to find many sands with varying conductivities. One can determine on the computer first what value of conductivity would

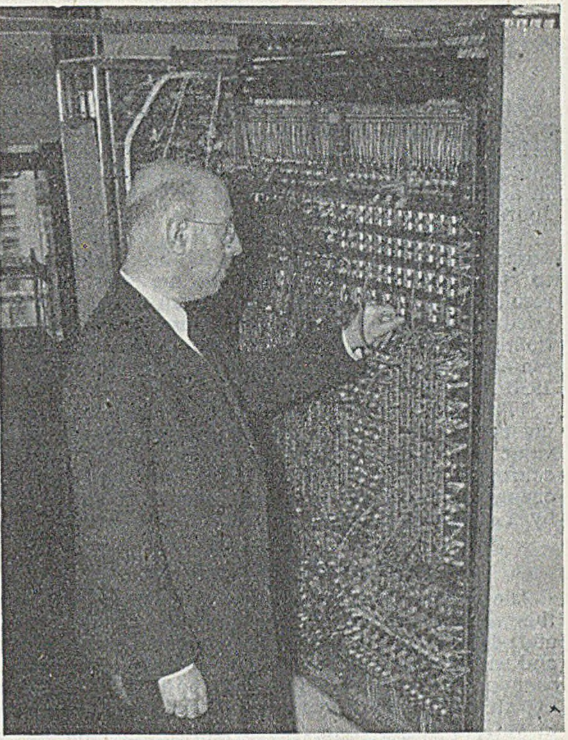


FIG. 8.—*Part of the Instrument Frame of the Heat and Mass Flow Analyser Laboratory, Columbia University.*

be desirable, and then later limit the search for sand to the one with approximately the best value of conductivity.

(*d*) One can measure temperatures and rates of heat flow accurately at any desired point in the body. There are no difficulties of inserting thermocouples, speed of the instrument, etc. The " Heat and Mass Flow Analyser " at Columbia University is such an Analogue Computer; it looks like a large telephone exchange[8] (Figs. 7 and 8), consisting of racks with electrical equipment and measuring instruments. Provision is made for a rapid change of circuits in order to allow presentation of many different problems. Problems regarding the foundry industry have been carried out over the last seven years in a co-operative programme with the American Foundrymen's Society.

In the following section some of the work carried out on foundry problems so far on the Heat and Mass Flow Analyser is reviewed.

REFERENCES

1 C. Schwarz, *Zeit. für Ang. Math. u. Mech.*, vol. 13, p. 202 (1933).
2 N. M. H. Lightfoot, *Proc. London Math. Soc.* (2), vol. 31, p. 97 (1929).
3 E. Schmidt, (*a*) August Foeppl Festschrift, Berlin, 1924; (*b*) Forschung auf dem Gebiete des Ingenieurwesen, 13 (5), (1942).
4 A. Nessi and L. Nissole, (*a*) Methodes graphiques pour l'etude des installations de chauffage, etc., Dunod, Paris, 1929; (*b*) Resolution Pratique des Problemes de Discontinuite, etc., Dunod, Paris (1933).
5 R. V. Southwell, " Relaxation Methods in Engineering Science," Oxford University Press, New York (1940).
6 H. W. Emmons, " The Numerical Methods for Transient Heat Flow," *Trans. A.S.M.E.*, vol. 65, No. 6 (1943).
7 G. M. Dusinberre, " Numerical Analysis of Heat Flow," McGraw Hill, New York (1949).
8 V Paschkis, " The Heat and Mass Flow Analyser Laboratory," *Metal Progress*, vol. 52, p. 813, November (1947).
V. Paschkis, " Heat Flow Problems in Foundry Work," *Trans. A.F.S.*, vol. 52, pp. 649-670 (1944).

(*To be continued*)

Index of Wholesale Prices

Board of Trade Revised System

The Board of Trade index number of wholesale prices has been published in its present form since 1935. After the last war it was considered that the index should be revised and the new system is described in an article in a recent issue of the "Board of Trade Journal."

The present index is built up from about 200 price series, the current price in each of these being related to the corresponding average for the year 1930, the resulting price movement being given a weight calculated to give it an importance approximately proportional to the value of the goods it was selected to represent in the total of imports and production in 1930.

The index was constructed to be a means of answering the question, "What is the average change in the value of money relative to other things?" and it conforms to the general belief at that time that this change in the value of money should be measurable by a relatively simple formula.

Preparation of the Indices

The various price series also give index numbers for the wholesale prices of food and tobacco as a whole and of industrial materials and manufactures as a whole, and within each of these main groups indices for various commodity groups. The principles on which the indices are prepared require that commodities should be priced at various stages from raw materials to manufactured goods so that, for example, the iron and steel index includes iron ore, pig-iron, steel billets, and fabricated products, etc., and similarly for other groups. The manufactured goods are manufactured industrial materials; finished consumer goods are not directly included, but are represented generally by intermediate manufactures. The items in the index were chosen so that the weights given to goods at later stages of manufacture are reduced to take account of their content of goods taken at earlier stages. The series for industrial materials and manufactures are further analysed to give indices of "basic materials," "intermediate products," and "manufactured articles." The form of the index is a geometric average of price movements, the weights being allotted by varying the number of price relatives included for each commodity.

Frequent minor improvements could not correct for any inappropriate selection of commodities or for any errors which may have developed because the weights were out of date. The weighting system is still based on the year 1930 and, while a new system of weights could have been derived from the figures from the census of production for 1935 and other relevant data, this was not done because of the outbreak of war and after the war this would not have been a sufficient reform.

Census Data

After the war it was considered that the index should be revised, but it was obviously necessary for calculating weights to have the data from the census taken in respect of the year 1948. It was also very evident that the limited usefulness in economic analysis of an index of the current type, which seeks to measure general price changes rather than those which are related to the most significant disbursements of money, made it advisable to change the whole system of index numbers.

The new system should give indices which relate directly to major economic groupings, and constructed as far as possible so that they may be of direct help to the Government, to industry, and to economists in studying the effects of price changes.

An extensive mass of price data covering a large part of the economy has been collected and tabulated, from which a range of indices has been computed. Others are in course of preparation.

It is proposed, where possible, to prepare and, when no breach of confidence is involved, to publish:—

(1) Index numbers of prices of the principal commodities used in industry and trade. The various price series of grades and types of commodities entering these indices will generally be weighted according to the quantities consumed in the United Kingdom.

(2) For certain industries "input" indices will be prepared of the prices of the materials and components used in the industry.

(3) Indices of the prices of the total product of each of the important industries. In computing these each commodity price series included will be given a weight proportional to the value of the output of that commodity and of others it is deemed to represent.

In addition, general index numbers relating to the money flows corresponding to movements of goods in various parts of the economy will be prepared; for example, price indices of the total output of manufacturing industry, of capital goods, etc. In most of the new index numbers (and all so far published or to be given very shortly) the weights have been derived from the figures given in the census of production for 1948.

Although figures for the year 1948 have been used for weights, it was not possible to get price data as far back as this for some important trades. It was, therefore, decided to commence the series of indices from mid-1949. This is not entirely satisfactory, but must serve until the series can be put on a new basis.

Mechanical Handling and Productivity

Appropriately, the mechanical handling conference organised by the Birmingham section of the Institution of Production Engineers on June 9 was held at the works of Fisher & Ludlow, Limited, for, as the institution's president, Major-Gen. K. C. Appleyard, pointed out, the company is considered one of the outstanding users of mechanical-handling equipment. The 500 executives from Birmingham, Wolverhampton, Leicester, Coventry, and London, who met for the conference, had an opportunity of seeing the factory where 2,000,000 sq. ft. was being employed to use mechanised equipment.

Stressing the importance of mechanical handling which had been the subject of study in the United States and this country by various Anglo-American teams of production engineers, Major-Gen. Appleyard said that engineers and industrialists here were fully conscious of the fact that in its study and application, a very real and practical contribution to increased productivity was taking place.

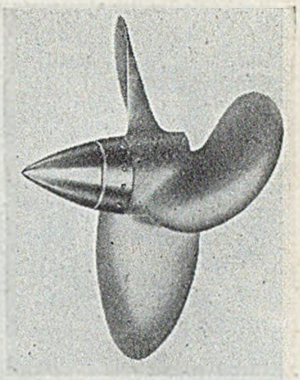
Electronics Industry in Scotland

In the next few days 25 Scottish firms will be formally invited to enter the electronics industry, one of the biggest of the new science-based industries. Originating the scheme is the Scottish Council (Development and Industry) and the firms, in company with Ferranti Limited, Edinburgh, will form a Scottish electronics group which will help the Ministry of Supply and the Admiralty to overcome a serious shortage of research and development capacity for defence work.

I.B.F. Conference Works Visits

Establishments in the north-east visited during the Newcastle-upon-Tyne Conference of the Institute of British Foundrymen, June 12 to 15

(*Continued from page* 584)



SIR W. G. ARMSTRONG WHITWORTH & COMPANY (IRONFOUNDERS), LIMITED, GATESHEAD

For many years prior to 1933, the whole area of the Close Works of Sir W. G. Armstrong Whitworth & Company (Ironfounders) Limited was devoted to the production of high-duty iron castings. These were mainly for marine- and land-engine parts, locomotive castings and certain specialised classes, the quality of which was recognised by the appropriate authorities. Although the foundry has since been encroached upon by the introduction of other products, it is still an important unit and is producing a variety of castings up to 35 tons in weight. The foundry is served by two cupolas, one of 10 tons and the other 8 tons per hour capacity. Fig. 12 shows a detail operation in the production of a large casting. "New Process" pig-iron made to standard specifications and to customers special specifications is another important product of these works. In 1933, after extensive market research and in anticipation of the need for modern rolling-mill equipment, the decision was made to produce alloy chilled-iron and alloy-steel base rolls. The few rolls of this type in use in Great Britain had, until then, been purchased from U.S.A. or Germany. By combining the best American and Continental practices, the new types of "Closeloy" rolls soon won favour in many important mills in the country. The first year's output was only 500 tons and size was limited to 15 tons delivered weight. Gradually, additional plant was installed to keep pace with the increasing demand. The Company's initial confidence in the product has been more than justified, as the output, in conjunction with alloy-steel rolls cast by their associate company, Jarrow Metal Industries, Limited, now exceeds 7,000 tons per annum.

The melting plant for rolls consists of two 18-ton

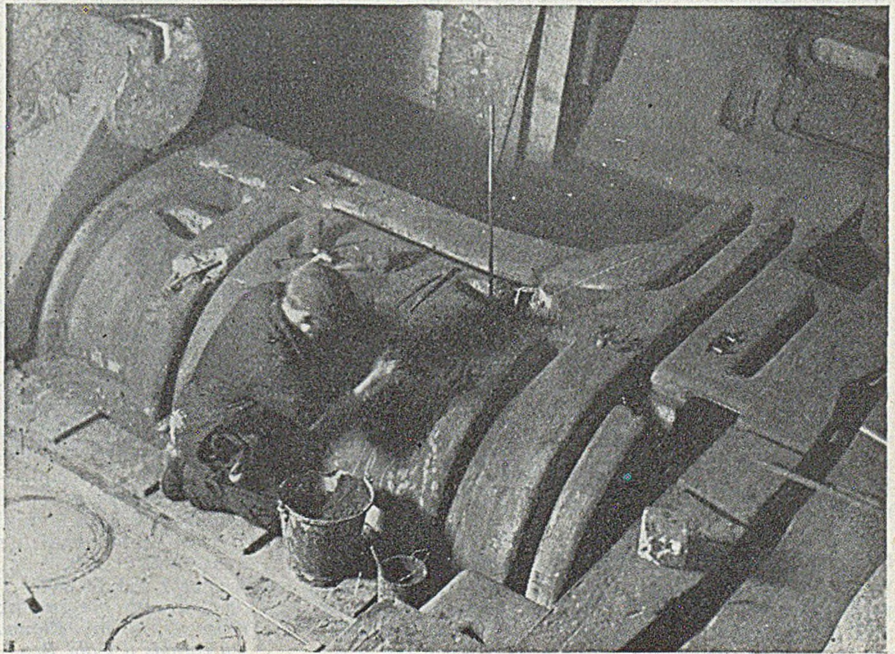


FIG. 12.—*Detail Finishing at the Armstrong-Whitworth Works of a Mould for a Large Casting for Electrical Power Plant.*

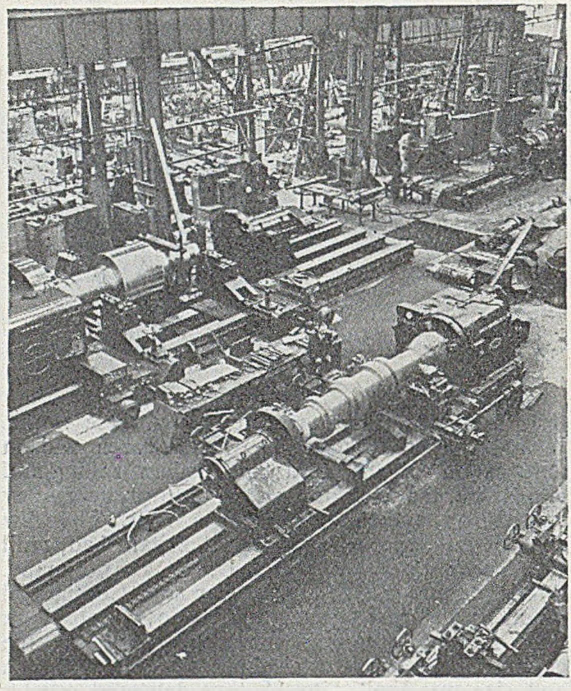


FIG. 13.—*View of the Roll Machine Shops at the Close Works of Sir W. G. Armstrong Whitworth & Company (Ironfounders), Limited.*

capacity and one 16-ton capacity air furnaces and and electric furnace holding 3 tons, together with a 3-ton per hour cupola with an automatic charger. Chilled-iron and alloy chilled-iron rolls are made in qualities to suit every mill purpose and the hardness extends, in the higher-alloy range to 90 deg. Shore sclerescope. Alloy-steel base rolls at 45 to 50 deg. Shore are made for all structural sections and for most heavy-duty work. A speciality in alloy-steel rolls can be seen in the back-up rolls in modern continuous strip mills. The largest of these at present being produced is 54 in. dia. by 80 in. barrel length and 16 ft. 4 in. overall in length.

Other Departments

The machine shops (Fig. 13) give an indication of the variety of types and sizes of rolls made. These range from 6 in. to 53 in. barrel dia. and from less than 1 cwt. to 35 tons finished weight. The machine shop has a complete range of machine tools to facilitate the precision machining so necessary with rolls for modern mills. The laboratories, by constant research, have kept pace with the increasing demand for rolls having great strength combined with resistance to wear. Metallurgical control combined with correct heat-treatment are constant studies.

In 1938, the Company was requested to undertake extensive light and medium general-engineering work of a specialised character—mainly the production of " Merlin " cylinder blocks; air-screws and other similar aircraft work. The decision was made to convert a portion of the foundry into engineering shops and these were rapidly fitted with the essential plant. At the conclusion of the war, in 1945, immediate steps were taken to provide a continuity of work for these sections in the form of commercial products. A large variety of work has passed through the shops in the intervening years and production is still being maintained at a high level. The tool room is kept working to capacity to supply tools of the highest grade for carrying out the many operations involved throughout the engineering department.

Armstrong-Whitworth iron castings are being supplied to many firms throughout the country and " New Process " refined iron is filling the needs of many ironfoundries. The rolls produced by the group are installed in most mills in Great Britain and in all the important mills in western Europe, South Africa, India, Australia and South America. Many of the engineering products are also being supplied to all parts of the world.

JARROW METAL INDUSTRIES, LIMITED

Jarrow Metal Industries Limited was formed as a result of the efforts of the late Sir John Jarvis

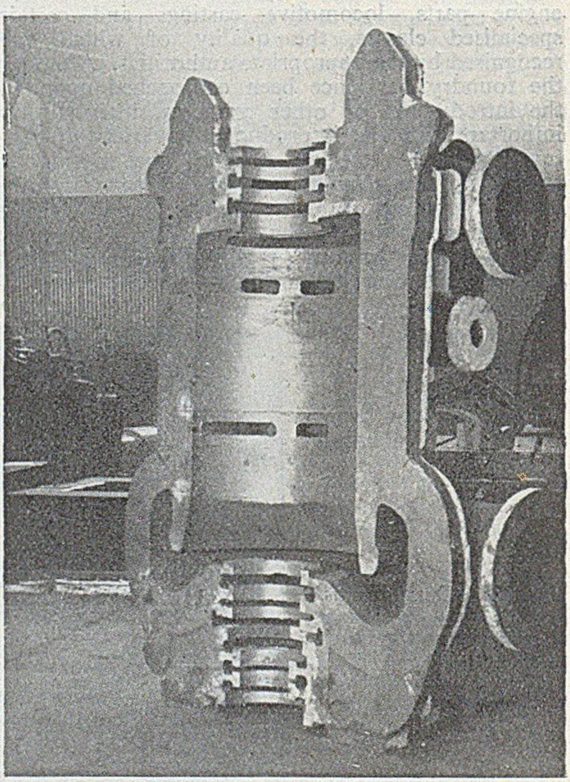


FIG. 14.—*High-pressure Ahead Turbine Cylinder Casing which is typical of Castings produced by Jarrow Metal Industries Limited. (Length 5 ft. 3 in.; width 2 ft. 6 in.; height 1 ft. 4½ in.; and weight 1 ton 14 cwt. The Steel has a Yield Point of 19.2 tons per sq. in.; Ultimate Tensile of 29.2 tons per sq. in.; Elongation of 33 per cent.; and withstands a Cold Bend-test to 140 deg. unbroken.)*

to rehabilitate Jarrow. When he launched the Surrey Fund in 1934, to give direct aid to the town, he envisaged the establishment of permanent industries as something practical, in the interests of, and of interest to, the town. Early in 1937, Sir John acquired the assets of Sir W. G. Armstrong Whitworth & Company (Ironfounders) Limited at Gateshead, in order to obtain the business organisation and directive ability for new industries at Jarrow, which were formed later in the year. Jarrow Metal Industries is one of these companies. The works are mainly designed for the production of steel castings of varied types and sizes up to 30 tons in weight.

The melting plant consists of one 15 to 20-ton and two 8-ton electric-arc furnaces capable of producing 350 tons of molten metal per week. The variety of types of castings produced covers too wide a range for adequate description. Notable amongst these, however, are turbine casings; marine- and land-engine parts; press frames; mill housings and ships' propellers. The foundry specialises in the manufacture of stainless-steel propellers, of which one type is illustrated at the head of this article. A typical turbine casting is shown in Fig. 14.

The casting and heat-treatment of rolls, subsequently machined by the firm's associated company, Sir W. G. Armstrong Whitworth & Company (Ironfounders) Limited, is an important part of the activities at Jarrow. The rolls range up to 50 tons cast weight, and are produced in cast carbon and alloy steels. They are all designed for heavy duty and their high qualities are recognised in rolling mills at home and in many parts of the world. The heat-treatment of castings and rolls is carried out in a battery of six gas-fired furnaces. A relatively new product to be seen at Jarrow is a fabricated axle-box from which the spilling of lubricant is impossible. These are in great demand by British Railways and are also fitted to rolling stock for export.

The extensive and well-equipped laboratories, which work in conjunction with those at Close Works, Gateshead, have an important part in all production. A team of research workers, under the direct supervision of the chief metallurgist are seeking constantly to improve upon the high standard already attained—at both the Jarrow works and at Armstrong Whitworth's at Gateshead.

NORTH EASTERN MARINE ENGINEERING COMPANY (1938), LIMITED, WALLSEND-ON-TYNE

The Wallsend works of this company is the headquarters of a group of marine engineers consisting of the North Eastern Marine Engineering Company (1938) Limited, Richardsons Westgarth & Company, Limited, and George Clark (1938) Limited. These associated firms, with four large works—one of which is situated at Wallsend, two at Sunderland and the fourth at Hartlepool—are actively engaged on the production of geared turbines, diesel engines and steam reciprocating engines for large and small vessels. The group also builds water-tube boilers for Foster-Wheeler type, Scotch boilers and marine superheaters. In addition, at the Hartlepool works, turbo-alternators up to 60,000 k.w. for power stations are manufactured, together with the necessary ancillary equipment.

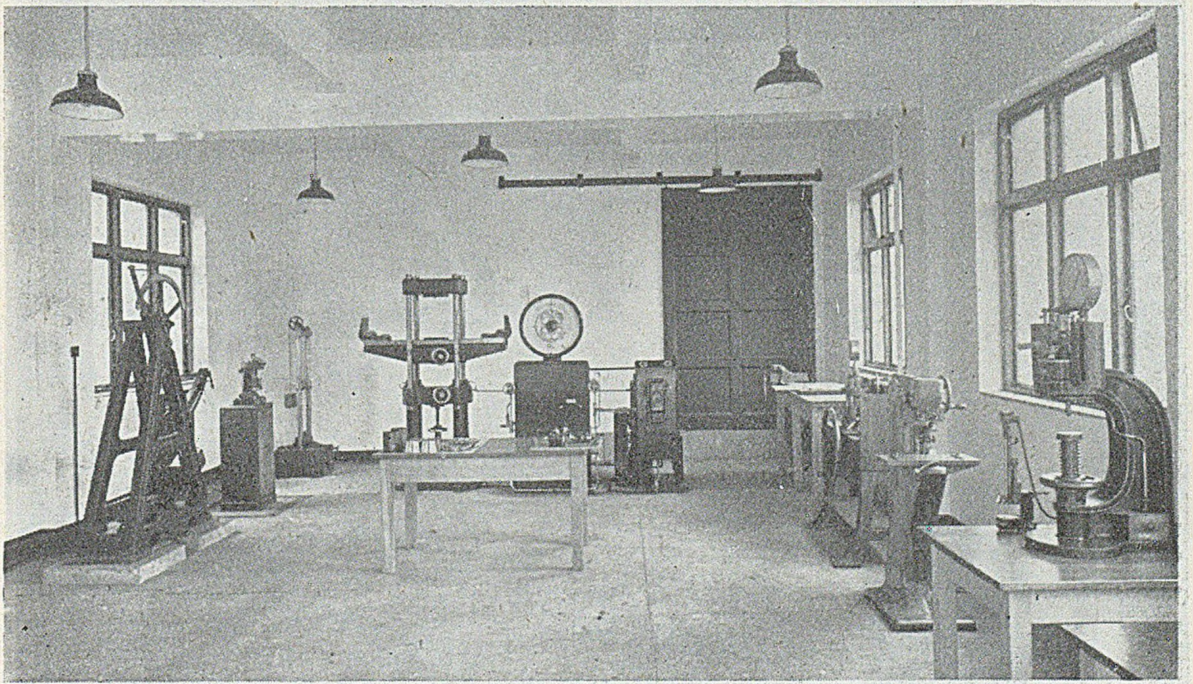


FIG. 15.—*Mechanical Testing Laboratory at the North Eastern Marine Engineering Company* (1938) *Limited.*

I.B.F. Conference Works Visits

Two large iron foundries, one being at Wallsend and the other at Hartlepool, produce the castings required by all the works. These include high-duty iron castings, by the Lanz Perlit process, for diesel engines, superheated steam engines and other severe conditions of service. Cast-iron propellers and a wide range of other castings up to a maximum weight of 35 tons are also produced. A licence for the manufacture of spheroidal-graphite cast iron by the magnesium process has recently been taken out and experimental work is proceeding.

Integrated with the work of the foundries and other departments is a large metallurgical laboratory, situated at Wallsend, equipped with modern mechanical testing machines and photo-micrographic apparatus and having full facilities for the chemical analysis of metals and alloys. It is also equipped for the testing of lubricants and fuels (both solid and liquid) and for the investigation of the many problems incidental to the business of large marine engineering works. (Fig. 15.)

The Wallsend works, which was visited by some 50 to 60 members of the Institute during the Annual Conference is situated about midway between Newcastle and Tynemouth. The south end of the works fronts directly on the river Tyne, with a piled deep-water jetty 1,500 ft. long having craneage facilities up to 150 tons, enabling several ships to be fitted out at the same time. The main shops lie north and south, the erecting shop being in the centre and having a broad gauge rail track running direct to the jetty for conveying loads up to 150 tons. To the west, the erecting shop is flanked by the large machine shop and main foundry (Fig. 16) and, to the east, by small machine shops, fitting shops and boiler shop.

The main output at present consists of N.E.M.-Doxford oil engines in powers ranging from 2,000 to 8,000 h.p. per shaft. The chief subsidiary line of business is the manufacture and fitting of super-heaters to new ships and the conversion of existing ships to the use of superheated steam.

During their tour of the works, the visitors had the opportunity of seeing a number of these engines at various stages of manufacture, from the production of the necessary patterns, castings and fabricated parts to completed engines ready for shop trials.

In the large machine shop they saw several large lathes employed in turning crankshafts, propeller and line shafting, stern-tubes and the larger engine running gear components such as connecting rods,

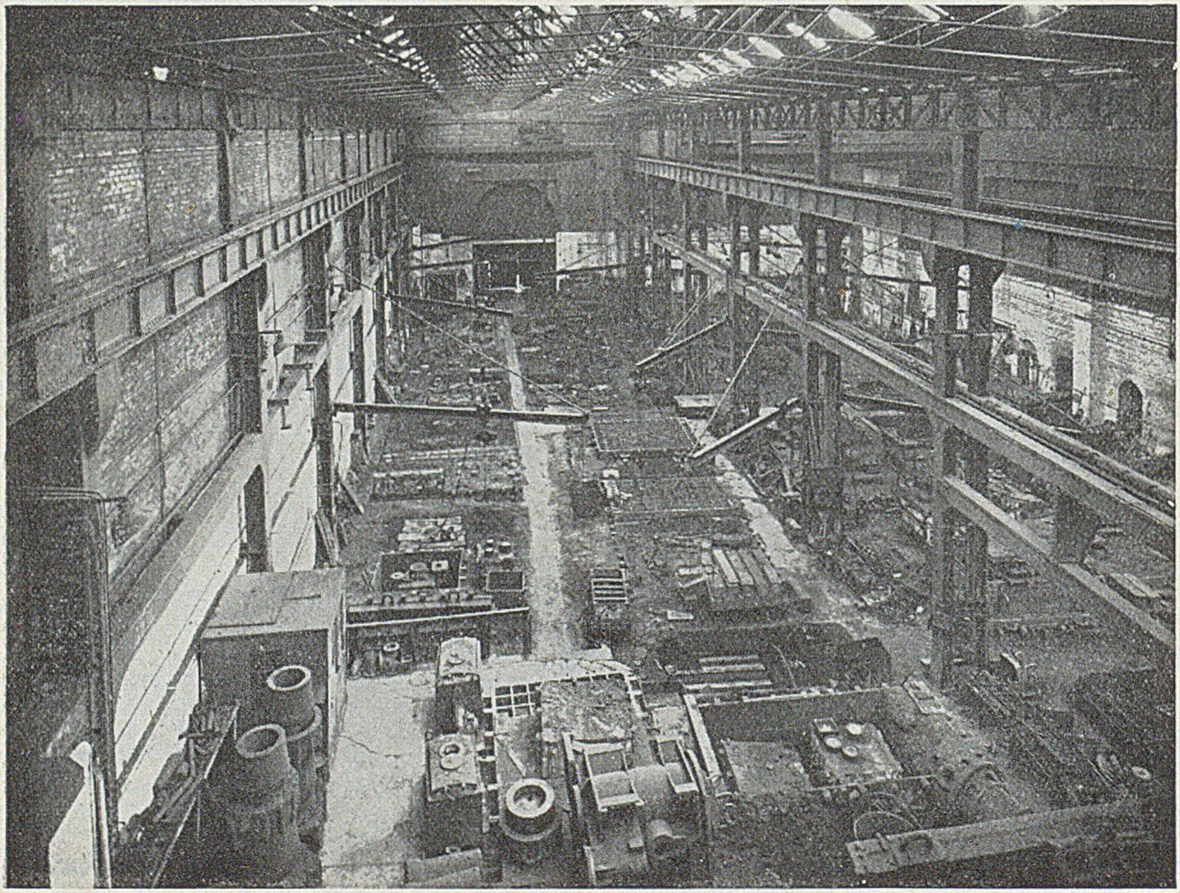


FIG. 16.—*Main Foundry at the Wallsend works of North Eastern Marine.*

piston rods, etc. There were also horizontal and vertical shaping machines for machining engine bedplates, columns and entablatures, together with a large plano-miller which can be adapted for milling or boring. Several boring and drilling machines were seen employed in machining crankshaft parts, cylinder liners, spherical bearing housings and other large components. The building of a large oil-engine crankshaft was in progress in a special pit designed for that purpose.

In the small machine shop were a variety of lathes, roundabouts, boring machines, shaping and milling machines and grinders engaged in machining pistons, crossheads, guide-shoes, bearings, bolts, camshafts, cams, and many other engine parts. The assembly of the various components such as fuel-injection pumps, running gear and control gear was seen in the fitting shop.

The erecting shop is equipped with three test beds and all the necessary cooling water and lubricating oil pumps, coolers and filters necessary to test the largest engines to their full output by means of a 10,000-b.h.p. "Froude" dynamometer, which is fitted with special hydraulic weighing gear. A view of the erecting shop can be seen in Fig. 17.

The iron foundries, which consist of two large shops, one being part of the main works and the other a separate building on the east side, are at present being extended and reorganised. The first stage of this reorganisation scheme—at the east foundry—is almost complete, and consists of an extension to the main building, the provision of four large additional core- and mould-drying stoves, a ladle-drying station, and internal alterations to separate fettling and sand-preparation work from moulding and coremaking. Facilities for washing, including showerbaths, footbaths and hand basins, together with locker accommodation for over 100 men, are provided in an annexe to the foundry. Full use is made of these facilities and many of the men now come to work in their ordinary clothes, change into working clothes and at the end of the day have a bath and return home in their clean clothes. When the alterations to the east foundry have been completed it is intended to re-organise and equip the main foundry on similar lines.

In the main foundry, many large moulds were in course of production, including cylinders and bedplates for steam engines, crosshead guides, top guides and other parts for Doxford diesel engines and cylinder blocks and bedplates for Sulzer diesel engines. In the east foundry, moulds in progress

(Continued overleaf)

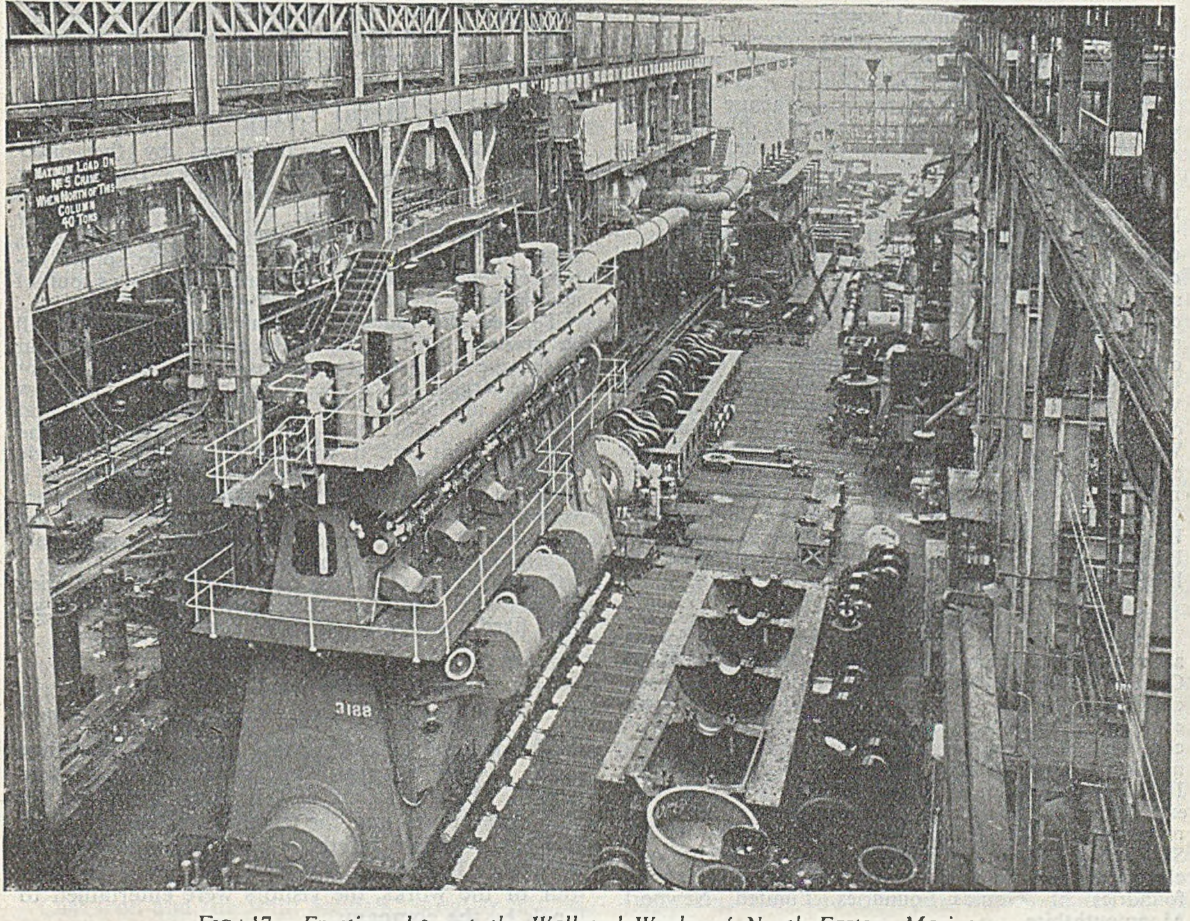


FIG. 17.—*Erecting shop at the Wallsend Works of North Eastern Marine.*

Meehanite Research Institute

Conference at Cheltenham

The nineteenth meeting of the International Meehanite Research Institute was held at the Queen's Hotel, Cheltenham, from May 29 to June 1, and representatives from nine different countries attended the various sessions devoted to numerous subjects.

The conference was opened under the presidency of Mr. H. Gardner, of Glenfield & Kennedy, Limited. During the preliminary business, the secretary, Mr. E. M. Currie, said two new branches had been formed during the year, one in Italy and the other in Scandinavia, and conferences had been held and well attended in Stresa and Copenhagen. In addition, under the ægis of the educational and training group, a second Metallurgists Refresher Course had had a very successful meeting at York last October.

The activities of the apprentice-training school at the Butterley Company's foundry at Ripley, near Derby, continued to flourish, and to date more than 130 apprentices had passed through. A tribute was paid to the patient work of the instructor, Mr. Brealey, and to the directors of the Butterley Company for their very helpful attitude in the maintenance of the school. As a reward for their excellent work and progress during the year, two outstanding apprentices had been invited to attend the research conference. Continuing, Mr. Currie said that to date Meehanite licences throughout the world numbered 143.

Technical Sessions

The discussion of some thirty reports on many aspects of foundrywork was then proceeded with under the chairmanship of Mr. Oliver Smalley, O.B.E. These included such subjects as the manufacture of cores; castings in the pulp and paper industry; dilution metal in the cupola; the relationship of the metallurgist to sales; castings for the steel industry; nodular iron and its future; ferrite in Meehanite metal; sub-zero temperature impact tests; S-curve characteristics; basic-lined and water-cooled cupola operation; sand mixtures in Great Britain; moulding of drying cylinders; loam and dry-sand moulding in a jobbing foundry; cement-sand moulding, sand-handling equipment and conditioning; casting yield; Sandslingers and their use; synthetic resins and the relative corrosion of Meehanite and other irons in certain chemical media. In addition, a separate session was held at which Papers by Mr. W. H. Harper on "Management" and Mr. P. Tromans, of Holman Bros., on "What a General Engineering Works requires from its Foundry Department" were exhaustively discussed. Metallurgical and foundry-practice sessioins, under the chairmanships of Mr. G. B. Taylor (Ashmore, Benson, Pease & Company, Limited) and Mr. E. K. Gould (Goulds Foundries, Limited) were also fully attended and very keen and lively discussions were reported.

Social Function

At the end of the first day, the members met for the annual dinner, which was presided over by Mr. E. M. Currie, owing to slight indisposition of the usual chairman. Mr. John Cameron, Snr., whose health, however, permitted him to be present and to receive many congratulations on his marvellous vitality. Visiting members from Belgium, Holland, Norway, Sweden, Italy, Switzerland, and Australia, then spoke of their experiences. The toast of the Research Institute, proposed by Mr. Harper and responded to be Mr. Smalley, was very well received. The conference concluded with a visit to the mechanised and jobbing foundries of Goulds Foundries, Limited, Newport, Monmouthshire.

Costing and Productivity

Ways in which the cost department could help in productivity were outlined by Mr. J. Hallifax, production superintendent of the High Wycombe factory of Hoover, Limited, when he addressed the national conference of the Institute of Costs and Works Accountants in London. The cost department could help, he said, by the detailed evaluation of such things as interruption to work flow, materials handling, inspection, reductions in scrap, and the streamlining of paper work. The issue of periodic lists of over-standard operations to the production units should be followed up to ensure that action was being taken by the right people.

Once a standard had been fixed for material consumption against a given production, the cost department should see to it that it was achieved or know the reason why and report to production management for action. If efficient cost accountancy disclosed materials wastage, then capital expenditure on equipment might be required to eradicate it—and the cost department should be prepared to present such a case to the directors. As to scrap, the endeavour to control it would be considerably eased if the production chief had revealed to him weekly items of scrap with a heavy cost loss for investigation and action.

Mr. Hallifax thought that the knowledge of the production engineering department should be co-opted in budgetary control or that there should be technically sound personnel in the cost department with knowledge of production problems. The cost department should get closer to the "factory floor." Cost accountants should train all levels of production management correctly to interpret the information passed to them.

Glacier Metal Company's Issues

Preliminary plans are announced by the directors of the Glacier Metal Company, Limited, for issues to preference and ordinary stockholders. This follows the "rights" issue last January to ordinary stockholders of 421,110 5s. ordinary shares at 8s. each. After this issue, it had been intended to spread expansion over a number of years and finance out of undistributed profits.

To meet this capital expenditure, some £250,000 will be needed. Further, upwards of £500,000 additional working capital will be needed in the next year or so, due largely to the rise in the company's main raw material, tin, but also in part to increased wages and overheads. Until the price of tin stabilises, the directors point out, it will not be possible to decide the long-term working capital need. Meantime, it is proposed to raise about £400,000 by "rights" issues of preference and ordinary shares to holders registered on June 22 and to cover the balance of immediate requirements by means of bank borrowings.

Consent of the C.I.C. has been obtained, but the price of the shares and their precise proportion has not yet been fixed. Meetings are called for July 4.

I.B.F. Conference Works Visits

(*Continued from previous page*)

included diesel cylinder liners and heads, scavenge pump covers, exhaust belts, propellers and other items. The extensions to this shop, including the new core stoves and the cloakroom and washing facilities, to which reference has already been made, were also inspected. On the conclusion of their tour of the works, the visitors were entertained to lunch by the company.

Institute of British Foundrymen

TECHNICAL COUNCIL

Nineteenth Annual Report

The year ended April 30, 1951 has brought to fruition the work of no less than five Sub-committees of the Technical Council of the Institute of British Foundrymen. Of these, the reports of three were presented during the Conference held in Newcastle-upon-Tyne. The other two reports are referred to in detail later.

The completion of the work of so many Sub-committees has enabled the Technical Council to embark on a number of new investigations, and in this connection the opportunity was taken to consult branch councils with the object of securing a broad view of the problems which beset the industry. As a consequence, five new Sub-committees were appointed during the year, and further investigations are under consideration.

Appreciation

The Technical Council again wishes to record its sincere thanks for the work of the many individuals, widely drawn from the Institute membership, who have served on Sub-committees. An even greater tribute must be paid to the chairmen of the Sub-committees who so willingly sacrifice a considerable share of their necessarily limited leisure in the interests of the industry and the Institute.

The grant from the Joint Iron Council, to which reference has been made in previous reports, was renewed for the past year and has again provided indispensable assistance in carrying out the large number of investigations which the Technical Council and its Sub-committees have had in hand.

The chairman's Advisory Panel, composed of Mr. A. E. Peace (chairman), Mr. L. W. Bolton, Dr. A. B. Everest and Mr. A. Tipper, has had a particularly strenuous year. Apart from the lengthy consideration it was called upon to give to the many suggestions received for future work, it met on several occasions during the year to make a preliminary examination of a variety of projects.

The Technical Council has had the valuable co-operation during the past year of the British Cast Iron Research Association, the Association of Bronze and Brass Founders and the British Non-Ferrous Metals Research Association at technical sub-committee level, representatives of these Associations having served on a number of Sub-committees. The Technical Council has also cordially welcomed a proposal for fuller co-operation with the British Steel Founders' Association when this body has completed the re-organisation of its Technical and Research division. Representation on external technical committees, including numerous committees of the British Standards Institution connected with the foundry industry, the Joint I.B.F./B.C.I.R.A. Committee on Gases in Cast Iron and the Joint Sands Committee has been fully maintained during the past year. Representatives of the Technical Council have also collaborated during the year in the work of the International Committee on Foundry Defects, the International Committee on Testing Cast Iron and the International Foundry Dictionary Committee. The invaluable services of the many members who represented the Institute on these important external committees are again warmly acknowledged.

Students' Scheme

The J. W. Gardom Students' Fund scheme, from which is provided financial assistance enabling students to take part in technical sub-committee work, has been fully utilised throughout the past year. The instruction and the opportunity to obtain a broader outlook on the problems of the foundry industry which this scheme provides, are a privilege which is greatly appreciated by the students concerned.

Sales of the "Atlas of Defects in Castings" have been well maintained and the Technical Council records with satisfaction that about 2,300 copies of this publication have now been placed in the hands of members and non-members in the industry. Permission to issue a Spanish edition of the Atlas was granted during the year to a firm of publishers in Madrid.

The further representations to the Ministry of Labour and National Service regarding the draft S.R. & O. relating to parting powders and sands, referred to in last year's report, have had a satisfactory outcome. Most of the amendments to the draft regulations suggested by the Technical Council have been adopted, and the regulations are now in line with the views of the Institute.

Work Completed

The following Sub-committees have completed their work and, in the instances noted, have been dissolved during the year:—

T.S.20—Soundness of Iron Castings (chairman: Mr. A. Tipper, M.Sc., F.I.M.).—This Sub-committee has completed its work and its report was presented for discussion at the Annual Conference at Newcastle-upon-Tyne this month.

T.S.29—Flow of Metal (chairman: Mr. E. M. Currie).—This exploratory committee submitted its report in the early part of 1950 and details of its recommendations were published in last year's report. Arising from the recommendations, a new Sub-committee (T.S.35) was appointed and Sub-committee T.S.29 was dissolved.

T.S.30—Synthetic Resins (chairman: Mr. G. L. Harbach, A.I.M.).—This Sub-committee has completed its work and its report was presented for discussion at the Annual Conference at Newcastle-upon-Tyne.

T.S.31—Heat Treatment of Grey Cast Iron (*chairman: Mr. T. R. Twigger, A.M.I.Mech.E., F.I.M.*).—This Sub-committee, exploratory in character, was formed in March, 1949 as a result of extended general consideration by the chairman's Advisory Panel of the subject of heat-treatment of grey cast iron.

The Sub-committee has completed its work, but before deciding on further action on the several recommendations made in the report, it was deemed advisable to present the report for discussion at the recently held Annual Conference of the Institute at Newcastle-upon-Tyne earlier this month, with the object of obtaining the general view of members on the suggestions submitted by the Committee.

T.S.34—Moulding Boxes (*chairman: Mr. J. Blakiston*).—This Sub-committee was appointed in December, 1949, with the following terms of reference:—"To propose a tentative specification or specifications for the standardisation of foundry moulding boxes." The Sub-committee has completed its work and has submitted a report. Consideration of this report led the Technical Council to the conclusion that the proposals put forward by the Committee were in line with the recommendations of the Lemon Committee urging increased standardisation in industry. It was therefore decided to submit the Committee's report to the British Standards Institution for consideration as the basis for a British Standard on moulding boxes.

Tribute has already been paid to the many members who have contributed to the great personal effort represented by the foregoing reports. The Technical Council also wishes to record its sincere appreciation of the enlightened and altruistic attitude of the many firms who have permitted members of their staffs to take part in technical committee work by allowing them to attend meetings and to carry out experimental work in their laboratories or foundries. These facilities necessarily continue to form an indispensable factor in the *modus operandi* on which technical sub-committee activity is based, as no programme of work on the present scale could be envisaged but for the sustained support of these organisations.

Work in Progress

Work during the year of the newly-formed and the remaining active Sub-committees is summarised below:—

T.S.23—Reclamation of Iron Castings (*chairman: Dr. A. B. Everest*).—The report of this Sub-committee was presented at the Buxton Conference and has been discussed at meetings of a large number of branches during the past session. As a result, a further meeting of the Sub-committee will be convened to consider points arising from the discussions and to make recommendations for the future disposition of the report.

T.S.24—Ingates (*chairman: Mr. R. C. Shepherd*).—This Sub-committee was formed in December, 1947, to study the influence of the shape and size of ingate and runner system on the condition of flow of metal into a mould. Following the work recorded in last year's report, the Committee initiated a series of experiments designed to provide data which would enable a prediction to be made of the size of ingate and runner which would permit a mould to be filled in an optimum period of time. The results of these tests revealed a certain amount of scatter which obliged the Committee to conclude that the method of test and procedure laid down did not control all the variables influencing running times, of which the greatest factor appears to be the powerful effect of quite small variations of head during casting. A new series of tests has been designed, and to help control and standardise the test conditions of the various investigators a post-graduate student of Birmingham University has been co-opted to the Committee as liaison officer. The student is also engaged on academic work which is complementary to the practical tests of the committee members. An analysis of the work of the Committee to date suggested that molten metals at normal casting temperatures behave as simple non-viscous fluids and the new series of tests aims at checking this point and of determining loss coefficients for various conditions. It is hoped to obtain these coefficients in such a form that they can be applied to any desired runner system. Some work has also been started with water in transparent moulds to check this analogy and to observe turbulence and back pressure effects.

T.S.26—Salvaging of Non-ferrous Castings (*chairman: Mr. G. Elston*).—This Sub-committee's report was also presented at the Buxton Conference and has since been discussed at branch meetings. The future disposition of the report, as in the case of T.S.23's, will in due course be considered in the light of these discussions.

T.S.32—Internal Stress (*chairman: Mr. M. M. Hallett, M.Sc.*).—The principal objective of the Sub-committee, which was formed in March, 1949, is to investigate the problems of internal stress in castings. During the year the Committee has carried out a considerable amount of experimental work, which indicated that residual internal stress arises from various casting factors, such as moisture content, hardness of ramming, rate of pouring, disposition of runner, temperature of pouring, etc., which control the thermal gradients. Work on double-flange bars and on a grid-iron pattern framework indicated that stresses due to resistance by the sand are of a relatively low order after the sand has been removed, *i.e.* the residual internal stresses are low. To extend the study and to include scale and form factors, work is now in progress on (*i*) the effect of sand-grain size distribution on residual stresses in castings, (*ii*) the residual stresses in cast iron and steel cylinders of varying bore, (*iii*) the residual stresses in 30 per cent. chrome-iron discs, (*iv*) the residual stresses in a large-scale version of the grid-iron pattern framework, and (*v*) further tests with the small-scale framework employing a high-duty iron cast in warm moulds and stripped at various temperatures.

T.S.33—Pyrometric Method of Investigating the Rate of Solidification of Cast Iron (*chairman*: *Mr. J. Hird.*)—This Sub-committee was formed in September, 1949, with the following terms of reference:—"To explore the suitability of the pyrometric and alternative methods of investigating the influence of mould materials on the rate of solidification of cast iron.

A series of experiments has already been made on behalf of the Committee at Birmingham University to obtain comparative data on the chilling properties of various typical moulding sands. The results of these tests showed that solidification times agreed with those expected, but values of the temperature diffusivity determined by mathematical analysis did not show the anticipated variation with sand quality. A number of possible explanations have been put forward to account for this, and further work along the same lines, with the additional equipment that is deemed necessary and with the conditions arranged to correspond more closely with the ideal conditions assumed in the mathematical treatment, is now in progress.

Newly-appointed Sub-committees

T.S.35—Flow of Metal (*chairman: Mr. E. M. Currie.*)—Arising from the report of Sub-committee T.S.29, Sub-committee T.S.35 was appointed in October, 1950 was the following terms of reference: —"To study the flow of metal into moulds by means of colour cinematography or by other suitable methods."

Since its formation the Committee has been at work on a diagrammatic script of a colour film which will provide an instructive cinematographic study of metal-flow patterns from various types of ingates. Work is now proceeding on the preparation of the moulds and it is hoped that it will be possible to make the film during the next few weeks.

T.S.36—Cupolas (*chairman*: *Mr. E. S. Renshaw.*)—Many of the suggestions for new work received from branch councils were concerned with various aspects of cupola practice. This fact influenced the Technical Council at its meeting in March, 1951 to form an exploratory Committee with the following terms of reference:—"To review problems in cupola practice, including the following:—Re-carburising; desulphurisation; hot-blast systems; water cooling; mechanical-charging systems; the value and effect of receivers, and, patching and lining practice, and to report to the Technical Council which subjects can be dealt with either by summarising existing knowledge or by further investigation, and which subjects are unsuitable for investigation by the Technical Council."

The Sub-committee has now held its first meeting, which was devoted to a brief review of the whole field and to the classification of the problems to be examined in detail.

T.S.37—Cast Iron Test Specifications (*chairman : Mr. N. A. Charlton*).—While the Technical Council does not anticipate that it will be necessary to initiate any alterations to the B.S.I. test specification for cast iron, certain points in this specification have been challenged and it is considered desirable that these points should be carefully examined. It was therefore decided, in March, 1951, to appoint a Sub-committee with the following terms of reference:—"To review the British Standard Institution's test specification for cast iron with special reference to: (*i*) the transverse test for grey iron, with particular reference to the deflection; and (*ii*) the relationship of test-bar to actual casting thickness."

This Sub-committee held its first meeting on April 27.

T.S.38—Copper-base Alloy Castings (*chairman : Mr. F. C. Evans*).—The present supply position of non-ferrous metals has lent point to the claim that the retention of private specifications by large users is leading to a waste of raw materials, especially in view of the contention that normal specifications give better castability and better-quality castings. In view of the valuable contribution which would accrue to the country's economy if this contention could be unequivocally established, the Technical Council, in March, 1951, appointed a Sub-committee with the following terms of reference:—"To investigate the mechanical properties of copper-base alloy castings in relation to the economical utilisation of available metals."

It is hoped to have this Sub-committee's report available within the next twelve months. The first meeting took place on April 30.

T.S.39—Mould Drying (*chairman : Mr. W. J. Colton*).—This Sub-committee was also formed in March, 1951, its terms of reference being:—"To review the factors involved in the drying and skin drying of moulds, with special reference to the rate of removal of moisture from the mould surface."

Election of Chairman and Vice-chairman, 1951-52

At the March meeting of the Technical Council, Mr. A. E. Peace was unanimously nominated as chairman for the year 1951-52. This recommendation was approved at the April meeting of the Council of the Institute.

Mr. L. W. Bolton, who has rendered valuable services as vice-chairman of the Technical Council for some years, intimated in March that, owing to extremely heavy business commitments, he would be unable to seek re-election for the ensuing year. Mr. Bolton's resignation was accepted with much regret, a tribute by the chairman to the sterling work which Mr. Bolton had carried out in the past being warmly endorsed by the Technical Council. Dr. A. B. Everest was nominated as vice-chairman in Mr. Bolton's stead, and was unanimously elected in this capacity at the April meeting of the Institute's Council.

[The Report is signed by Mr. A. E. Peace, chairman.]

John Needham and Sons Limited have had plans approved to carry out extensions to Portwood Foundry, Romiley Street, Stockport.

Bessemer Medal Presentation

The distinguished services to the iron and steel industry of Mr. Benjamin F. Fairless, president of the United States Steel Corporation, have been recognised by the award of the Iron and Steel Institute's Bessemer medal. Mr. Fairless was unable to attend the institute's annual meeting in London on May 30, and, as previously announced, the presentation was made by Sir Charles Goodeve, F.R.S., director of the British Iron and Steel Research Association, at the

Mr. Fairless Receives the Bessemer Medal from Sir Charles Goodeve.

annual meeting of the American Iron and Steel Institute.

Sir Charles was in the United States as leader of the iron and steel productivity team which crossed the Atlantic under the auspices of the Anglo-American Council on Productivity.

Glasgow Technical College Fees

An increase in fees from £26 5s. to £30 per session for full-time courses at the Royal Technical College, Glasgow, has been approved by the governors. Submitting a minute of the Finance & Property Committee, who recommended the increase, Mr. A. Turnbull, vice-chairman of the board of governors, said the decision had been made reluctantly. Costs, however, had risen, and it was felt that a portion of them should be met from higher fees. The new charges take effect from next session. The governors have accepted a bequest of £10,000 from the late Walter M. Neilson, grandson of James B. Neilson, inventor of the hot-blast system, to found research scholarships in engineering. The award will be known as the James Beaumont Neilson (the Hot-blast) Research Scholarship.

JACKSON & BROTHER LIMITED have had plans approved to extend Wharf Foundry, Bolton.

Latest Foundry Statistics

The Ministry of Supply report that in April the production of aluminium castings was 5,934 tons, of which 1,675 tons were sand, 3,336 gravity, and 925 tons pressure die castings. Additionally, 389 tons of magnesium castings were made.

According to the May issue of the Monthly Statistical Bulletin issued by the British Iron and Steel Federation, employment in ironfoundries showed an increase of 1,012 in April as compared with March. This increase was made up of 1,050 males and a loss of 38 women. Compared with a year ago there had been a gain of over 4,000. The steelfoundry industry at 19,125 also registered a gain of 55, of whom 37 were men. As we anticipated, the average weekly production of liquid metal for steel castings rose during April to 2,060 tons, as against 2,030 tons in March and 1,630 a year ago. Unless handicapped by raw material shortage, we expect still higher production in the coming months. Deliveries of castings, too, were higher by a weekly average of a hundred tons.

Steel production in May, which was affected by the Whitsun holidays, was at an annual rate of 15,864,000 tons, compared with 16,597,000 tons in May of last year. As in the previous month, output was thus below last year's level. Steel output in the first five months of this year has been running at about 300,000 tons below last year's rate.

Pig-iron Production Recovers

Pig-iron output was at an annual rate of 9,482,000 tons in May, which compares with a rate of 9,646,000 tons a year ago. Last month's pig-iron output, however, showed a substantial recovery from the big drop recorded in April, when production was at an annual rate of 9,280,000 tons.

The British Iron and Steel Federation recently expressed confidence that steel production for the whole of this year will not fall below a total of 16,000,000 tons. Much, of course, depends upon the trend of pig-iron output, last month's output of which was certainly encouraging.

Scrap imports in May totalled 26,000 tons, against 196,000 tons in May, 1950. The British Iron and Steel Federation hopes that scrap imports this month and next will be about 40,000 tons a month, and every effort is to be made to ensure that supplies of home scrap are made freely available.

Latest steel and pig-iron output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1951—1st qtr. ..	184,400	9,587,000	315,900	16,425,000
April ..	178,500	9,280,000	322,500	16,771,000
May ..	182,400	9,482,000	305,100	15,864,000
1950—1st qtr. ..	186,100	9,677,000	320,700	16,679,000
April ..	182,500	9,492,000	323,500	16,822,000
May ..	185,500	9,646,000	319,200	16,597,000

SEVERAL THOUSAND TONS of valuable scrap metal will be provided by the scrapping of the veteran City Line vessel, City of Tokio, of 6,993 gross tons, which has ended her 30 years' career. On her last voyage she brought a cargo of manganese ore to Glasgow. Final disposal of the vessel has not yet been decided, but an official of the owners said that the ship would undoubtedly be scrapped.

News in Brief

The U.S. Defence Minerals Administration will take over complete allocation of molybdenum ore from June 30. The take-over applies to foreign as well as domestic shipments.

The board of Derbyshire Stone, Limited, propose that 170,400 5s. ordinary shares be issued at par by way of rights to the ordinary stockholders.

A two-for-one scrip bonus is announced by the chairman of H. & C. Davis & Company, Limited, light structural engineers, etc., of Clapham, London, S.W.4.

Three launches on the Wear on June 19 bring the river's output for the first half of the year to 16 vessels of over 114,000 tons gross, compared with 18 vessels of 80,000 tons last year.

A 30,000 sq. ft. factory at Thorne, Doncaster, which has been empty since last August, has been taken over for the manufacture of electrical equipment by the British Thomson-Houston Company, Limited.

Arrangements are proceeding for the placing of a proportion of the issued capital of E. Austin & Sons (London), Limited, metal merchants and refiners, etc., which consists of 1,000,000 ordinary shares of 5s. each.

Some 7,000 people visited the works of Herbert Morris, Limited, manufacturers of lifting and transporting machinery, of Loughborough, on June 2, when, for the first time in its history, the company held an "at home day."

Keith Blackman, Limited, manufacturers of fans, etc., of Tottenham, London, N.17, announce a dividend of 22½ per cent., less tax, for the year to March 31, 1951, on the ordinary capital increased to £300,000, against 20 per cent. on £250,000 last year.

Allied Ironfounders, Limited, are paying a final ordinary dividend of 11¼ per cent., making 17½ per cent. for the year ended March 31. This total compares with 12½ per cent. (interim dividend of 5 per cent. and final of 7½ per cent.) for the preceding 12 months.

North British Locomotive Company, Limited, Glasgow, have received an order from the Nigerian State Railways for seven large locomotives, valued at £160,000. Recently the firm completed a contract for the same concern for 52 engines of this class, and a few months ago they received a £1,750,000 share (130) in a contract for 217 engines for Indian Government Railways. Work will be completed next year on these YP-class locomotives.

Wessex Industries (Poole), Limited, West Street, Poole, Dorset, announce two new motorised additions to their range of trucks. These are the "Wrigley" mobile crane, model 210, and the hydraulic tipper, model 339. The former is powered by a 1-h.p. unit and has a 10-cwt. capacity jib-crane fitted and the latter is driven by a 3-h.p. Villiers engine unit and takes a load of 1 ton; both are fully manœuvrable on pneumatic or solid-rubber tyred wheels.

Three departments of the Renfrew shipbuilding yard of Lobnitz & Company, Limited, were destroyed by fire which swept through a large building early last Saturday morning. The patternshop, template department, and joiners' shop and polishing department were involved, and valuable stocks of patterns were lost. The departments were all in one block; the first and second floors of the building and the roof being completely destroyed, while the ground floor was damaged by water.

Angus police are making investigations into the outbreak of two fires within 48 hours at the engineering works of Keith Blackman, Limited, Arbroath. The second blaze occurred on Sunday evening and destroyed thousands of wooden patterns contained in a second-storey store. The first fire on Friday evening destroyed an adjoining three-storey building stacked with wooden master patterns. The Sunday fire was the more severe in its implications, as the patterns were in almost daily use, although every effort is being made to maintain production.

Mr. A. Talbot, of Western Foundries, gave a demonstration of foundrywork to Southall Chamber of Commerce, industrial section, last Monday, with Mr. W. Wilson in the chair, when he tried to show what was being done to obtain apprentices for foundries. On Tuesday, both Mr. Wilson and Mr. Talbot went to Hounsfield Technical School, Edmonton, London, to give a lecture and demonstration on founding. The instructor at the school said that foundrywork never failed in its appeal to boys, provided a suitable introduction was made. He regretted that more was not done at other schools to popularise foundrywork among boys.

The Steel Company of Wales, Limited, has announced that their 80-in. continuous hot-strip mill at Abbey Works has been successfully started and the first phase of testing and operation under full-load conditions is gradually changing over to production. One shift is at present being worked and it is expected that two-shift working will commence in a few weeks. The cold-reduction plant for the manufacture of sheet at the Abbey Works is not expected to start operation until the late summer and the tinplate plant at Trostre until the autumn, so in the meantime the coils produced on the hot-strip mill are being sent to other cold-reduction plants for rolling and finishing.

Large Steel Castings Exported

The largest export load ever consigned in one day by David Brown-Jackson, Limited, left their Salford foundry recently. The respective castings were: A 13-ton cast-steel tyre for a Jamaican cement mill; a 25½-ton winder wheel for South Africa and two halves of a 27-ton cast-steel gear destined for Australia.

The gear for South Africa, one of a set of eight, was 11 ft. 6 in. dia., and had a 3-ft. face-width. The Australian wheel, part of an order for three sets of winder gears supplied to the Broken Hill Pty. Company, of New South Wales, was assembled from steel castings made in halves; the diameter in this case was 13 ft. 6 in., with a 4-ft. face-width. As such, this is believed to be the largest gear ever hobbed in this country; the assembled wheel had 248 teeth. The corresponding carbon-steel pinions are of 19 in. dia., 11 ft. long, and weigh approximately 4 tons each. With an input speed of 300 r.p.m., these gears are designed to transmit 5,000 h.p. Both the Australian and the South African gears were cut by David Brown-Jackson, Limited, on a machine capable of accommodating gears of 19 ft. dia.

Personnel Management

Twenty countries will be represented at a conference on "Personnel Management in Great Britain" which is being organised at Cambridge from June 26 to 29 by the Institute of Personnel Management. In all, about 70 representatives of personnel management from industry, commerce, and teaching organisations overseas will attend the conference, for although the institute's national conference has been attended by delegates from abroad, this Cambridge conference is the first to be arranged specially for them.

Good relationships within the industries of the free nations are of paramount importance, and the conference will give the experts an opportunity to exchange views and share knowledge of the best management practice—a concrete contribution to the world's social and economic security.

Increases of Capital

The following companies are among those which have recently announced details of capital increases:—

CAXTON STEEL COMPANY, LIMITED, London, N.W.10, increased by £25,000, in £1 ordinary shares, beyond the registered capital of £25,000.

MAGNETIC & ELECTRICAL ALLOYS, LIMITED, London, W.1, increased by £49,000, in £1 ordinary shares, beyond the registered capital of £1,000.

ACROW (ENGINEERS), LIMITED, London, S.W.1, W.1, increased by £49,000, in £1 ordinary shares, beyond the registered capital of £300,000.

SIMMONS & HAWKER, LIMITED, engineers, etc., of London, E.C.2, increased by £35,000, in £1 ordinary shares, beyond the registered capital of £15,000.

PEIRSON & COMPANY, LIMITED, structural engineers, etc., of London, W.C.1, increased by £30,000, in £1 6% cumulative preference shares, beyond the registered capital of £5,000.

PATCHETT & COMPANY, LIMITED, whitesmiths, steel and constructional engineers, etc., of Leeds, increased by £73,000, in 5s. ordinary shares, beyond the registered capital of £2,000.

MARRYAT & SCOTT, LIMITED, manufacturers of lifts, cranes, etc., of Hounslow, increased by £15,000, in £1 6% cumulative preference shares, beyond the registered capital of £10,000.

TELEFLEX PRODUCTS, LIMITED, manufacturers of power transmission mechanism, etc., of London, W.1, increased by £50,000, in 1s. ordinary shares, beyond the registered capital of £100,000.

HEATH TOWN TRADERS & JENKS, LIMITED, iron and steel merchants, etc., of Heath Town, Wolverhampton, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £3,500.

BRAHAM, KATTERSON & BENHAM, LIMITED, mechanical engineers, etc., of Enfield, increased by £45,000, in 450,000 2s. ordinary shares, beyond the registered capital of £35,000. This company is now a " public " concern.

ALMAG ENGINEERING COMPANY, LIMITED, London, W.11, increased by £20,000, in £1 ordinary shares, beyond the registered capital of £15,000. Almag Engineering (Holdings), Limited, holds the majority of the issued shares.

W. M. STILL & SONS, LIMITED, metal spinners, tinsmiths, etc., of London, E.C.1, increased by £40,000, in 20,000 ordinary and 20,000 5% redeemable cumulative preference shares of £1 each, beyond the registered capital of £80,000.

FRANK WIGGLESWORTH & COMPANY, LIMITED, engineers, millwrights etc., of Shipley (Yorks), increased by £25,000, in £1 ordinary shares, beyond the registered capital of £100,000. Cord Clothing & Belting, Limited, holds the majority of the issued shares.

HOLDEN & BROOKE, LIMITED, mechanical engineers, etc., of West Gorton, Manchester, increased by £16,000, in £1 ordinary shares, beyond the registered capital of £75,000. The above increase is for the purpose of acquiring not less than 90% of the issued share capital of Frank Pearn & Company, Limited.

RHYMNEY ENGINEERING COMPANY, LIMITED, Cardiff, increased by £100,000, in 50,000 " A " ordinary and 50,000 " B " ordinary shares of £1 each, beyond the registered capital of £100,000. At August 3, 1950, Powell Duffryn, Limited, held 100,000 " A " and International Combustion (Holdings), Limited, held 100,000 " B " shares of £1 each.

BOSTOCK & BRAMLEY, LIMITED, power-transmission engineers, etc., of Stalybridge, increased by £22,500, in 20,000 " A " and 2,500 " B " shares of £1 each, beyond the registered capital of £10,000. Industrial & Commercial Finance Corporation, Limited, Hudswell, Clarke & Company, Limited, and Hydraulic Coupling Patents, Limited, each holds large blocks of shares.

Metals Economy Adviser

The Minister of Supply announces that in order to assist him in discharging his responsibility to promote economy in the use of scarce metals in rearmament production and in the engineering industries he has appointed Mr. D. A. Oliver, director of research at the Birmingham Small Arms Company, Limited, to serve part time as metals economy adviser. The Minister has expressed to the Company his great appreciation of their willingness to release Mr. Oliver for this post. Mr. Oliver will also be available to advise the Lord Privy Seal on questions of economy in use arising in connection with the supply of non-ferrous metals.

House Organs

Aluminium Courier, No. 15, May. Published by the Aluminium Development Association, 33, Grosvenor Street, London, W.1.

This issue is of exceptional interest, as it carries an illustrated article on the part which aluminium alloys have played in the make-up of the various exhibits showing at the South Bank exhibition. The reviewer was pleased to note that a well-written leader takes the traditional form and gains much in dignity and interest thereby. The illustrations have been well chosen and produced. The main feature of this publication is its " readability." It is available to our readers on writing to the publicity manager of the Association.

Cracks and Crazes, Vol. 2, No. 4. Issued by M. Cockburn & Company, Limited, Gowanbank Iron Works, Falkirk. The value of this house organ is that it is produced by the staff for the staff. This means that a number of individuals have learnt to express themselves in plain English. Here and there a little more attention to paragraphing and the omission of the first personal pronoun would make for improvement. The flea story by " Ceramion " is excellent, and the notion that they cause blowholes is as fantastic as it is funny. The reviewer imagines that this magazine will be better appreciated by the employees than many of those which are more pretentious in their presentation.

International Enamellist, Vol. 1, No. 1. Published by Dana Chase Publications for distribution in countries other than in U.S.A. by the International Division, Ferro Enamel Corporation, Cleveland, 5, Ohio, U.S.A.

This house organ is to be published quarterly, and will replace the now defunct "Enamelist." It comes to us through Ferro Enamels, Limited, of Wombourn, Wolverhampton, and a covering letter asks for our comments. The only adverse criticism we have to make is the ridiculous size of the lettering on the diagrams illustrating an article on New Developments in Porcelain Enamelling, by B. H. King. The articles have been well chosen, though they are not necessarily directly connected with vitreous enamelling. In this issue there is one on the important subject of packaging, and a second on the inspection of engineering components. The latter, by the way, is a very important contribution to the subject. This 32-page strictly technical magazine is well illustrated, and is completely devoid of advertising matter. We congratulate the Editor on his initial effort, and wish the new venture every success.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

GODALMING, July 7—Supplying and laying 1,734 yds. of 9 in., 6 in.. and 4 in. dia. spun-iron water mains, etc., for the Borough Council. Mr. C. B. Spivey, water engineer, " Branksome," Filmer Grove, Nightingale Road, Godalming. (Deposit, £2 2s.)

MANCHESTER, July 9—Approx. 12,000 yds. of 48 in. dia. steel water pipes, specials, etc., for the Corporation. The Secretary, Waterworks Offices, Town Hall, Manchester, 2.

MERE AND TISBURY, June 30—Provision and laying of 11,400 yds. of 8 in., 4 in., and 3 in. dia. spun-iron pipes, etc., for the Rural District Council. Mr. T. W. Whitfield, consulting engineer, Hilperton, Trowbridge (Wilts). (Deposit, £3 3s.)

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered, unless otherwise stated*)

June 20, 1951

PIG-IRON

Foundry Iron.—No. 3 Iron, Class 2:—Middlesbrough, £10 17s. 9d.; Birmingham, £10 13s.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £12 9s., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si)—North Zone, £12 16s. 6d.; South Zone, £12 19s.

Scotch Iron.—No. 3 foundry, £12 7s. 9d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £13 7s. 6d.; South Zone, £13 10s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £13 17s. 6d.; South Zone, £14.

Cold Blast.—South Staffs, £16 10s. 6d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £12 7s. 6d.; Scotland, £12 14s.; Sheffield, £13 2s. 6d.; Birmingham, £13 9s.; Wales (Welsh iron), £12 7s. 6d.

Spiegeleisen.—20 per cent. Mn, £18 3s.

Basic Pig-iron.—£10 19s. all districts.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered.*)

Ferro-silicon (6-ton lots).—40/55 per cent., £37 15s., basis 45% Si, scale 14s. per unit; 70/84 per cent., £52, basis 75% Si, scale 14s. 6d. per unit.

Silicon Briquettes (5-ton lots and over).—2lb. Si, £44 2s.; 1lb. Si, £45 2s.

Ferro-vanadium.—50/60 per cent., 15s. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 9s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £175; ditto, copper-free, £190.

Ferro-tungsten.—80/85 per cent., 35s. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 37s. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent C, £66, basis 60% Cr, scale 22s. per unit; 6/8 per cent. C, £61, basis 60% Cr, scale 21s. per unit; max. 2 per cent. C, 1s. 6¾d. per lb. Cr; max. 1 per cent. C, 1s. 7¼d. per lb. Cr; max. 0.15 per cent. C 1s. 8d. per lb. Cr.; max. 0.10 per cent. C, 1s. 8½d. per lb. Cr.

Chromium Briquettes (5-ton lots and over).—1lb. Cr, £69 4s.

Cobalt.—98/99 per cent., 17s. 6d. per lb.

Metallic Chromium.—98/99 per cent., 5s. 11d. per lb.

Ferro-manganese (blast-furnace).—78 per cent., £37 19s. 10d.

Manganese Briquettes (5-ton lots and over).—2lb. Mn, £46 18s.

Metallic Manganese.—96/98 per cent., carbon-free, £215 per ton.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—Basic: Soft, u.t., £17 4s.; tested, up to 0.25 per cent. C (100-ton lots), £17 9s.; hard (0.42 to 0.60 per cent. C), £19 4s.; silico-manganese, £24 6s. 6d.; free-cutting, £20 9s. Siemens Martin Acid: Up to 0.25 per cent. C, £22 11s. 6d.; case-hardening, £23 9s.; silico-manganese, £26 14s.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £20 4s.; basic, hard, over 0.41 up to 0.60 per cent. C, £21 9s.; acid, up to 0.25 per cent. C, £23 9s.

Sheet and Tinplate Bars.—£17 6s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £21 3s.; boiler plates (N.-E. Coast), £22 10s. 6d.; chequer plates (N.-E. Coast), £23 8s.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £20 1s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £22 15s.; flats, 5 in. wide and under, £22 15s.; hoop and strip, £23 10s.; black sheets, 17/20 g., £29 13s.; galvanised corrugated sheets, 17/20 g., £43 6s.

Alloy Steel Bars.—1-in. dia. and up: Nickel, £37 19s. 3d.; nickel-chrome, £56 6s.; nickel-chrome-molybdenum, £63 1s.

Tinplates.—48s. 3½d. per basis box.

NON-FERROUS METALS

Copper.—Electrolytic, £234; high-grade fire-refined, £233 10s.; fire-refined of not less than 99.7 per cent., £233; ditto, 99.2 per cent., £232 10s.; black hot-rolled wire rods, £243 12s. 6d.

Tin.—Cash, £970 to £980; three months, £940 to £945; settlement, £975.

Zinc.—G.O.B. (foreign) (duty paid), £160; ditto (domestic), £160; "Prime Western," £160; electrolytic, £164; not less than 99.99 per cent., £166.

Lead.—Good soft pig-lead (foreign) (duty paid), £160; ditto (Empire and domestic), £160; "English," £161 10s.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £180; rolled zinc (boiler plates), all English destinations, £178; zinc oxide (Red Seal), d/d buyers' premises, £178.

Other Metals.—Aluminium, ingots, £124; antimony, English, 99 per cent., £390; quicksilver, ex warehouse, £73 10s. to £74; nickel, £454.

Brass.—Solid-drawn tubes, 24½d. per lb.; rods, drawn, 27d.; sheets to 10 w.g., 28⅞d.; wire, 30½d.; rolled metal, 27⅝d.

Copper Tubes, etc.—Solid-drawn tubes, 26⅞d. per lb. wire, 261s. 9d. per cwt. basis; 20 s.w.g., —s. per cwt.

Gunmetal.—Ingots to BS. 1400—LG2—1 (85/5/5/5), £285; BS. 1400—LG3—1 (86/7/5/2), £302; BS. 1400—G1—1 (88/10/2), £369; Admiralty GM (88/10/2), virgin quality, — , per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £379; L.P.Bl, £322 per ton.

Phosphor Bronze.—Strip, 39d. per lb.; sheets to 10 w.g., 41¼d.; wire, 43½d.; rods, 39d.; tubes, 44d.; chill cast bars: solids —, cored, —. (C. Clifford & Son, Limited.)

Nickel Silver, etc.—Ingots for raising, 2s. 6½d. per lb. (7%) to 4s. 6¾d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 3s. 0½d. (7%) to 4s. 0¾d. (30%); to 12 in. wide × .056, 3s. 0¾d. to 4s. 1d.; to 25 in. wide × .056, 3s. 2¾d. to 4s. 3d. Spoon and fork metal, unsheared, 2s. 9½d. to 3s. 9¾d. Wire, 10g., in coils, 3s. 6½d. (10%) to 4s. 6½d. (30%). Special quality turning rod, 10%, 3s. 5½d.; 15%, 3s. 10½d.; 18%, 4s. 2¼d. All prices are net.

NEW

CHELFORD

Processed Washed Sand

A modern plant has been installed for the washing and grading of Chelford Sand. This plant is of the latest and most efficient type and Chelford Processed Sand can now be supplied thoroughly washed and in two grades, coarse and fine. The chief features are as follows :—

COARSE GRADE

Grading mainly between 30 and 85 mesh B.S.S. and practically free from fines below 85.

Uniform grading gives closer control of mixtures.

Increased permeability.

Negligible clay content.

Superior to natural sand for special purposes e.g. synthetic moulding mixtures, cement moulding process, etc.

FINE GRADE

Practically all passing 60 mesh B.S.S. with main grain size between 72 and 150.

Uniform grading.

Low clay content with increased refractoriness.

Excellent for fine cores and for addition to facing sand mixtures where smooth finish is desired.

GR

GENERAL REFRACTORIES LTD.

GENEFAX HOUSE · SHEFFIELD 10 · Telephone SHEFFIELD 31113

Raw Material Markets

Iron and Steel

Makers of all grades of pig-iron are heavily committed—some much in excess of outputs—with the result that fresh bookings would only add to present difficulties. No type of foundry is free from these difficulties, although the engineering, motor, and textile foundries are the chief sufferers. They have plenty of work on their books and production at capacity levels could be returned if sufficient supplies of pig-iron and scrap could be secured. As it is, output is being slowed down and instances have, in fact, been reported where work has been suspended through shortage of pig-iron. Decreased deliveries from the furnaces have resulted in the depletion of stocks, so that current production is entirely dependent on day-to-day deliveries. An improvement of the present position could only be obtained by increased imports of iron ore, which would enable the hematite makers to step up production considerably and to blow in fresh units, as well as assist producers of the low- and medium-phosphorus pig-iron to maintain outputs. The foundries are taking all the refined irons, as well as Scotch foundry irons, which they can lay hands on, even though these inevitably add to their costs.

The light and jobbing foundries are well provided with work. Outputs of high-phosphorus iron remain barely sufficient to meet their current needs. Consumers' stocks have dwindled and producers have not been able to keep pace with the orders on hand, so that fresh business is difficult to place.

Non-ferrous Metals

Last week was certainly a disastrous one for bulls of tin, which fell heavily. The spectacular decline in values on the London market during the month of June has been due to the action taken by the United States Reconstruction Finance Corporation in reducing by successive stages the price at which it is prepared to offer tin to users. These separate cuts have amounted to from 3 to 7 cents per lb., and by the end of the week the U.S. quotation had fallen to 111 cents. This is equivalent to about £888 per ton, so that the three months' price on Friday was about on a parity with the American figure. This sharp setback has taken consumers in this country rather by surprise, but there has been a certain amount of buying on a day-to-day basis. But there are many who believe that the R.F.C. may be aiming to reduce to 103 cents, at which level the metal was pegged for some time.

It is hard to believe that the far-reaching decline in the tin quotation will not have some effect on sentiment in other commodity markets. Is it perhaps the first sign of the approaching break-up of what may be called the Korean price structure?

Official tin quotations on the London Metal Exchange were:—

Cash—Thursday, £960 to £965; Friday, £915 to £925; Monday, £915 to £925; Tuesday, £955 to £960.

Three Months—Thursday, £927 10s. to £930; Friday, £875 to £877 10s.; Monday, £880 to £885; Tuesday, £930 to £935.

The closing prices for to-day (Wednesday) are shown on the list of current prices on page 684.

Stage by stage the Ministry of Supply is approaching a full control of the secondary metal situation in this country, but whether quantitative allocation of scrap will be achieved in the long run remains to be seen. This final step is one which presents such difficulty that it may well be it will never be taken.

Ban on Certain Nickel Uses

Because of the increasing use of nickel in the defence programme, the Board of Trade and the Ministry of Supply are banning its use in the manufacture of a number of articles from tomorrow (Friday). The ban follows the cuts in nickel supplies for stainless steel production and nickel plating, announced by the Minister of Supply on April 20, when he stated that the prohibition of the less essential end uses of nickel would follow. The list has been compiled after consultation with most of the industries concerned.

The Orders—the Nickel Prohibited Uses (Board of Trade) Order, 1951, and the Nickel Prohibited Uses (Ministry of Supply) Order, 1951—stop the use of nickel or austenitic stainless steels or nickel alloys in the manufacture of the items listed in Schedule 1. The principal nickel alloys involved are nickel silver, cupro nickel, and monel metal.

Although a variety of domestic goods and commercial goods are involved, most domestic articles in everyday use—such as aluminium and enamel kettles and pans—will not be affected since they are made from other materials. Makers of prohibited articles listed in Schedule 1, are allowed until October 1 to use up stocks of components made of any of these materials which they hold at present. This will give manufacturers an opportunity of adjusting their production lines. The nickel plating of articles or components listed in Schedule 2 is also prohibited, but in order to give manufacturers an opportunity to make other arrangements, this provision will not come into force until August 22. Plating will be allowed for a number of domestic items subjected to wear or severe corrosive influences, such as kitchen hardware.

Issue of Licences

Licences to manufacture prohibited articles may be granted by the Board of Trade and Ministry of Supply in the following circumstances:—

(i) for exports if, in the case of the goods listed in Schedule 1, the value of goods for export to dollar areas or to the Commonwealth is at least 15 times that of the nickel or nickel alloy incorporated in them and the value for exports to other markets is at least 50 times. This conversion factor will be calculated by comparing the export price (f.o.b.) of the goods with the cost of the nickel or nickel alloy they contain. Nickel plating will generally be allowed for exports if it is essential in marketing and if reasonable economy is used in its application.

(ii) if small quantities of the controlled material are needed to finish nearly completed articles, or to make essential functional parts.

(iii) if the controlled material is in a form which cannot be used for making anything but the prohibited article for which it was intended—manufacturers who are unlikely to use the whole of their present stocks by October 1, should notify the regional offices of the Board of Trade or the Ministry of Supply as soon as possible, of the amounts they estimate will then be outstanding.

(iv) where exceptional hard wear or corrosion makes the use of controlled material essential, such as nickel plating an article made of steel, which is in constant contact with water, or

(v) if the full application of the Order would cause exceptional personal hardship.

Manufacturers seeking exemption licences, or further information and advice, should apply to the regional controllers of the Ministry of Supply or the Board of Trade, depending on which Order prohibits the manufacture of the article.

Forthcoming Events

JUNE 27

Institute of Economic Engineering

Visit to Works of the Austin Motor Company, Limited, 10 a.m., at Birmingham.

JUNE 28 to JULY 1

Institution of Production Engineers

Conference at Harrogate. Theme: "How to Facilitate the Introduction of Improved Methods into Industry." Conference headquarters at the Hoted Majestic. Technical lectures begin at 9.15 a.m. on June 29.

Obituary

Mr. W. E. Beard, general manager and secretary of the Patent Enamel Company, Limited, Birmingham, died on June 10.

Prof. Alexander McKenzie, Emeritus Professor of Chemistry, University of St. Andrews, University College, Dundee, died recently.

Mr. Gordon MacDonald Ritchie, who died suddenly on June 8, was a director of the Ritchie-Atlas Engineering Company, Limited, Glasgow. He was 36.

Mr. George Frederick Vincent Richards, an international authority on the nuts and bolts industry, and managing director of Nuts & Bolts (Darlaston), Limited, has died at the age of 64. With three other prominent industrialists he founded the company in 1913, and had been managing director since that time. He was vice-chairman of the Black Bolt and Nut Association of Great Britain, and recently at Blackpool he was presented with an inscribed silver tray in recognition of his services to the industry, which included improving methods of production and working conditions.

Personal

Dr. D. B. Foster, M.I.Mech.E., F.Inst.F., A.M.I.Chem.E., has joined Mullard, Limited, as chief engineer of the equipment division.

Mr. J. W. Benny, joint managing director of Birmingham Aluminium Casting (1903) Company, Limited, Smethwick, has been elected president of the West Bromwich and District Manufacturers' Association.

Mr. A. A. Rennie, "father" of Jarrow Town Council, twice Mayor of the town, and a foreman at the North Eastern Marine Engineering Company (1938), Limited, Wallsend, has been recommended for admission as an honorary Freeman of the borough.

Dr. R. Genders, M.B.E., D.Met., F.R.I.C., F.I.M., is now associated as consultant metallurgist with the Sandberg organisation, 40, Grosvenor Gardens, London, S.W.1., in connection with their recently reopened analytical laboratories and test house.

Mr. Peter Wrightson, deputy managing director of Head, Wrightson & Company, Limited, engineers and founders, of Thornaby-on-Tees, has been elected to the north-eastern board of Martins Bank, Limited, in succession to Sir John S. Barwick, who has retired.

Mr. Leslie C. Gamage, vice-chairman and joint managing director of the General Electric Company, Limited, has been re-elected president of the Institute of Export, an office which he has held for the past seven years. Mr. D. Maxwell Buist, export director of the British Electrical and Allied Manufacturers' Association (Inc.), and Mr. J. P. Ford, a director and general manager of Associated British Oil Engines (Export), Limited, have been elected chairman and vice-chairman, respectively, of the council of the institute.

CLASSIFIED ADVERTISEMENTS

PREPAID RATES : **Twenty words for 5s. (minimum charge) and 2d. per word thereafter. Box Numbers. 2s. extra (including postage of replies).**

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, 49, Wellington Street, London, W.C.2. If received by first post Tuesday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY METALLURGIST (age 28), good technical qualifications and 11 years' experience in laboratory and foundry work, desires position as ASSISTANT to Foundry Manager with progressive firm.—Box 1059, FOUNDRY TRADE JOURNAL.

METALLURGIST (25), 5 year Ferrous Research Association, grey iron, malleable experience, all aspects, gaseous processes, etc., used to full control, requires progressive position as ASSISTANT to Works Manager. Midlands.—Box 1056, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

H. M. HOBSON, LTD., Hobson Works, Fordhouses, Wolverhampton, invite applications for the post of FOUNDRY MANAGER. Applicants should have knowledge of modern foundry practice and metallurgy, with first-class experience of the production of high quality castings in magnesium and other non-ferrous metals. Applicants should state fully experience, age, and salary required.

A VACANCY exists in a highly modern and mechanised light alloy foundry for an experienced and qualified foundryman. Applicants must have the following qualifications: (a) Fully experienced in the mass production methods of light alloy castings. (b) Practical moulder to trade and qualified to train and control unskilled labour on machine moulding—sand slinging, etc. (c) Accustomed to a high standard of work. (d) Have the necessary drive and initiative and able to take responsibility.

This post offers a good salary and excellent prospects for the right man—attractive Superannuation Scheme.—Write in the strictest confidence, giving full particulars of age, experience, qualifications, and salary expected, to the PERSONNEL MANAGER, Renfrew Foundries, Ltd., Hillington, Glasgow, S.W.2.

LARGE Founders in S.E. London have the following posts vacant:—

(a) METALLURGIST for work in connection with the production of cast iron and copper base materials.

(b) METALLURGIST for work on light alloys. Applicant with knowledge of aluminium and magnesium base alloys used for castings will be preferred.

(c) METALLURGIST for investigations on non-ferrous alloys in Research Laboratory. Applicant should have a good degree in metallurgy or equivalent qualification, or alternatively a degree in physics or chemistry with metallurgical experience.

(d) RADIOLOGISTS for X-ray inspection of castings. Applicant, with experience in the interpretation of radiographs of light alloy castings will be preferred.

Salaries according to qualifications and experience.—Write PERSONNEL MANAGER, Messrs. J. Stone & Co. (Charlton), Ltd., Woolwich Road, Charlton, London, S.E.7.

SITUATIONS VACANT—Contd

ASSISTANT FOREMAN wanted for small Iron Foundry, East Anglia. State salary wanted and give full details of training and experience.—Box 1030, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, with first-class experience of gravity diecasting. Full details of experience, age, and salary required.—MARSHALL CASTINGS, LTD., Mount Street, Nechells, Birmingham, 7.

ASSISTANT (18/20) required for investigation work on Foundry Bonding Agents at Laboratory in Liverpool. Experience in Foundry Sand Testing an advantage. Facilities granted for part-time education. Pension Fund. Good prospects.—Write full details age, experience, and salary required, to STAFF MANAGER (Ref. A/L), F. W. Berk & Co., Ltd., 1-19, New Oxford Street, London, W.C.1.

METALLURGIST (ASSISTANT) required in modern East Anglian works producing malleable and cast iron. Applicants should have experience of cupola control and be capable of handling labour. Good transport facilities available to and from the centre of the town, and excellent canteen facilities.—Replies, stating age, education, experience, and salary required, to Box 1039, FOUNDRY TRADE JOURNAL.

TWO able and keen FOUNDRY TECHNICIANS required for servicing well-known bonding material. Practical experience essential. One about 28-32 years of age, the other 24-25. Salaries not less than £550 and £450 per annum respectively. Able to drive car. Will work half time in laboratory and half time on servicing.—Good prospects for right men. —Box 1031, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Jobbing Foundry, North-East Coast. Must be practical, capable of taking full control, knowledge of rate fixing and estimating. Accommodation available.—Box 1047, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT (aged 35/45) required for Grey Iron Foundry handling also high tensile iron, in West Riding of Yorkshire, producing 50 to 60 tons of high quality precision machine castings per month. Applicants must have proved themselves in a similar capacity and should be capable of taking full responsibility to the Works Manager for both the pattern making department and complete foundry covering coremaking, machine and floor moulding, fettling, cupolas and metal and sand control. Also to have knowledge to facilitate instituting and operating foundry loading system. Starting salary commensurate with responsibility.—Replies, which will be treated as strictly confidential, should state age, full details of practical and technical training, positions held and present salary, Box 1050, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—Contd.

WORKING FOREMAN required, to take charge small iron foundry, South Wales. Good opportunity for energetic young man.—Write, stating qualifications, Box 1057, FOUNDRY TRADE JOURNAL.

QUALIFIED METALLURGIST required for the control of whiteheart malleable iron production. A person who has experience of gas annealing preferred. —Write, giving details of age, training, experience, etc., to Box 1049, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required for Malleable Iron Foundry. To control foundry and ancillary departments. Must have sound experience of jobbing and repetition moulding, coremaking, coreblowing, sand and production control, and payment by results methods. Good disciplinarian. Excellent future prospects.—Write, with full details of training, experience, and present salary, to Box 1041, FOUNDRY TRADE JOURNAL.

ESTABLISHED REPRESENTATIVE required by Lancashire firm manufacturing Aluminium Gravity Die Castings. Must have good connections and knowledge of the trade, also conversant with up to date prices.—Box 1048, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required by well-established firm in East Midlands, modern buildings and equipment. Applicant must have good practical experience, ability to organise and take full control.—Write, giving full particulars and salary required, to Box 1042, FOUNDRY TRADE JOURNAL.

FOUNDRY TECHNICIAN for Laboratory in mechanised Grey Iron Foundry in Midlands. Experience in analysis, sand and metal control, and age 25-35 years.—Apply, with full details of education, experience, and salary required, Box 1029, FOUNDRY TRADE JOURNAL.

TOOL Room FOREMAN wanted for large Aluminium Founders, Birmingham district, experienced in Diesinking of Gravity and/or Pressure Diecasting Dies. Age 30/40 years. Capable of estimating hours required for die production from component drawings.—Apply, stating age, experience, and salary required, to the GENERAL MANAGER, Box 1010, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN wanted. Must be practical man, able to organise good and indifferent moulders in not highly mechanised but progressive and well established foundry employing 12 to 20 moulders, with ancillary labour. Write, stating age and experience and wages expected. S.W. London suburb.—Box 1053, FOUNDRY TRADE JOURNAL.

BUSINESS FOR SALE

FOR SALE AS A GOING CONCERN.—Iron Foundry in South of England. Premises 43,000 sq. ft. Mainly modern ferro concrete buildings, 17,500 sq. ft. Mechanised equipment with key personnel if required.—Box 1054, FOUNDRY TRADE JOURNAL.

PATENT

THE Proprietor of British Patent No. 601968, entitled "Improvements in the extraction of alumina from its ores," offers same for license or otherwise to ensure practical working in Great Britain.—Inquiries to SINGER, STERN & CARLBERG, 14, East Jackson Boulevard, Chicago, 4, Illinois, U.S.A.

BUSINESS OPPORTUNITIES

WORKING PARTNER required for small foundry, South Wales. First-class iron moulder, with knowledge all foundry practices, essential. Capital of secondary importance.—Box 1058, FOUNDRY TRADE JOURNAL.

PLANT FOR SALE

SHOT Blast Rumbling Barrel Plant, Tilghman C.B.2, double jet, external mixing tube. Complete and ready for work, with all motors, dust arrester (separate), starters, etc. Size of barrel 18 in. by 24 in.

This plant is absolutely in new condition and has done only a few hours' demonstration work.

Apply :

H. BRIDGES, "Kingscroft," Kingsbury Road, Minworth, Birmingham. Telephone : ASHfield 1439.

MATERIALS WANTED

SMALL Grey Cast-Iron Plates, 7 in. by 4 in. by ½ in. thick, in good quality non-porous soft cast iron, required for the next 5 years in quantities of approximately 1,500 per week. If interested drawings and samples will be sent.—Reply Box 1060, FOUNDRY TRADE JOURNAL.

MATERIALS FOR SALE

LARGE and Small Rollers. Solid and Laminated Woods. Also turnery in all hardwoods, including Lignum.—MUSTILL, Clifton Road East, Liverpool, 6.

GRINDING WHEELS.—One 21 in. by 1½ in. by 8 in. bore; one 24 in. by 1½ in. by 8 in. bore (for Aluminium). What offers? Most Foundry Requisites ex stock.—L. A. WITHAM & Co., "Lawco" Foundry Supplies, 620, South Street, Glasgow, W.4.

MACHINERY WANTED

REQUIRED, urgently, 30-cwt. Geared Crane Ladle. New or secondhand.—NEWCAST FOUNDRIES, LTD., Silverdale, Staffs.

REQUIRED.—25-30 cwts. capacity Geared Tilting Ladle. Must be in good condition. State price and where seen.—Box 1021, FOUNDRY TRADE JOURNAL.

WANTED. — Barrel Shot Blast Apparatus, complete with dust collecting Unit, airless preferred. State price.—Box 1034, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED—*Contd*

COLEMAN Coreblowing Machines, R.2 and R.4, in good condition, wanted.—State price, etc., CHARLES PERKS, LTD., Croft & Stafford Street Foundries, Willenhall.

MACHINERY FOR SALE

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. BREALEY (MACHINERY), LTD., Station Works, Ecclesfield, Sheffield.

MOULDING MACHINES.

F.E.CO.'S, Type HRO, Hand Rollover Pneumatic, pattern draw (for use with sand rammer and slinger).

Colman Type CNS, Pneumatic Jolt Squeeze, box lift stripping; 80 lbs. w.p.

Adaptable Hand Ram; standard size; late type.

F.E.Co.'s Hand Squeeze, pin lift; table 1 ft. 10 in. by 2 ft. 2½ in.

Tait Pneumatic Squeeze, pattern draw; table 1 ft. 4 in. by 1 ft. 10½ in.; pin lift about 4 in.

Hilltop Hand Squeeze, pin lift, Type HT4; table 15 in. by 18 in.

Macnab, size "D," Jolt Ram Rollover Pattern Draw; rollover plate 40 in. by 30 in.; pattern draw 12 in.; 80 lbs. capacity; 1,100 lbs. air pressure.

SAND MIXERS, ETC.

Rotoil Junior. No. 2 size, Sand Mixer; 2 cwts. capacity.

F.E. Sand Dryers, coke-fired; stationary type.

Mathieson Gas-fired Mould Dryer; 7 ft. long by 4 ft. 6 in. wide, with 3/50/400 V. Blower.

MISCELLANEOUS.

"Steele-shaw" Two-unit Paint Shaking Machine; 2 h.p., 3/50/400 V. motor, 1,400 r.p.m.

Jubilee Tipping Wagon or Truck; 1½ cu. yd.; all steel body; 24 gauge.

J.A.P. Petrol Engine, Model 5B; 3½/4½ b.h.p

"Rocket" Core Blower, by Coggan; 15 lbs. capacity.

Lees-Hall Diecasting Metal Zinc Melting Furnace; bale-out type, on legs; Bunsen burner.

5-CWT. CAPACITY UNGEARED HAND LADLE.

AIR COMPRESSORS, Air Receivers, Belt or Electrically-driven Blowing and Exhaust Fans, DUST COLLECTORS, etc. Norton Heavy D-E. Grinder; wheels 16 in. dia. by 3½ in. face; adjustable work rests and wheel guards.

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E., Crosswells Engineering Works, Langley Green, near Birmingham. Broadwell 1359

DELIVERY EX STOCK

New shot blast cabinets complete with Dust Extractors, etc., size 5ft. × 3ft. Also new 8ft. cube room Plants Low prices.

Please send for our NEW Illustrated catalogue on request

ELECTROGENERATORS LTD.

14 AUSTRALIA RD., SLOUGH

Telephone: SLOUGH 22877

BUY FROM US AND SAVE MONEY

MACHINERY FOR SALE—*Contd.*

FOR SALE.—1 Ingersoll Rand, Type 40, Air Cooled, 2-Stage Compressor, with inter and after coolers. 160 c.f.m. free air at 100 p.s.i. V-belt coupled to Crompton-Parkinson 38.5 h.p. Slip Ring Motor (400-440 V.), with Starter, by E.A.C.

2 Stone Wallwork Moulding Machines, Type W.T.563. Shockless-Jolt Squeeze—Straight Draw. Table size, 221/5 in. by 19 in. Pattern draw 6¾ in.

1 B.M.M. Turn-Over Moulder, Type B.T. Table size, 27 in. by 18 in. Pattern draw 9 in.

Box 1051, FOUNDRY TRADE JOURNAL.

ALBION TWW WORKS

BLOWING AND EXHAUSTING FANS

BLOWING FANS :

SEVERAL NEW ELECTRIC FORGE BLOWERS. 125 c.f.m., 3 in. w.g., 2½ in. inlet, 2 in. outlet, 400/3/50.

SEVERAL NEW KEITH BLACKMAN BLOWING FANS. 10,000 c.f.m., 13 in. w.g. 1 h.p. Motor, 400/3/50. Blast gate and starters.

MOTOR DRIVEN BLOWING FAN, Keith Blackman, 150 c.f.m., 10 in. w.g. 1 h.p. S.C. Motor, 400/3/50

NEW SIZE 20 MULTIVANE STEEL PLATE PRESSURE FAN. 1,500 c.f.m. against 18 in. w.g. 10 h.p. S.C. Motor, 400/3/50.

NEW SIZE 24 MULTIVANE STEEL PLATE PRESSURE FAN. 2,820 c.f.m. against 22 in. w.g. to 20 b.h.p. S.C. Motor, 400/3/50.

MUSGRAVE MULTIVANE MOTOR DRIVEN BLOWING FAN. 2,500 c.f.m., ¾ in. w.g. 10 h.p. S.R. Motor, 400/3/50, 1,400 r.p.m. Ellison O.I. Starter.

BELT DRIVEN :

SEVERAL BELT DRIVEN FANS, by KEITH BLACKMAN. Size 14, Type 9, 5 in. inlet, outlet 3 in. by 3½ in. 330 c.f.m. at 8.5 w.g., 2,900 r.p.m. ar 560 c.f.m. at 14 in. w.g. Vee rope pulley 3½ in. dia.

VEE BELT DRIVEN STEEL PLATE CASING FORCED DRAUGHT FAN, by Standard Pulverised Co. 16 in. dia. suction, 12 in. dia. discharge; capacity 5,000 c.f.m., 15¾ in. w.g., 1,450 r.p.m.

EXHAUST FANS :

NEW SIZE 9 PADDLE BLADE FAN. 450 c.f.m. against 3 in. w.g. .75 h.p. Motor, 400/3/50. Inlet 5¾ in. dia., outlet 5¾ in. by 5¾ in.

SIZE 12 PADDLE BLADE FAN. 1,000 c.f.m. against 5 in. w.g. 2 b.h.p. S.C. Motor, 400/3/50.

SIZE 15 PADDLE BLADE FAN. Capacity 2,000 c.f.m. against 6 in. w.g. 5 h.p. S.C. Motor, 400/3/50. Outlet 9½ in. by 8 in.

ROTARY BLOWERS :

NEW No. 1 "EMPIRE" POSITIVE PRESSURE BLOWER. 26 c.f.m. against 5-lbs. p.s.i. pressure, 870 r.p.m., pulley 4 in. by 1½ in., belt striking gear.

NEW No. 3 "EMPIRE" POSITIVE PRESSURE BLOWER. 60 c.f.m., 5-lbs. p.s.i. pressure, 525 r.p.m., pulley 7 in. by 3 in.

No. 4 "EMPIRE" DRIVEN POSITIVE PRESSURE BLOWER, by Alldays. 97 c.f.m. at 5-lbs. p.s.i. 4 h.p. S.C. Motor and Starter, Air Receiver 6 ft. by 27 in.

"HOLLAND" MOTOR DRIVEN ROTARY BLOWER, comprising twin blowers giving combined displacement of 2,700 c.f.m., 60 in. w.g., mounted in tandem. 125 h.p. Motor, 730 r.p.m., mounted between blowers.

THOS W. WARD LTD.

ALBION WORKS : SHEFFIELD

Phone 26311 'Grams: "Forward."

Remember . Wards might have it !

MACHINERY FOR SALE—*Contd.*

TWO secondhand Cupolas for sale. Shells 5 ft. 4 in. inside diameter, complete with motors, fans, starters and all blast pipes.—Enquiries, write Box 1052, FOUNDRY TRADE JOURNAL.

FOR SALE

NO. 16 ATRITOR CRUSHER by Alfred Herbert, complete with Feed Hopper, overhauled and with a quantity of spares. Also a No. 12 Atritor by Alfred Herbert, for which we have available about 6 tons of spares. Both these machines are offered at extremely low prices for quick clearance.

SAVILLE-CALVERT (MACHINERY), LIMITED
BIRMINGHAM ROAD, STRATFORD-ON-AVON.
Tel. : Stratford-on-Avon 3681.

NEW CRANES FROM STOCK.

1 6-Ton Electric Overhead Travelling Crane. 20 ft. Lift, 35 ft. Span, 400/3/50 supply.

1 6-Ton Ditto. 30 ft. Span.

The above are 3-motor, double girder type Cranes. Floor controlled.

1 3-Ton Electric Overhead Travelling Crane, Electric Hoist and Hand Cross and Long Travel. 400/3/50. 35 ft. Span.

1 Ditto. 6-ton capacity. 400/3/50 supply. Floor controlled.

The Spans of the above Cranes can be adjusted if required.

FRANK SALT & CO., LTD.,
Station Road, Blackheath, Birmingham.
[illegible] BLA. 1635.

IN STOCK IN SLOUGH FOR IMMEDIATE DELIVERY.

COKE-FIRED TILTING FURNACES, as new, with Keith Blackman a.c. Fans, 250 lbs. and 440 lbs. size. £125 each.

BALE-OUT FURNACES, by Morgan and British Furnaces. 200 lbs.-400 lbs., in stock. Prices £40 to £150.

WEIGHING MACHINES. 30-cwt., 1-ton, 3-cwt., etc. Suitable for cupola charges. Cheap.

Small and large DISINTEGRATORS, by Alfred Herbert, at £28 to £48.

Several CUPOLAS, from ½ ton per hour to 3 tons per hour. Details on request.

Plenty of Foundry Equipment in stock. Immediate attention all enquiries.

ELECTROGENERATORS LTD.
Australia Road, Slough.
Telephone : Slough 22877.

MACHINERY FOR SALE—*Contd.*

600

FANS AND BLOWERS

75,000-c.f.m. encased type Fan, by BRITISH AIR CONDITIONERS. 2½ in. w.g., 320 r.p.m., inlet 66 in. dia., horiz. bottom discharge 43 in. by 47 in., shrouded multivane impeller.

18,000-c.f.m. sheet metal encased Fan, by STANDARD & POCHIN. 4 in. w.g., 1,310 r.p.m., 29 in. dia. inlet, vert. upwards discharge 28 in. by 20 in., shrouded multivane impeller, suitable for other duties varying down to 5,000-c.f.m., 1 in. w.g., 556 r.p.m.

15,000-c.f.m. sheet metal encased Fan, by CHAPMAN ENGINEERING CO. 1½ in. w.g., 585 r.p.m., 30 in. dia. inlet, vert. upwards discharge 22 in. by 28 in., multivane impeller, arranged to drive from 5-h.p. T.E. motor 400/3/50.

SEVEN 13,900-c.f.m. sheet metal encased Fans, by R. K. WEBSTER. 3 in. w.g., 802 r.p.m., 27 in. dia. inlet, top horiz. discharge 27 in. by 18 in., multivane impeller, arranged belt drive, will give 6,000-c.f.m. 1 in. w.g., 434 r.p.m.

Eleven 10,000-c.f.m. sheet metal encased type Fans, by MATTHEWS & YATES. 3 in. w.g., 980 r.p.m., inlet 22 in. dia., horiz. bottom discharge 23 in. by 16½ in., paddle blade impeller, arranged for belt drive, will also give 5,000-c.f.m. 1 in. w.g., 500 r.p.m.

Seven 10,000-c.f.m. casing type Fans, by KEITH BLACKMAN. 1½ in. w.g., two bottom inlets 15 in. by 29¾ in., bottom discharge 24 in. by 26½ in. 4-h.p. at 645 r.p.m. required.

GEORGE COHEN
SONS & CO., LTD.
WOOD LANE, LONDON: W.12
Tel : Shepherds Bush 2070
and STANNINGLEY nr. LEEDS
Tel : Pudsey 2241

CAPACITY AVAILABLE

NON-FERROUS FOUNDRY. Capacity available. First-class quality castings, in Aluminium-Bronze, Gunmetals, etc., at competitive prices, including patterns if required.—BEESTON LEE & CO., LTD., 33, Swindon Road, Stratton St. Margaret, Wilts.

CAPACITY, substantial, available immediately, fully mechanised Foundry; high quality Grey Iron and Malleable Castings; boxes up to 28 in. by 16 in. by 5 in.; Patternmaking facilities if required. —E. J. WALLACE, 50, Wellington Street, Glasgow, C.2.

CAPACITY AVAILABLE—*Contd.*

CAPACITY available for castings weighing from 1 lb. to 15 tons, including Quasi-Bessermised ingot moulds up to 10,000 tons per annum.—THE CROSS FOUNDRY & ENGINEERING CO., LTD., Gorseinon, near Swansea.

FOUNDRY in Home Counties has capacity available for repetition grey iron castings up to 24 in. sq. boxes.—Box 1001, FOUNDRY TRADE JOURNAL.

ACCURATE Patterns in the minimum of time. Plate Specialists.—A. ELSTON, 1, Cranbrook Road, London, E.17. KEYstone 6788.

BEEHIVE FOUNDRY, 50, Hall Lane, Walsall Wood, Staffs., for small to medium size Aluminium Sand Castings of Quality.—'Phone Brownhills 3323.

PATTERNMAKING Capacity available immediately.—Write or telephone F.H. (NEWCASTLE), LTD., Pottery Lane, Newcastle-on-Tyne, 1. Tel. No. 28291/2.

CAPACITY available for Light Castings weighing from 1 lb. to 5 cwts., including Castings for Vitreous Enamelling. —WESTERN LIGHT CASTINGS FOUNDRIES, LTD., Fairwood Foundry, Gowerton, near Swansea, manufacturers of malleable iron castings.

PATTERNMAKING. — Accurate first-class Patterns for machine or hand moulding. Keen prices, quick delivery.— D. O. POOLE, 27, Priory Avenue, Taunton, Somerset. Tel. 5046.

H. G. HOPPER (Kingston) Ltd.
HAMPDEN ROAD, KINGSTON
KIN 0177/8/9

PATTERNS (Wood & Metal)
CASTINGS (Iron & Non-Ferrous)
GEAR CUTTING
GENERAL MACHINING

All at our
KINGSTON WORKS

Good Deliveries

MISCELLANEOUS

PATTERNS for all branches of Engineering, for Hand or Machine Moulding.—FURMSTON AND LAWLOR, LTD., Letchworth.

PATTERNS in Wood or Metal; high finish and accuracy maintained; plate and multi-cored work a speciality.—HAYWOOD BROS., Littleborough, Lancs 1543.

GENERAL Pattern and Woodwork Co. (W. E. Gibson). Office: 25, Moss Street, Derby. Accurate First Class Patterns for machine or hand moulding. Competitive prices. Quick delivery.

MANURE, especially suitable for Foundry work and as supplied to the trade for over 25 years. Quotations on request.—FRANK GINSTER, Moxley, Wednesbury. 'Phone: 0688 Wednesbury.

MISCELLANEOUS—*Contd.*

REFRACTORY Repairs and Renewals to Annealing Refinery and Reverberatory Furnaces, and Furnaces of all types.—B. RICHARDSON, 49, Milton Avenue, East Ham, E.6. Tel. No.: GRAngewood 4976.

PATTERNS.

WOOD and Metal for Plate or Hand Moulding.—BARRON CLARK, Glenton Street Works, Peterborough. Telephone Peterborough 2750.

WE buy used or unserviceable Steel Files at good prices, in lots of cwts. or more.

THOS. W. WARD, LTD.,
T.S. Department,
Albion Works, Sheffield.

MISCELLANEOUS—*Contd.*

REFRACTORY MATERIALS.—Moulding Sand, Ganister, Limestone, Core Gum; competitive prices quoted.—HENSALL SAND CO., LTD., Silver Street, Halifax.

MOULDING BOXES fabricated from Aluminium Alloy or Steel; for all types of welded fabrication we can give a first-class job and good delivery.—THE GLENMOOR ENG. CO., LTD., Eyre's Avenue, Stanningley Road, Leeds, 12.

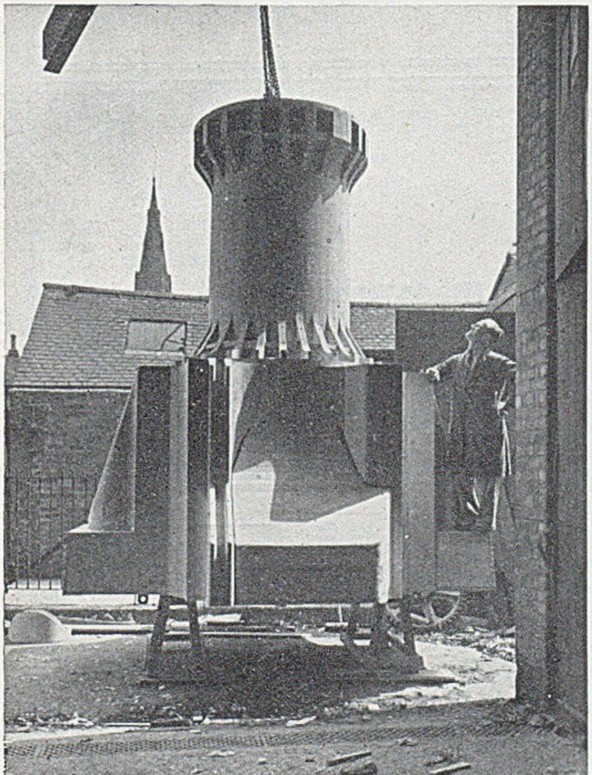
MOISTURE TEST.—3 MINUTES! Exact percentage of water in foundry sand determined in three minutes by "SPEEDY" MOISTURE TESTER. Portable; non-electric; simple for use by unskilled labour; inexpensive. Over 6,500 in use in Foundries and many other industries.—Write for fully descriptive Illustrated Brochure to THOS. ASHWORTH & CO., LTD. (Dept. F.T.J.), Burnley, Lancs.

PATTERNMAKERS' *Section*

PATTERNMAKERS
(Engineering) CO. LTD.
Shrewsbury Road, London, N.W.10.
HIGH-CLASS PATTERNS
NON-FERROUS
CASTINGS
Phone: ELGAR 8031/2

SURREY PATTERNS
9a FRITH ROAD, CROYDON
ENGINEERS PATTERNMAKERS
Pine, Mahogany or Metal Patterns
for Plate or Hand Moulding
Non-Ferrous Castings
Telephone: CRO. 0994

LAWS & SON,
(New Address)
31 Hanbury Road, Acton, W.3
(ACOrn 1883)
All types of patterns, Wood or Metal. SPECIAL LARGE-TURNING FACILITIES. Sub-contracts. Non-ferrous castings.



PATTERNS
WOOD AND METAL
Over 100 Skilled Craftsmen at your service

•

G. PERRY & SONS
LTD.

HALL LANE
AYLESTONE
LEICESTER

Telephone: LEICESTER 32261

PATTERNMAKERS' Section

G. & R. THOMAS LTD

MAKERS OF

HIGH-GRADE PIG IRON

FOR CYLINDER & HIGH DUTY CASTINGS

The perfect pig-iron for cylinder and high duty castings - - - free from porosity and of high tensile strength. Our Technical Staff is always ready to assist users and to advise with regard to mixtures. We cordially welcome your inquiries.

Hatherton Furnaces, Bloxwich, Staffs

Telephone:
BLOXWICH 66248/9

FAMOUS SINCE 1844

Telegrams:
THOMAS BLOXWICH, WALSALL

FOSECO

PRODUCTS AND SERVICE

for the foundryman

Foseco Preparations are a specially prepared range of compounds for the refining, purifying, degassing, deoxidising etc. of Ferrous, Non-Ferrous, and light Metals & Alloys. The Foseco range includes core and mould dressings, diecoatings and refractory washes, which accomplish the desired results without fuss or bother; no injurious fumes or health hazards.

To assist foundrymen with their problems we have a specially trained staff of technical representatives and metallurgists available without charge or obligation.

To help the practical man to overcome his difficulties our publication "Foundry Practice," published on alternate months, will be sent free on request - send for your copy today.

FOUNDRY SERVICES LTD.
LONG ACRE · NECHELLS · BIRMINGHAM · 7

LGB

EYRE

THE EYRE SMELTING COMPANY LTD

ALUMINIUM WORKS, WILLOW LANE, MITCHAM, SURREY. Telephone: MITcham 2248

2637

ALBOND

Regd. Trade Mark

AN ECONOMICAL BONDING CLAY FOR FERROUS AND NON-FERROUS FOUNDING

HELPS FOUNDRYMEN IN 3 WAYS:—

* **NATURAL SANDS** (Add one to two per cent) Albond in ordinary moulding sand acts as a rejuvenator, eliminates waste and confers flowability, improved "green" strength and cleaner stripping.
* **SYNTHETIC SANDS** (Add up to six per cent) Albond provides the ideal bond for pure silica sand in fully "synthetic" mixtures. It is highly refractory, has good spreading power and prevents friability.
* **CORE SANDS** (Add about one per cent) Albond added in the mixer to core sand gives better "green" strength and non-sticking. Cores are non-sagging, have high "hot strength" and resist metal penetration.

FIRST CLASS DELIVERY—ALL ORDERS EXECUTED WITHIN A WEEK

ALBION PULVERISING COMPANY LIMITED

134, EDMUND STREET, BIRMINGHAM 3

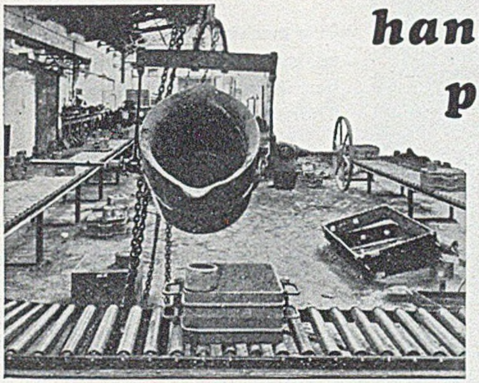
TELEPHONE: CENTRAL 1574

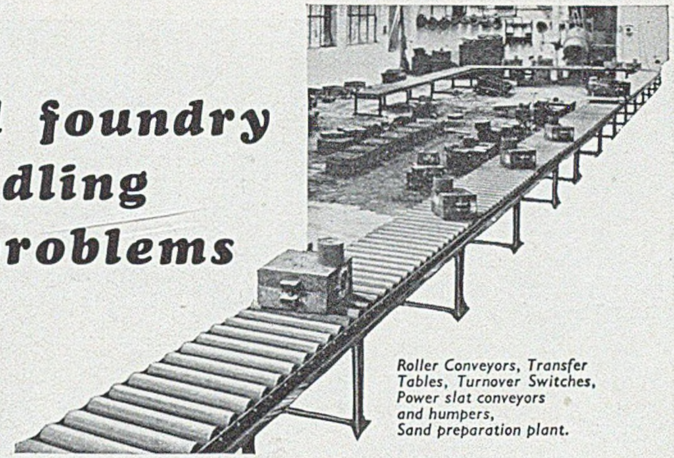
Scottish Representatives: W. H. McKENZIE & CO., 28, ROYAL EXCHANGE SQUARE, GLASGOW, C.1. Tel.: Glasgow CENtral 5670

SIR W. G. ARMSTRONG WHITWORTH & CO. (IRONFOUNDERS) LTD.

CLOSE WORKS, GATESHEAD-ON-TYNE.

Conveyors for all foundry handling problems





Roller Conveyors, Transfer Tables, Turnover Switches, Power slat conveyors and humpers, Sand preparation plant.

Rownsons

Manufacturers of

Belt, Slat, Chain and Portable Band Conveyors, Stackers and Humpers, Swing Tray Elevators, Portable Platform Hoists, Donald Patent Elevator-Conveyors for Ship Loading and Unloading.

ROWNSON, DREW & CLYDESDALE LTD.

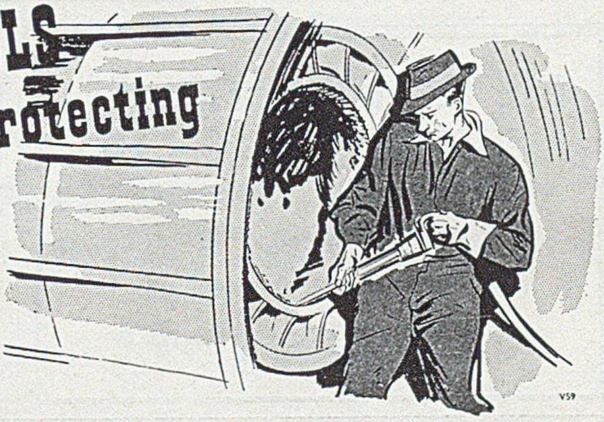
Head Office : 225 UPPER THAMES STREET · LONDON · E.C.4.

Telephone : GULliver 4418. Cables : Rownson, London. Codes : Bentley's Private. A.B.C. 5th & 6th and Liebers.

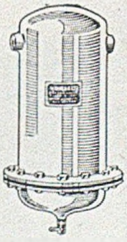
Works : MAIDEN LANE · YORK WAY · KING'S CROSS · LONDON · N.7.

RDC 1495

PNEUMATIC TOOLS are worth protecting



Pneumatic tools cannot be expected to work at full efficiency through a reasonable working life if they are constantly being fed with unfiltered air. Unless adequate VOKES filters are fitted to the compressor and at various stages along the delivery line, atmospheric impurities will be allowed to enter via the compressor intake . . . water will collect, or oil vapour will be picked up in the compressor . . . scale and rust will form in the delivery pipes and needless damage will be caused to tools and machines. Only VOKES filters with their 99.9% efficiency rating can give complete protection against these dangers and once the appropriate filters have been fitted, the simple renewal of elements, when inspection proves this to be necessary, will provide complete insurance against breakdown and depreciation at a ridiculously low premium. Full details will gladly be given on the VOKES filters most suited to your own application.



V 51

VOKES *Pioneers of scientific filtration*

VOKES LTD. Head Office : GUILDFORD, SURREY. London Office : 40 Broadway, Westminster, S.W.1

Vokes (Canada) Ltd., Toronto. Represented throughout the World. Vokes Australia Pty., Ltd., Sydney

A WORLD-WIDE FILTRATION SERVICE AT THE COMMAND OF INDUSTRY

Published by the Proprietors, INDUSTRIAL NEWSPAPERS, LIMITED, 49, Wellington Street, Strand, London, W.C.2, and Printed in Great Britain by HARRISON & SONS, LTD., Printers to His Majesty The King, London, Hayes (Middx) and High Wycombe.

FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 90
No. 1816
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL
JUNE 21, 1951
Offices: 49, Wellington Street, Strand, London, W.C.2

Single Copy, 9d. By Pos
11d. Annual Subscrip
tion, Home 40/-, Abroa
45/- (Prepaid)