FOUNDRY TRADE JOURNAL

EST. 1902

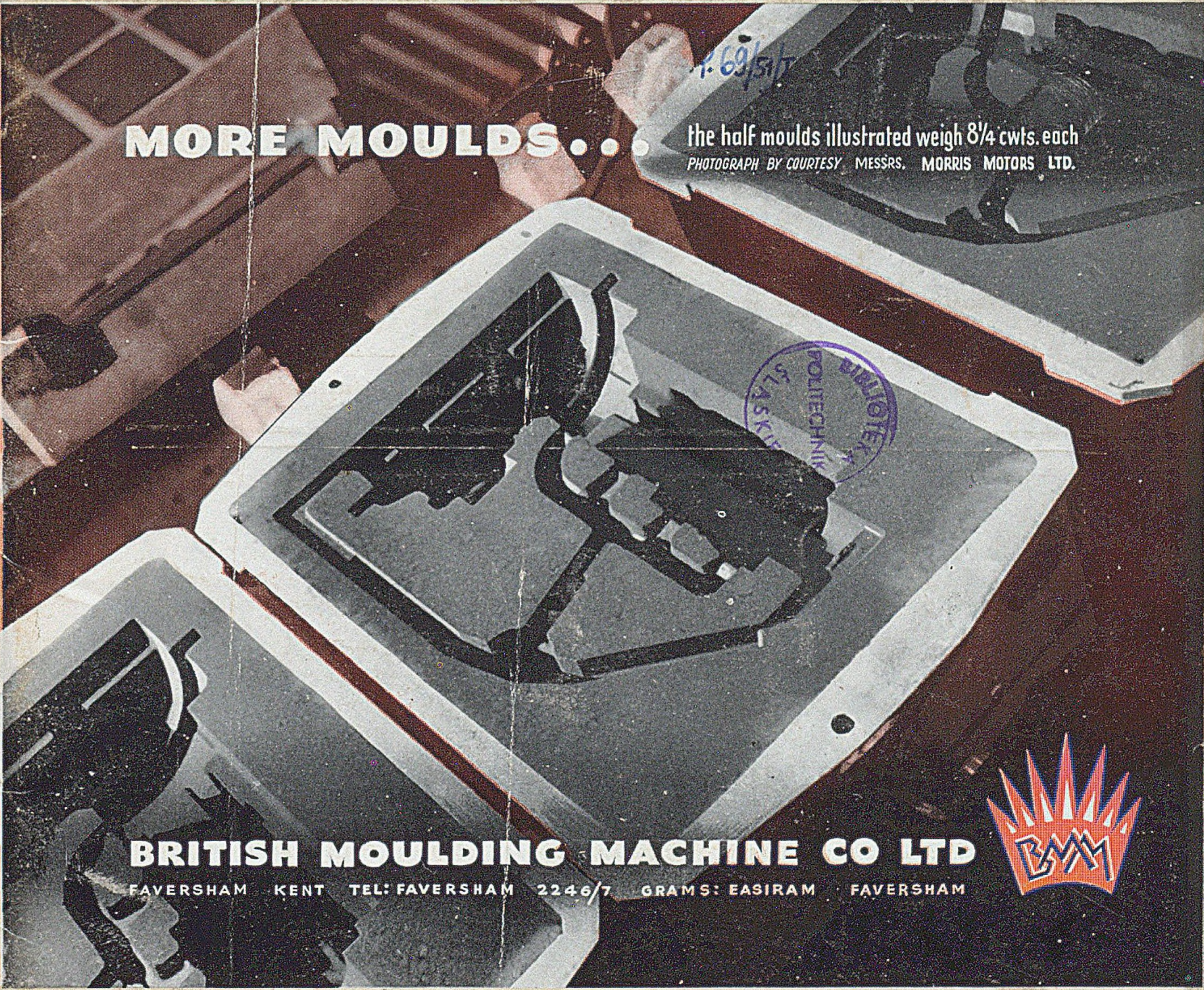
VOL. 90
No. 1811
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

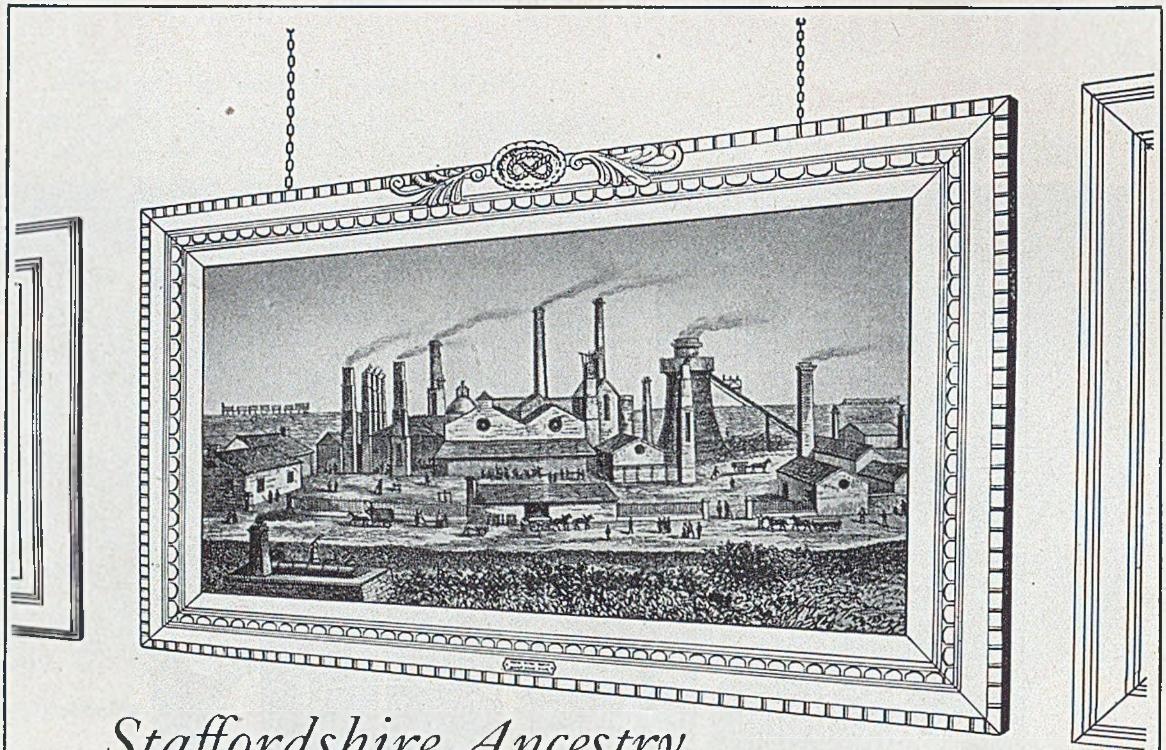
MAY 17, 1951

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

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



A

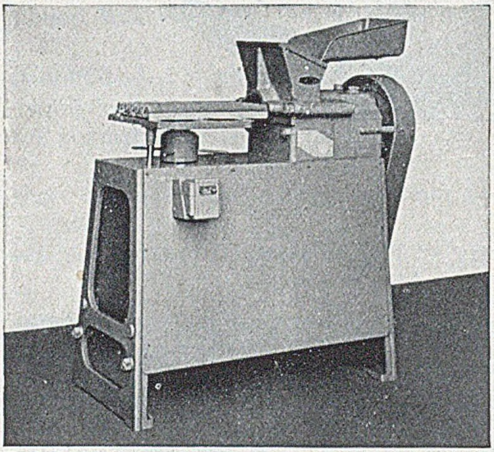


FIRST CLASS CORES WITH *ANY** FOUNDRY SAND

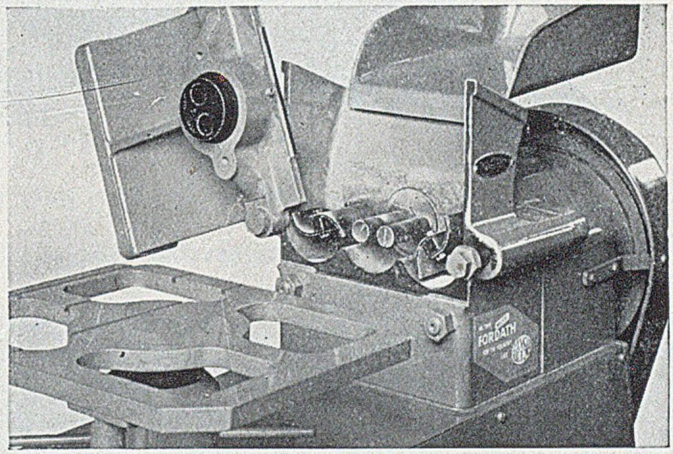
A new chapter in foundry technique

FORDATH "MULTIPLUNGER" CORE MACHINE

(PATENT APPLIED FOR)



Fordath "Multiplunger" Core Machine, showing extruded cores



Main hopper chamber, showing plungers

When, 25 years ago, Fordath introduced the *Multiple* Rotary Core Machines an outstanding advance was made on anything then known. Through the years these machines have been steadily improved and *to-day* many thousands are giving sterling service in all parts of the world.

But Fordath does not stand still. In the newly designed core extruder, plunger action is used, instead of a rotating worm, to thrust the core-mix through the multiple die. The pressure thus developed has an economic as well as a technical advantage:

* *Quality and consistency of the core-sand mixture are* NOT *critical factors. The Multiplunger will extrude satisfactorily even when poor quality core sands only are available; cores can, if necessary, be extruded using facing sand or plain red moulding sand.*

Optimum rate of feed is maintained automatically by the gear-driven synchronized rotating blades which impel a full charge of sand in front of each plunger.

The end-piece of the main hopper chamber can be swung clear on its hinges giving easy access for cleaning and changing the dies.

RANGE. Dies can be supplied for cores of any diameter between ¼" and 3". Ten ¼" cores are produced simultaneously and all dies up to 1¼" are multiple, the number of cores produced varying with the diameters. Cores of sizes over 1¼" are produced singly.

VENTING. Cores are automatically vented.

FORDATH

SOLE GLYSO CORE OIL COMPOUNDS MAKERS

at the core of good work in the foundry

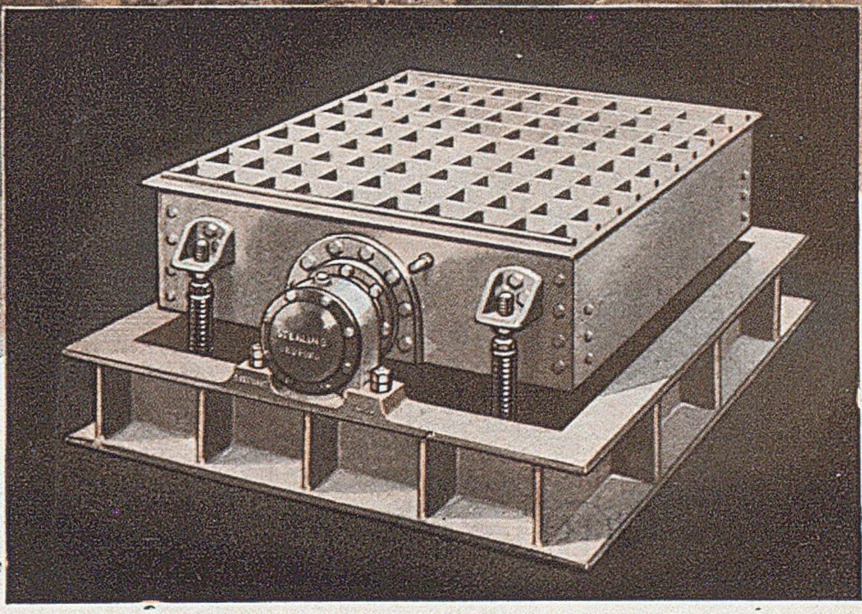
Prices and details from :

THE FORDATH ENGINEERING CO. LTD. Hamblet Works, West Bromwich, Staffs.

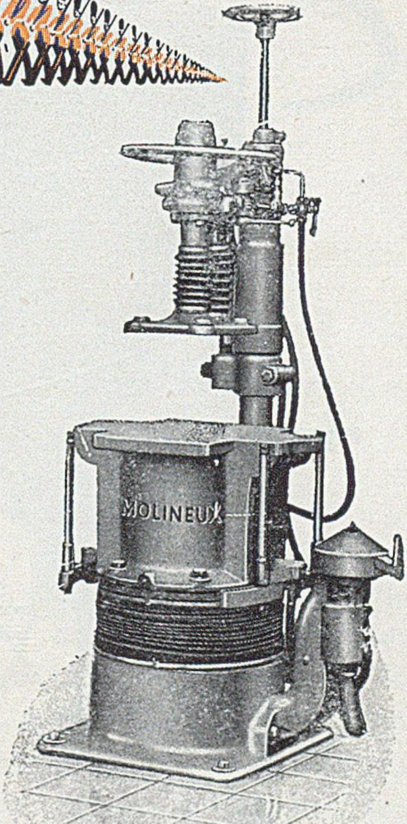
TEL: *West Bromwich* 0549, 0540, 1692. TELEGRAMS: *Metallical, West Bromwich*

Knocking-out at Coneygre Foundry.


Goodbye to
all this



MARCHING FORWARD



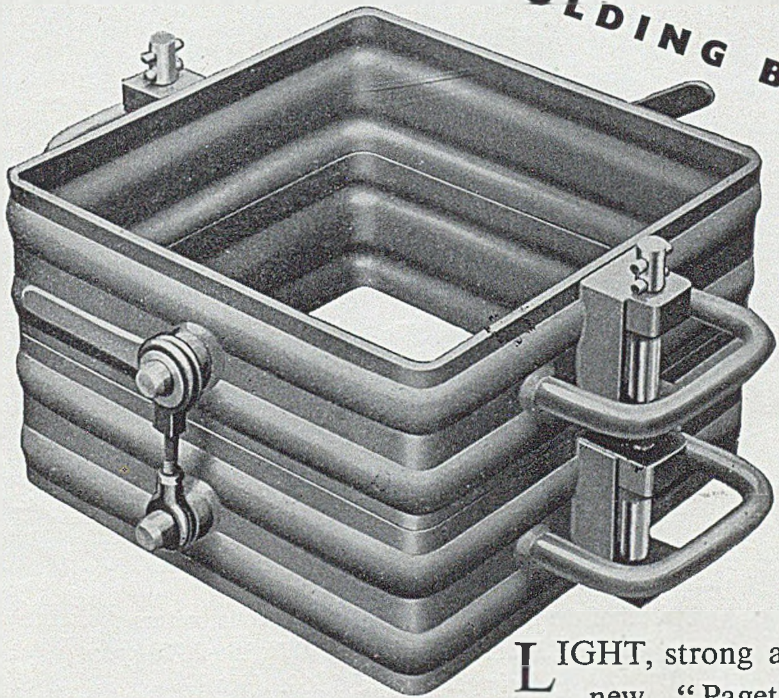
Progress follows the installation of Molineux Moulding Machines. 85% *of Molineux users have sent us repeat orders, often shewing the measure of their own progress. We are regularly exporting to* 10 *countries, where we have live, technically competent agents.*

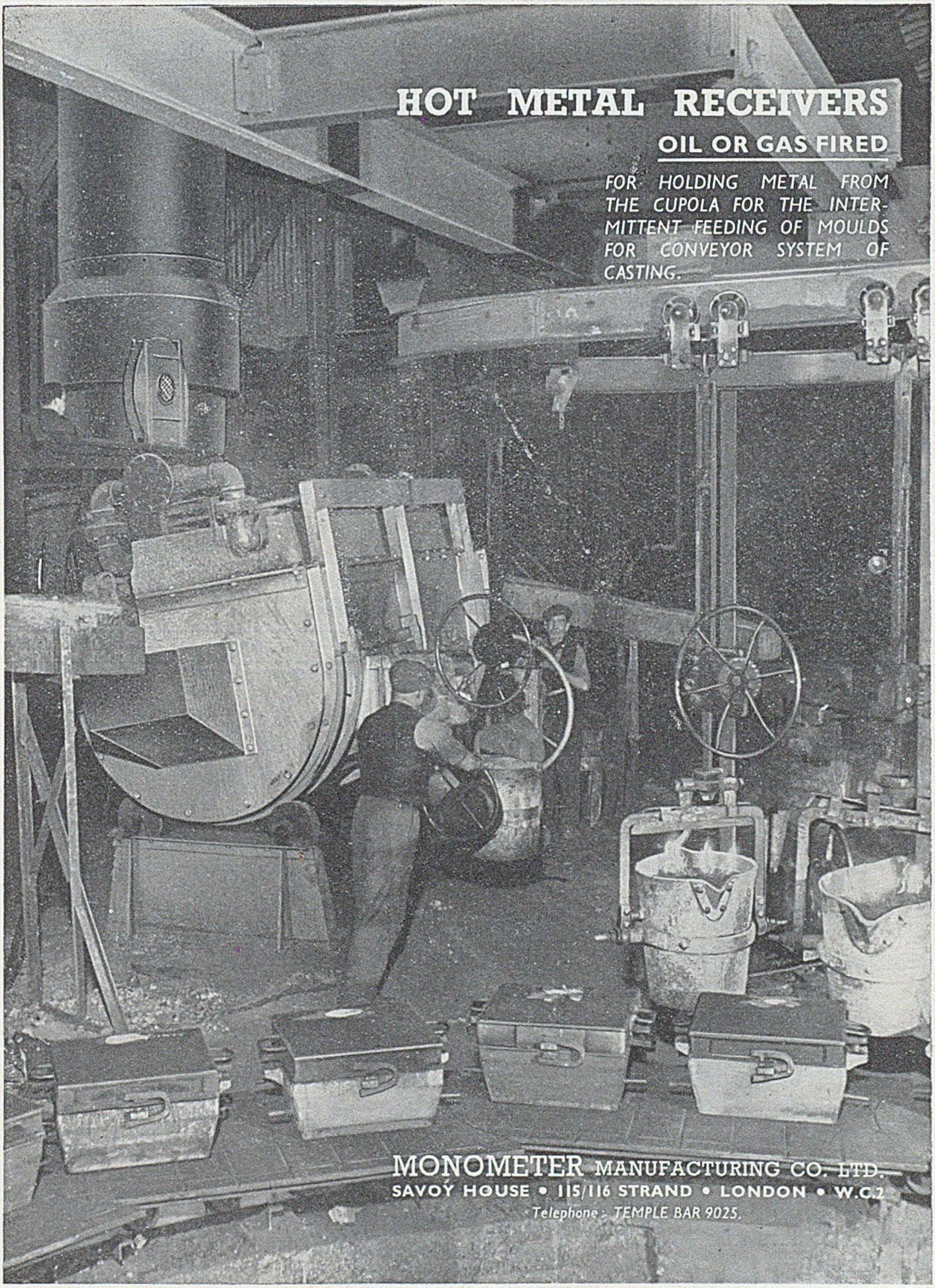
MAYBE OUR EXPERIENCE OF MACHINE MOULDING WOULD HELP YOUR MOULD PRODUCTION——————

MOLINEUX FOUNDRY EQUIPMENT LIMITED

MARLBOROUGH ROAD LONDON N.19

Telephone: ARCHWAY 4127/8/9




HOT METAL RECEIVERS
OIL OR GAS FIRED
FOR HOLDING METAL FROM THE CUPOLA FOR THE INTERMITTENT FEEDING OF MOULDS FOR CONVEYOR SYSTEM OF CASTING.
MONOMETER MANUFACTURING CO. LTD.
SAVOY HOUSE • 115/116 STRAND • LONDON • W.C.2
Telephone: TEMPLE BAR 9025.

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 : **J. J. Sheehan, B.Sc., A.R.C.Sc.I.,** Coneygre Foundry, Ltd., Tipton, Staffs.
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* : A. S. Wall, 14, Palace Avenue, Llandaff, Cardiff.

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.,** 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.

THE 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, May 17, 1951 No. 1811

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"

Reporting Progress

We regard the issue of Proceedings of Institute of British Foundrymen, as a progress report not only in the art and science of foundry practice, but also of the organisation itself. The membership, quoted at 4,588, is a record, and we do not remember any year when an increase has not been announced, though, of course, it may have happened. This increase is not fortuitous—it is due to the ever-increasing services which go with membership. The most important of these is the opening of new branches, which affords technical activities to the member without the need for travelling. An active branch may during the session, besides holding the usual meetings, organise several visits, two types of social functions, and a study trip on the Continent. Next in importance has been the creation of the Technical Council, which through its committees has broadened knowledge of foundry practice in fields chosen by the members themselves as being of the more pressing interest. Again, the dissemination of information has been widened by the organisation of foremen's conferences and a day of national works visits. For many years the Institute has actively sponsored international foundry co-operation, and thereby opened more doors for technical advancement.

All these services and activities do result directly and indirectly in reinforcing foundry practices, many of which later find their way into the Proceedings of the Institute—a collection of these forming the finest reference library on foundrywork emanating from this country. This particular volume of the Proceedings reflects current work, the lasting value of which only posterity can judge. We have a feeling that when there were fewer unsponsored papers, they were, though perhaps less erudite, of greater interest. Thus for the best papers one turns to those presented to the branches, where several are of outstanding quality. The Institute does not invent—it merely mirrors—and it is not the fault of the Institute that there are but two papers dealing directly with steel. The deficiency lies with this section of industry itself. In recent years, the aluminium founders have had a definite policy of providing papers, and other sections of the industry would do well to follow their lead.

Vol. XVIII is of pretty much the same size as the previous one, and the standard of presentation under the Editorship of Mr. Lambert has not only been maintained but enhanced. The contents pages are now better displayed, whilst the index shows that every effort has been made to help the reader rapidly to find references to any subject in which he may be interested. These attributes are the more noteworthy because, owing to trouble in the printing industry, a late start was made, yet by strenuous efforts by everybody concerned, much of the lost time was made up. The appearance of this volume will be welcomed by members and non-members—to whom it is available against payment—as a major contribution to the literature of foundrywork.

Institute's Scottish Extension

New Section at Arbroath

The work of the Institute of British Foundrymen has been receiving special attention recently in the north-eastern district of Scotland. During each of the past five years, a joint meeting has been held in Dundee between the Dundee Institute of Engineers and the Scottish branch of the foundrymen. At each of these meetings the paper submitted dealt with some aspect of foundry practice. As a result, interest in the Institute was quickened and a number of new members were enrolled.

At the close of session 1950-51, the Institute held a special meeting for its own members, and non-member foundrymen were invited to be present. The meeting was held in Arbroath and was attended by 55 people. Provost J. F. Webster, Arbroath, was in the chair, and the paper, on "Cupola Control," was submitted by Mr. D. H. Young, Glasgow. At the conclusion of the meeting, on the recommendation of Provost Webster—who is a member of the Institute—it was agreed, subject to approval of the Council of the Institute, to form a section of the Scottish branch for the benefit of the members resident in the north-east of Scotland.

The Council of the Institute, at its meeting in Birmingham on April 21, received a report from Mr. John Bell, hon. secretary of the Scottish branch, dealing with the facts given above, and the formation of the new section, to be known as the Scottish branch (North-Eastern section), was unanimously approved. A meeting of the new section was held in Arbroath on April 25, when Mr. A. Campion gave an address on "Gating and Venting." Since then there has been a visit on May 16 to the works of Urquhart Lindsay & Robertson Orchar, Limited, Dundee.

The office-bearers elected for the new section are: As *president*, Provost John F. Webster; as *vice-president*, Mr. H. J. M. Conacher; as *members of council*, Mr. Cormack, Mr. Matthews, Mr. Scarcliffe, and Mr. White; as *hon. secretary*, Mr. R. Leeks, whose address is c/o Alexander Shanks & Son, Limited, Arbroath, Angus. An attractive syllabus is being prepared for next session.

Beilby Memorial Awards, 1950

The administrators of the Sir George Beilby memorial fund, representing the Institute of Metals, the Royal Institute of Chemistry and the Society of Chemical Industry, have decided to make two awards, each of one hundred guineas, from the fund for 1950. These awards have been made to William Albert Baker, B.Sc.(Lond.), F.I.M., in recognition of his experimental contributions to knowledge of the factors determining the production of sound castings of non-ferrous metals and alloys, and Gordon Whittingham, M.A., Ph.D. (Cantab.), in recognition of his experimental contributions to knowledge of the combustion products of fuels containing sulphur and their effects on corrosion.

Mr. Baker joined the staff of the assay office, Royal Mint, London, as a student assistant, and graduated in metallurgy at the University of London as an external student in 1934. Shortly afterwards he joined the British Non-Ferrous Metals Research Association as an investigator, where he was engaged mainly on problems connected with the melting and casting of non-ferrous metals, and to the general principles to be observed in developing foundry techniques. Dr. Whittingham is superintendent of the combustion department in the British Coal Utilisation Research Association laboratories at Leatherhead.

I.B.F. Awards

The Institute of British Foundrymen announces the following awards for 1951. The *E. J. Fox Medal* has been awarded to Mr. H. Morrogh, senior research metallurgist to the British Cast Iron Research Association, in recognition of his pioneer work in connection with nodular iron. The *British Foundry Medal and Award* have been bestowed on Mr. E. S. Renshaw and his co-author, Mr. S. J. Sargood, respectively, as having given the best Paper of the year. Mr. Renshaw is foundry metallurgist at Ford Motor's of Dagenham, and Mr. Sargood is his assistant. The *Meritorious Services Medal* this year goes to Mr. A. S. Worcester, who for 25 years has been a member of the general Council, and active on many committees. He is managing director of Kaye and Company (Huddersfield), Limited.

Founders' Company Visits the Midlands

Members of the Worshipful Company of Founders recently paid a visit to foundries and training establishments in the Midlands. In the illustration (a photograph taken by Mr. F. Arnold Wilson) the party is assembled outside the National Foundry College at Wolverhampton.

From left to right.—Mr. V. C. Faulkner, Mr. D. C. Paterson, Dr. J. E. Hurst, Mr. H. Wilson Wiley (clerk to the Company), Mr. F. C. Munro, Mr. R. B. Templeton, Mr. E. H. Mitchell, Dr. J. G. Pearce, Mr. H. Newton Knights (front row), Mr. J. J. Sheehan (president I.B.F.) (rear), Mr. James Bamford (head of College), Mr. J. L. Wheeler (master of the Founders' Company), Mr. F. Lonsdale Mills, Mr. O. F. Deane, Mr. A. P. L. Blaxter, Mr. P. L. Young, Mr. H. C. Bradbrook (upper warden), Mr. A. C. Jennings, Mr. E. P. Major, and Mr. R. C. Scott.

Loam Moulding of Pump Casings and Impellers*

By E. Clipson

What follows gives a detailed description of the making of a turbine impeller, of the double entry, shrouded pattern type, and also, a volute section of the 102-in. centrifugal pump both as produced by loam moulding. The two examples chosen are but a few of the large loam-moulded castings being made in the Author's foundry at the moment and represent but a small part of an order which has taken almost two years to complete.

Some of the rather unusual points in the centrifugal pump design and manufacture may be of interest. When built-up, the overall height of the pump volute is 23 ft. 6 in. and the whole unit, shown in Fig. 1, weighs 60 tons. To facilitate manufacture, the volute of the pump was made in four sections, each comprising two parts jointed through the vertical centre-line, the largest being the part containing the discharge branch. It will be appreciated that owing to the magnitude of the job in question all the processes cannot be described, but as many interesting details as possible will be covered in the limited space available. When one realises that these large castings are all produced on a floor space of 60 by 40 ft. it is no mean achievement, for it must be borne in mind that each detail has to be carefully planned in order to bring it within the range of the limited lifting, melting and drying facilities.

Introduction

First of all it should be stressed that this is simply a description of two of the numerous methods applied for the production of such castings in loam sand. In the main, they are the ring-prodded method or slotted binder with loose bars method, or a combination of both. At the same time it is not claimed that the practice is new, or that it is the only way of producing these castings.

Before proceeding to outline the general moulding procedures, reference is made to the following important points. In the foundry of the type producing this type of work it is important that complete records of moulding and melting techniques for each casting should be kept. The importance of this is, of course, common knowledge to those engaged on highly-mechanised work as well as to those engaged on large loam-moulded work. To put it bluntly, there must be " no second time of asking " where, anything from 3 to 18 weeks' work and up to 20 tons of metal may be involved on a particular casting.

The records should include information relating to the positioning of runners and risers, their dimensions, time of mould drying, actual weight of each casting, size of ladle or ladles employed, one or more cupolas being used, time to melt, surplus metal and above all, the careful observation of the metal in the charges.

* Paper read before the Lincoln branch of the Institute of British Foundrymen. Mr. Burrell presiding. The Author is foundry manager, Foster-Gwynnes, Limited, Lincoln.

Consideration of the following points must be taken into account before starting the making of a large loam-moulded casting:/

(1) Which is the most practical method of development of the mould in relation to the core, if any, *i.e.* mould first or core first?

(2) Stove dimensions for drying purposes.

(3) Building of a core or a mould to correspond with lifting capacity (10- or 15-ton cranes being available).

(4) Building so as to render the work sufficiently strong to allow a reasonable amount of handling.

It will be observed from the foregoing that the particular job to be described was only just within the limits imposed by the above considerations.

Pattern Equipment

Generally speaking, very little pattern equipment is required on this type of work, resulting in a useful reduction of capital expenditure in the way of timber and patternmakers' time. Before commencing any loam work, it is necessary for the patternmaker to " set out " the casting to be produced at its " full size " on a board in the pattern shop, in this case the size was 13 ft. by 10 ft. This remains available for reference from time to time during the building-up of the work in the foundry. Also, a cross-section is usually required; that, of course, being dependent on the development of the mould. From this, the building of the formers and strickles for the job can be constructed with ease. The patternmakers must have the skill and ability to read a drawing correctly, for in loam-moulded work it has been personal experience to observe the difficulties encountered. It is only too easy to develop a job the opposite hand to that required, this being particularly so in pump work of the type under review.

Loam-moulding Tackle

Since there was no convertible tackle suitable for this job, new plates, grids and binders had to be made, a description of which will be given. One set of tackle was made suitable for both right- and left-hand sections, by reversing the plates and binders after each cast.

Volute Section of the 102-in. Pump

First Stage, Bottom-half Mould

In the production of the volute section, it was

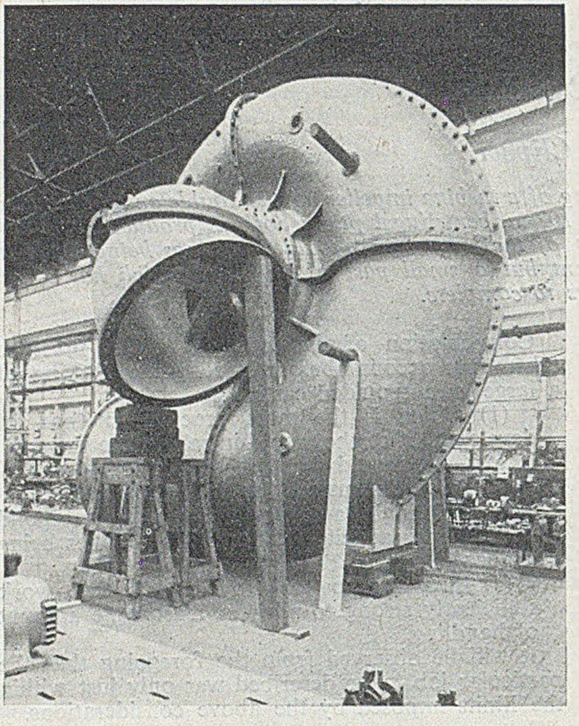


FIG. 1.—*View of the Finished Pump Volute Casting; Overall Height, 23 ft. 6 in.; Finished Weight, 60 tons.*

decided to cast it in one piece; the joint flange and the core being in the bottom part of the mould. First of all a foundation plate weighing 9 tons was cast on the open bed (Fig. 2). Its size was, in this case, determined by the size of the flange plus 12 in. of joint. A cast-iron foot-step was then bolted to this bottom plate to locate a 3-in. dia. vertical steel spindle. To this spindle an arm was attached, on which the various strickle boards were used. A foundation course of brick-work and loam was next laid on, followed by a course of stiff loam, and strickled off level to receive the full joint-flange pattern, in this case 3½ in. thick.

A cast-iron bottom binder, the inside of which conformed to this flange was then placed into position, on top of which a 1½-in. thickness of loam was added to the top side of the flange. This again was strickled off to form the bottom joint of the mould. At this stage, patternmakers are responsible for seeing that all centre-lines, positions of flanges, brackets and formers, are correctly "set out" on the mould joint, the fulcrum point being the spindle centre. The lines are preserved by washing over this joint with thin gum-water prior to stoving. These lines are most important and are one of the secrets of successful loam-moulding. No. 2 strickle board was then fixed, the height being determined by the patternmaker in relation to the mould joint (Fig. 3*a*). In this case, the strickle formed the "eye" of the volute casing.

Building the Core

The core was next built up of bricks and soft loam, roughed up to shape, the inside of joint flange and formers being the guide. The core in this case was not made separately, but was built on the bottom part of the mould, this being reinforced by the inclusion of three cast-iron grids. As the core progressed in shape, ashes and small coke were built in with the bricks leading to a common vent at each end of the core.

After building up roughly to shape, the bricks and loam were thoroughly clay-washed and a layer of 1½ to 2 in. of loam was added, being rammed to the wooden formers at points or lines indicated on the mould joint, the intermediate part being shaped off to the moulder's judgment (Fig. 3*b*). The spacing and position of these points are very important, as incorrect shape of the volute would seriously affect the efficient working of the pump.

This more-or-less completed bottom half of the mould was next transferred to the drying stove for two nights' firing, each about four hours' duration, after which it was put back into its original position on the foundry floor, making certain that it was again truly level.

Formation of Metal Thickness

To form the metal thickness, No. 3 strickle-board was set to form the thickness over the "eye" of the volute (Fig. 4). Provision was then made for the 1½-in. metal thicknesses of the casting. These were formed separately in a frame or corebox if desired. In this case they were of 18- by 2- by 1½-in. dimensions. Each "thickness" piece was rammed-up in loam sand in its particular corebox with two $\frac{3}{16}$-in. dia. wires laid in the full length. A considerable number of these were made, dried, and placed round the core at intervals, as shown in Fig. 5. To do this, a series of saw cuts had to be made across the "thicknesses" to enable them to be "bent" to shape. The intermediate sections were afterwards filled in with loam to complete the casting thickness.

At this stage in the making of such castings patternmakers are employed in the final setting-up of all the trimmings, such as flanges, facings, brackets,

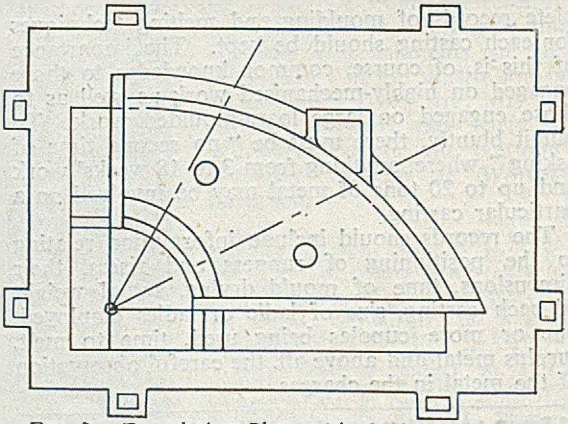


FIG. 2.—*Foundation Plate with the Volute Section Superimposed.*

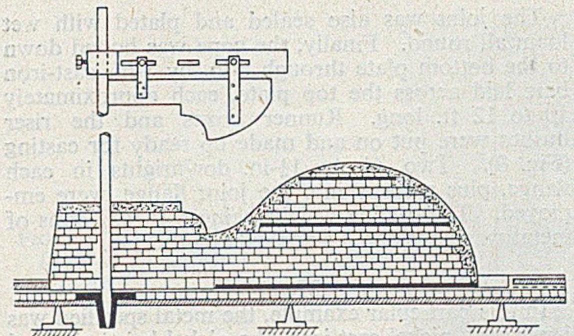


FIG. 3 (*a*).—*Cross-section through the Volute Core, showing Relative Positions of Foundation Plate, Spindle and Strickle.*

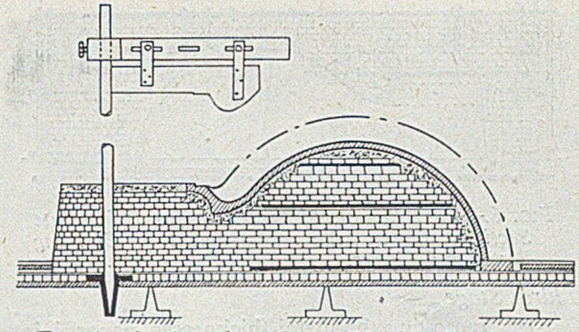


FIG. 4.—*Section through the Mould, showing the added Metal Thickness and Flanges.*

etc. Pieces of paper were clay-washed on one side, and laid over the thickness pieces, including the print itself and print ends of the core. Quite a colour scheme exists at times, all kinds of paper being used. The reason for this paper covering is to ensure a cleaner stripping when lifting off the cope; in other words, its action is the same as that of parting sand.

Second Stage, Cope

Dry sea-sand, or parting sand, was next spread on the joint, followed by a layer of wet loam to a thickness of about 1½ in. A cope-lifting binder, 3 in. thick, weighing 45 cwt., with eight lugs equally spaced, was cast, thoroughly clay-washed and bedded on. Work then commenced on the building of the cope, shown in Fig. 6.

Cast-iron grids were made, carrying a number of 1-in. by ⅛-in. wrought-iron skimmers, and these were bolted to the top of the lifting binder. These grids assisted in supporting the heavy brickwork and the skimmer irons supported the mass of loam immediately above the metal thickness. This was actually the face of the mould in the cope. To ensure stability, courses of bricks were laid as headers alternated with courses of stretchers. The building of the brickwork continued to a depth of about 3 ft., after which another middle binder was " bedded on." The binder was cast with slots incorporated, to take the loose bars, which acted as additional supports for brickwork, and, of course, for resistance to internal strains during casting.

Here again, grids were bolted to this middle binder, in which a number of wrought iron pegs, 1 in. by ⅛ in., were cast. These were subsequently wired up with $\frac{3}{32}$-in. twisted wire to tommy bars, through holes in the top plate. An additional number of skimmer irons, 2 in. by ¼ in., were also built in immediately above the core to assist in the support of the loam and to prevent sagging of the top part.

Two further courses of brickwork were added, followed by a course of black loam. The top plate, weighing in this case 6 tons, was then fixed into position, building bars were fitted in, and the complete cope secured to the other two binders by means of bolts and distance-pieces. About 200 of these building bars were employed to complete the job, each being 33 in. long by 4 in. by ⅝ in. thick, the slots in the middle binder and top plate being 4½ in. by 1 in. to accommodate them, as shown in Fig. 7.

All was now ready to lift the cope, as far as building was concerned, but before doing so, lines and V-notches were made across the joint in the soft loam, to ensure the correct reassembly subsequently. The lifting was done by means of four double-leg chains attached to a beam, the cope being placed on 4-ft. high adjustable jacks for any necessary repairs. The method of stiffening the loam by means of fires underneath has proved very successful for such work in preventing any sagging before transference to the stove for two nights' drying.

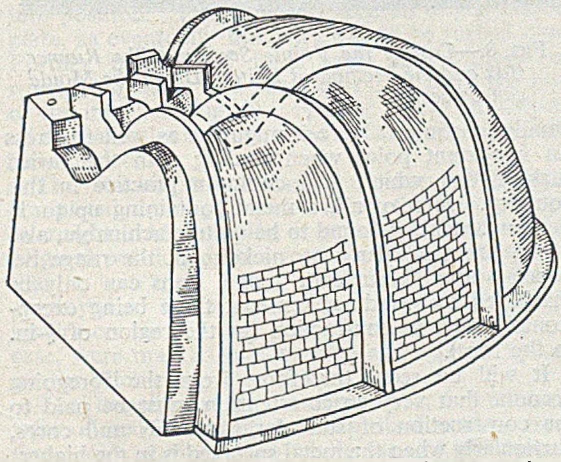


FIG. 3 (*b*).—*Wooden Formers in Position on the Volute Core.*

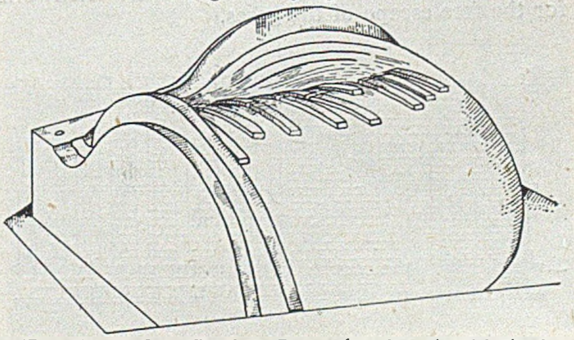


FIG. 5.—*Volute Section Core, showing the Method of Adding the Metal Thickness.*

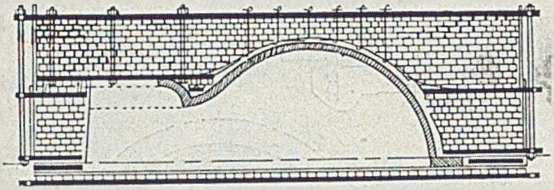


FIG. 6.—*Construction of the Cope for the Volute Section, showing the Arrangement of Carrying Plates and Lifters.*

Third Stage

After removing the metal thicknesses, paper, joint pattern, flanges, brackets, etc., the bottom part after mending-up was completed and then placed in the second stove. Finally, the half-moulds were taken out, the bottom half placed on the foundry floor and the cope lowered on the four jacks as before. Both the mould and core were rubbed down with emery cloth, patched, cracks were made up and the whole finally blacked.

Runner Boxes

As two ladles were being used to cast this job, two special runner boxes were made up separately in cast iron by means of the ring-prodded method, a course of bricks and loam being laid inside the runner boxes and dried in the same manner as the mould.

Assembly of Mould

The bottom part of the mould, including the core, was next put back into the stove once again for final drying, the top part remaining in position on its stands. Drying off was also assisted by "kettle" fires. The bottom part was then fixed into position on the floor (the position decided upon being the most convenient from the casting point of view), and the cope was tried on, the assembly marks around the joint previously mentioned being carefully noted. This was done two or three times before the founders were satisfied that everything was ready for the final assembly.

It should be mentioned at this stage that a square opening was purposely left out of the brickwork at each end of the cope, through which a 2-in. dia. tube was inserted into the ashes and coke of the core. These vent pipes were sealed up in loam sand and finally bricked up and plated, leaving, say, 6 in. of the tube outside of the brickwork for the free escape of the gases.

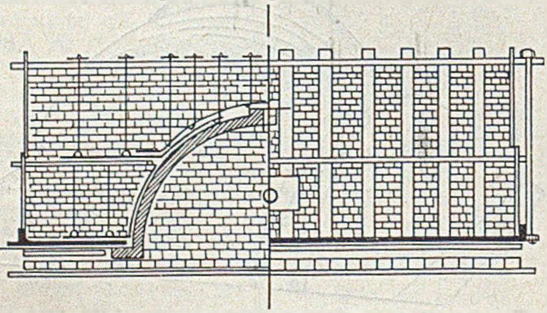


FIG. 7.—*Half-section and Part Exterior of the Assembled Mould for the Volute Section.*

The joint was also sealed and plated with wet loam all round. Finally, the cope was bolted down to the bottom plate through 6-in. by 8-in. cast-iron bars laid across the top plate, each approximately 10 to 12 ft. long. Runner boxes and the riser bushes were put on and made up ready for casting (Fig. 8). Two 4½- by 1¼-in. downrights in each flange, plus a spray into the joint flange, were employed. The casting weight being 6 tons, 8 tons of metal was considered sufficient for the job.

Metal

In this particular example, the metal specified was 1 per cent. nickel cast iron, the nickel being charged in the cupola and not at the spout, as was usual for smaller castings. Here it might be as well to stress an important point when dealing with the varied nickel irons, which is a common practice in this foundry. First of all, a metal containing up to 3½ per cent. nickel is found to be quite machinable, also 16 to about 22 per cent. nickel; but the range between 4 and 12 per cent. nickel irons can only be machined by grinding, some of these being exceptionally high in contraction (in the region of ¼-in. to the foot).

FIG. 8.—*Casting the Volute Section. The Runner Box and the Method of Bolting Down the Mould can be seen.*

It will be seen, therefore, from the foregoing account that very strict attention must be paid to the construction of such large moulds and cores, particularly when the metal specified is in the higher-grade nickel alloys, where anything up to 2 in. of contraction must be taken into account.

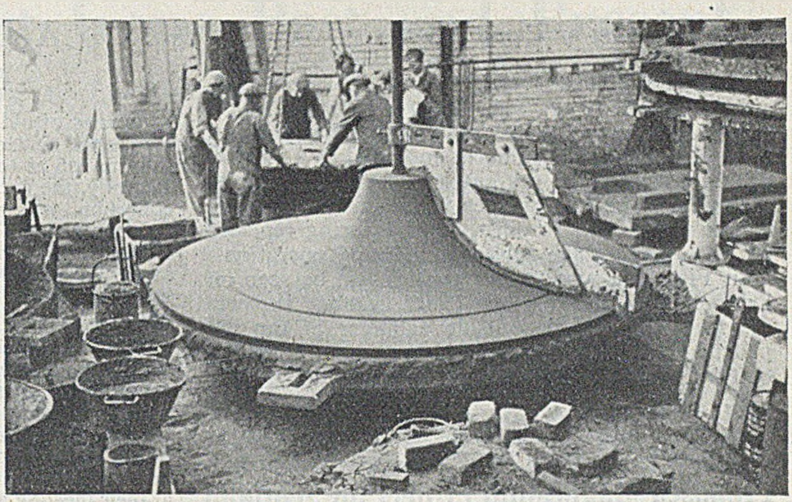


FIG. 9.—" *Dummy* " *Pattern for the Impeller Swept-up Prior to Stove Drying.*

102-in. Pump Impeller

The 102-in. pump impeller, next to be described, was one of the double-entry, shrouded-pattern type with Francis blading, and was of 95-in. dia. over the shrouds, with a tip width of 35 in., and a final casting weight of 10 tons. This again was built up on the foundry floor, which in this case consisted of large cast-iron plates, no pits being available for such a large job. It was decided to commence work on the No. 1 core section first, as this was the more complicated and would take a considerable time to complete.

Dummy Plate

First of all, a cast-iron dummy plate, 10-ft. 6-in. dia. and 3 in. thick, with four lifting lugs equally spaced, was cast on an open-sand bed. A footstep was secured to the centre of this plate and a 3-in. dia. steel spindle was inserted to carry the strickle boards. The foundation course of brickwork was then laid in soft loam, on top of which a circular cast-iron grid, with vertical dabbers previously cast, roughly to the shape of the impeller boss, was set into position. This grid was secured to the bottom plate, as eventually this part was to be turned over. Further bricks and loam were added, made up roughly to shape and strickled off to form the boss of the impeller (Fig. 9). Finally, a very thin slurry of the same loam was mixed up and applied as the finishing coat.

The strickle board was then taken off and the completed dummy transferred to the stove to dry overnight. After drying it was again fixed into its original position on the foundry floor, making sure that it was truly level. Patternmakers were then employed to strike out a series of pitch-circle diameters on the dummy face. The vanes, 12 in this case, were marked off, bisected and equally spaced on the pitch-circle diameters.

The impeller vanes, both right and left hand, were offered into position and scribed round. After these were removed, the whole face of the dummy was covered with a substantial coating of gum water to preserve the construction lines. The dummy was again put back into the stove to dry off. Fig. 10 shows the vanes in position ready for making the first section core; the curved surface of the vanes can also be seen; these at the suction side of the impeller are 5 in. apart at the tip width. The vanes at this point have to be in the vertical position.

The vane patterns are made of cast iron and, as

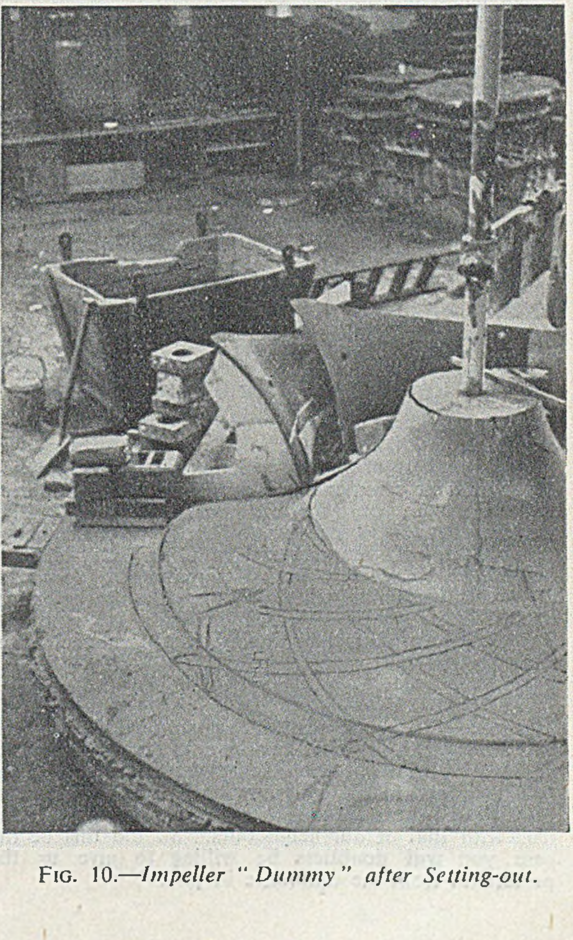


FIG. 10.—*Impeller* " *Dummy* " *after Setting-out.*

Loam Moulding of Pump Casings

each weighs almost 3 cwt., the two holes in each, which can be seen in Fig. 11, have been put in for ease in handling. The first vane was held in position by means of wooden supports, anchored by a number of 56-lb. weights, to prevent it being moved during ramming. The other vanes were similarly secured in due course, the wooden supports being replaced by iron ones for the subsequent drying operation.

In Fig. 10 a wooden gauge-stick can be seen on the boss top, showing the exact distance between the vane tips on the outside diameter of the impeller. This was used from time to time to ensure that the vanes were not being rammed out of position.

(*To be continued*)

Proposed Magnesium Project for Scotland

In consequence of the increasing demand for light-weight metals for rearmament, the case for setting up plant in the Highlands to make magnesium from the local dolomite instead of buying metal from high-cost producers overseas, is to be re-opened immediately. Ministry of Supply are already bringing back into production their magnesium-reduction plant near Manchester, and have also taken control of supply and distribution of all virgin magnesium which is the basis of an increasing number of special alloys, particularly for aircraft construction.

A draft scheme for the Highlands was prepared some time ago by the Scottish Council (Development and Industry)—more precisely by the dolomite group—at the instigation of the Council's mineral-resources panel. It is based on the production of magnesium from dolomite by the ferro-silicon process, for which it is claimed that the consumption of electric power is roughly half that in the electrolytic and carbothermic process. There are large deposits of dolomite in a number of districts—particularly around Loch Eriboll in north-west Sutherland, Durness, and Loch Kishorn in Wester Ross. It has been predicted that the Eriboll and Kishorn reserves could be worked most economically.

Shortage of Steel and Tinplate

Precision Presswork Company, Limited, of Climax Works, Coleshill Street, Birmingham, 4, inform us that they are makers of moulders' chaplets and studs, which prior to their commencing manufacture were imported from Germany or America. For the past 30 years this Company has been able to supply these, but unless the position of raw material improves very shortly, output will be severely cut. If this happens, foundries all over the country will suffer, as will also the export trade. These chaplets and studs being very light, a few extra tons of steel or tinplate would put the matter right.

A Backward Glance

By T. R. Harris

Bundles of old letters, having lain for many years in merchants' and other offices, often contain interesting information as to the mode of working in bygone days. Recently, the writer, having occasion to examine such a collection, was particularly engrossed in a number of references to the foundry industry. Thinking the information which they contained may be of interest to modern foundrymen generally, who mix their metals by analysis and carry out routine tests on the metal produced, he has culled a number of extracts:—

The first letter, written from the Yniscedwyn Iron Works, on September 8, 1837, to a founder in the West of England, contains the following. "Your letter has reached me at the moment that I am about to start for Liverpool for the purpose of bringing my invention of the application of Anthracite Coal to the advantageous smelting of Iron before the British Association at their meeting at that place. I am therefore compelled to write you hastily. I have at this moment not a Pig of the make of this works for sale, but as soon as I can do so, which may be in a fortnight, I should like to send you as sample 20 tons of my Patent Pigs. You will find my *hot blast* Anthracite Coal Iron melt very liquid and in point of *strength* stronger than any English or Welsh *cold blast* iron that perhaps ever came before you. I am now largely extending these works, and in a few months shall be making 250-300 tons of Iron weekly in consequence of the great success of my Patent process . . . because of the very superior kind of Iron which I am now making, under my Patent process, we have been obliged to have our sledge hammer handles made nearly twice as heavy as they were ever before made to break the Pigs for the remelting cupolas, the iron is so difficult to break. (Signed) George Crane.

Two years later, the same writer in a postscript to a letter relating to some blast cylinders the founder was preparing for the iron works, writes: "You would find if you were to remelt with hot blast and anthracite all kinds of iron improved on its strength and fluidity by that process."

In 1845, when soliciting orders for the patent iron, the supplier writes: "We have long had six furnaces in blast, wholly upon anthracite, and presume that we have been turning out a larger quantity of Pig Iron for sale than any other establishment in South Wales (the larger makers have Rail and Bar mills which we have not) . . . there is usually a stock on our wharf and we are keeping two and often three furnaces upon No. 1 Foundry and should be pleased to send you upon such terms as to induce you to favour us with your regular orders."

Cold- or hot-blast iron was often the question to be decided in those days and many engineers and founders were rather conservative, preferring the older material. The producer tried to convince the doubters by inviting them to make practical tests as the following letter shows. William Needham, writing from the Varteg Iron Works, on February 20, 1840, says: "We beg to make you an offer of our pig iron at £4 5s. per ton for No. 1 and £4 for No. 2 each at 6 months' acceptance. We believe you have an objection to hot blast pigs, but from repeated and careful trials, we have ascertained ours to be fully as strong as those made at the Blaenafon or Pontypool Works. Our mode of testing the strength is by ascertaining the weight that a cast iron bar one inch square will sustain suspended from the centres between two bearings three feet from each other and to this trial we would invite your attention in the full assurance that it will show results in a most satisfactory nature as to the comparative strength of our iron with that of our neighbours. Should this be the case you will doubtless be willing to give us the preference from the difference in price."

(*Continued at foot of column one*)

Notes on Cast Iron—Past and Present

By E. Longden M.I.Mech.E.

(*Continued from page* 496)

CUPOLA PRACTICE

The cupola is the principal furnace used for melting cast iron, although the air furnace and the open-hearth furnace are employed to melt cast iron, especially malleable iron. It will be evident from the text of the Paper that the quality and the efficiency of the metal supply will be considerably influenced by the conditions of melting. The greatest success attends the production of well-melted high-temperature metal in adequate supply at the right time and place. The primary consideration is not coke economy—it should be the last.

Mixing and Rotation of Cupola Charges

To obtain economically the desired analyses for the various grades of cast iron which may be needed, calls for a consideration of the following conditions: (1) reliable analyses of metals intended for mixtures; (2) the melting points of the individual metals introduced into the mixtures; (3) the class of metal in respect of density in the solid state, and its freezing point; (4) the amount of superheat necessary in any particular class of metal, and (5)

* Paper delivered early in the session to the Slough section of the London Branch of the Institute of British Foundrymen. Mr. R. B. Templeton presiding.

[*Photomicrographs, Figs.* 21 *to* 45 *are complementary to Figs.* 5 *to* 20, *printed with the first section of this Paper, representing the structure of a selection of the cast irons (including malleable) in use to-day and referred to in the text—Editor.*]

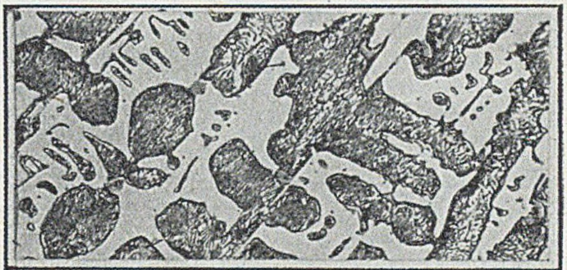


FIG. 21.—*White Iron before Malleablising Treatment (iron carbide in a matrix of Austenite and Pearlite).* ×200. *Etched in Picric Acid.*

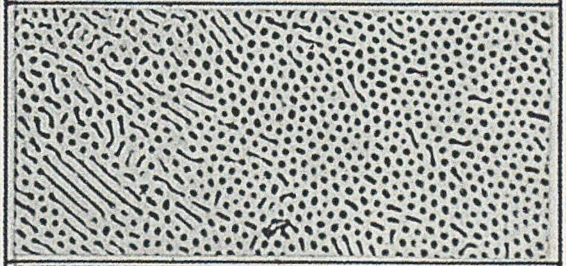


FIG. 22.—*Eutectic White Iron Ledeburite (solid solution of iron carbide in iron, named after the German metallurgist, Ledebur).* ×200. *Etched in Picric Acid.*

FIG. 23.—*Hypo-eutectic White Iron; Primary Austenite Transformed to Pearlite in a Filling of Eutectic.* × 200. *Etched in Picric Acid.*

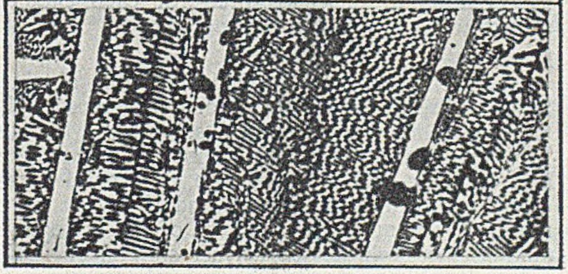
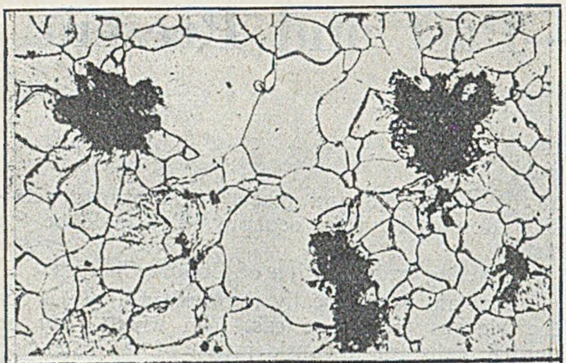
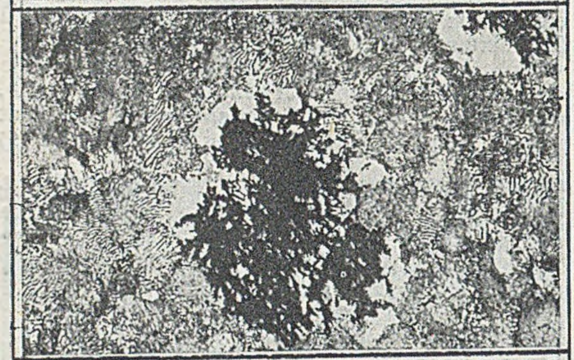


FIG. 24.—*Hyper-eutectic White Iron; Primary Cementite Dendrites surrounded by Eutectic.* × 200. *Etched in Picric Acid.*





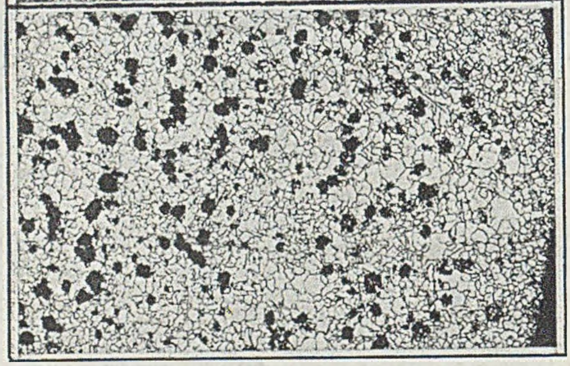
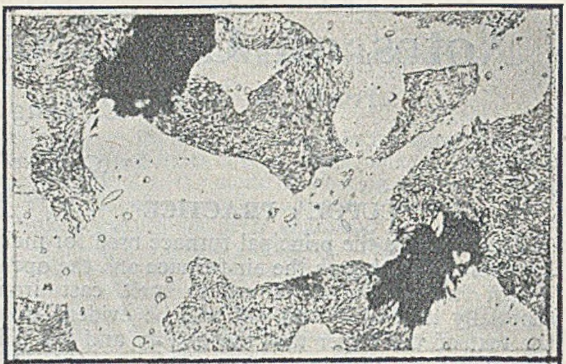
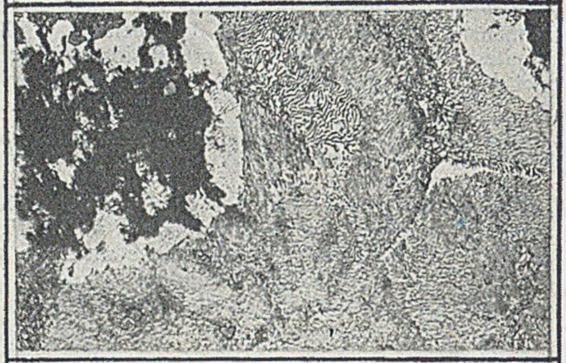


FIG. 25 (TOP).—*Blackheart Malleable Iron.* × 200. *Etched in 2 per cent. Nitric Acid in Alcohol.*

FIG. 26 (MIDDLE).—*Pearlitic Blackheart Malleable.* × 200. *Etched in Picric Acid.*

FIG. 27 (BOTTOM).—*Edge of Blackheart Malleable Iron.* × 50. *Etched in 2 per cent. Nitric Acid in Alcohol.*





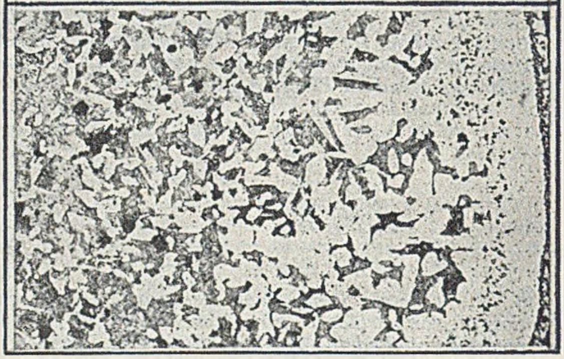


FIG. 28 (TOP). — *Whiteheart Malleable.* × 200. *Etched in Picric Acid.*

FIG. 29 (MIDDLE).—*Whiteheart Malleable (another position).* × 200. *Etched in Picric Acid.*

FIG. 30 (BOTTOM).—*Decarburised Edge of Whiteheart Malleable Iron.* × 50. *Etched in Picric Acid.*

the quantity of metal required for each class of metal during any single melting period.

Mixing

If the class of metal needed be readily obtained from a simple mixture of one or two grades of pig-iron of similar melting points, along with the foundry scrap returns from runner and riser gates and headers, and a proportion of general scrap, compounding is not difficult, and if all the metal required over any single melt be of the same class, mixing is still, however, further simplified. Difficulties increase with an increase in the number and degree of dissimilarity in the classes of metal required during the period that the furnace is in continuous blast.

General irons can be obtained without the use of metals of widely-varying melting points. It is also possible to purchase special pig-irons of uniform analyses and melting points, without resort to two or more classes of metal, which may vary in these respects. Special pig-iron commands a special price and, for certain important castings, such metal may be necessary, but, where economy is desired (generally at all times) in medium- and special-

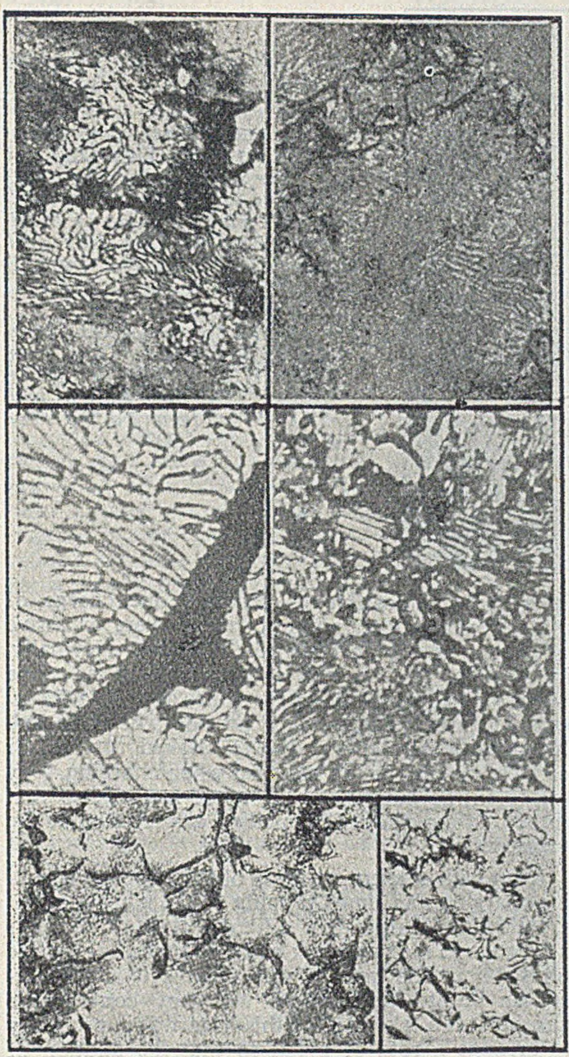


FIG. 31 (TOP LEFT).—*Emmel Iron; Centre of 3-in. Section. Highly Pearlitic, Curly Graphite; Yields 18 to 26 tons per sq. in. Tensile.* × 500.

FIG. 32 (TOP RIGHT).—*Emmel Iron; Edge of 3-in. Section. Highly-refined Pearlitic Structure; Compact Graphite. Yields 18 to 26 tons per sq. in. Tensile.* × 500.

FIG. 33 (MIDDLE LEFT).—*Dechnesne Iron before Jolting. Note Massive Graphite.* ×500.

FIG. 34 (MIDDLE RIGHT).—*Dechnesne Iron after Jolting. Note Refinement of Graphite. Yields up to 20 tons per sq. in. Tensile and up to 32 tons after Heat-treatment.* × 500.

FIG. 35 (BOTTOM LEFT).—*Lanz Hot-mould Iron. A Fine Example of Highly-refined Pearlitic Cast Iron with Compact Refined Graphite, Low Total Carbon, and very Small Amounts of Sulphide and Phosphide. Yields 18 to 21 tons per sq. in. Tensile.* × 150.

FIG. 36 (BOTTOM RIGHT).—*Lanz Hot-mould Iron; Same Iron as in Fig. 35. General Dendrites are Surrounded by Secondary Graphite. Yields 18 to 21 tons per sq. in. Tensile.* × 60.

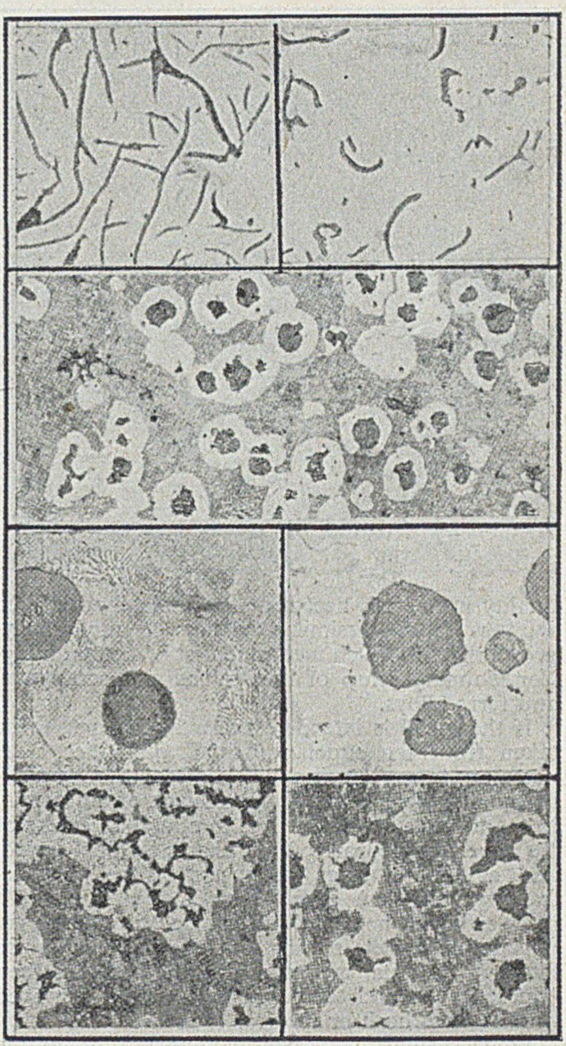


FIG. 37 (TOP LEFT).—*Mond Nickel Company, Limited, Ductile Cast Iron before Treatment, showing Large Flake Graphite Formation.* ×100.

FIG. 38 (TOP RIGHT).—*Mond Nickel Company, Limited, Ductile Cast Iron (Magnesium-nickel-silicon Treatment). Incompletely Treated, showing Compacted Graphite.*

FIG. 39.—*B.C.I.R.A. Nodular Cast Iron. Uniform Spherulitic Graphite, Double Treatment. Mg* 0.04 *and S* 0.018 *per cent.* × 100.

FIG. 40 (LEFT).—*Mond Nickel Company, Limited, Ductile Cast Iron, Magnesium-nickel-silicon Treatment. As-cast Spheroidal-graphite Cast Iron.* ×250.

FIG. 41 (RIGHT).—*Mond Nickel Company, Limited, Ductile Cast Iron, Magnesium-nickel-silicon Treatment. Structure shows Spheroidal Graphite with Ferritic Matrix after Heat-treatment at a Temperature of 725 deg. C. for 8 hrs.* × 250.

FIG. 42 (BOTTOM LEFT).—*Cerium Treated Iron, showing Effects of Single Treatment. Quasi-flake Graphite.* ×100.

FIG. 43 (BOTTOM RIGHT).—*B.C.I.R.A. Nodular Cast Iron, Cerium Treated, showing the Effect of the Double Treatment in Producing a General Nodular Structure.* × 100.

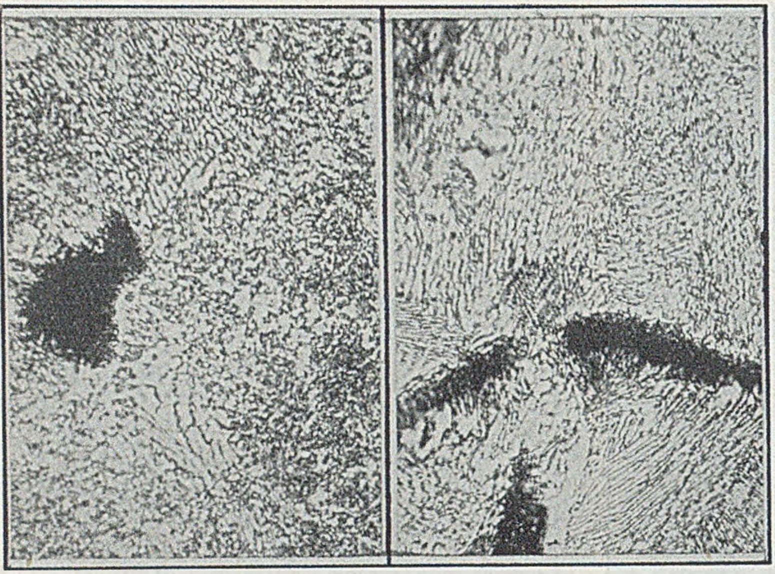


FIG. 44 (LEFT).—*Meehanite Inoculated Cast Iron. Yields 22 to 24 tons per sq. in. Tensile (up to 32 tons per sq. in. after Heat-treatment). Fine Example of Maximum Pearlitic Cast Iron with Refined, Compact Graphite.* × 1,000.

FIG. 45 (RIGHT).—*Grade G.C. Meehanite Inoculated Cast Iron. Yields 17 to 19 tons per sq. in. Tensile. Highly Pearlitic with well-distributed, Refined Graphite.* × 1,000.

quality irons, it is necessary to obtain the required analyses from dissimilar grades of moderately-priced metals. Such metals consist of common pig-iron, foundry scrap of known analysis, scrap steel and ferro-alloys.

If the metal is intended for small castings, to be taken from the cupola in small quantities, it is necessary to avoid using metals of contrasting melting points, there being danger of lack of uniformity in the mixture. It is possible to obtain an excess of the most fusible part of the charge at one period, and, at another stage, an excess of the most refractory metal. A cupola with a deep bosh, or a receiver which holds several charges of metal, may obviate incomplete mixing, but effective changes in the class of metal melted during the heat are then impracticable, and temperatures are not improved when a deep bosh or receiver is used.

When steel forms a considerable portion of the charge (upwards of 5 per cent.) and it is intended for small castings, pre-melting may be resorted to, by making a steel-rich pig-iron as a key metal, to introduce to the general mixture when charging for direct mixtures. A similar procedure may be necessary with medium as for small castings, if steel forms more than 8 per cent. of the mixture.

With medium, medium heavy and large heavy castings, the pre-melting of a steel mix key-metal is quite unnecessary, unless the steel content of the charge exceeds 12 per cent. in the case of medium heavy and 15 per cent. in heavy, to 20 per cent. in very heavy. The various sizes of castings stated has reference mainly to the quantity of metal required for individual castings, although section thicknesses influence the choice of procedure. When large quantities of metal are tapped into ladles from 2 to 25 tons capacity, it will be understood that the ladle quantity ensures a uniform mixing of metal.

Rotation of Charges

It is often necessary to pass two or more classes of metal through a cupola during a day's blow. It is quite impossible to separate one charge of metal from another without feeding very excessive quantities of coke between the charges. Normally, in a 24-in. cupola, two charges will be at some stage of melting at the same time, and, in a 72-in. cupola, three charges may possibly be affected. Irregularity in melting, due to choked tuyeres, or careless placing of the material when charging, may create extraordinary conditions of melting, so that three or four charges of melting are affected at the same period.

Even with efficient working of the cupola, respecting charging and timed tapping of the metal, so that a following charge of a different class of metal is not prone to melt and mix with the preceding charge of metal in the bosh of the cupola, it is still uncertain that one charge will not contaminate another. To take care of this hazard it is necessary to arrange a rota of metal so that the dilution of one distinct class of metal with another distinct class is taken care of. This may be accomplished by taking away metal made up of a portion of the end of the charge, which completes one distinct class of metal, and a portion of the metal from the next charge of a different class of metal. The metal so obtained can be poured into castings requiring the approximate composition of the metal so obtained. Allowance should be made in the mixtures for the quantity of intermediate metal taken from between charges.

The most effective control of differing metals can be obtained by arranging that changes in qualities are as progressive as possible. To illustrate this statement it could be assumed as an extreme case, that six different classes of metal would be required during a day's blow. The analyses were arranged in the order of melting suitable for blending from one quality to the next class most nearly resembling the preceding one.

It is advisable to make the first charge of metal a cleanser of the cupola bosh and to raise the cupola melting conditions for the metal to follow. Table IV shows how a rotation of charges can be arranged.

TABLE IV.—*Suggested Rotation of Charges for Cupola Melting.*

Quality.	T.C.	Si.	P.	Mn.	S.
No. 0 ..	3.25	1.50	0.50	1.00	0.12
No. 1 ..	3.10	1.00	0.30	0.80	0.12
No. 2 ..	3.15	1.25	0.50	0.70	0.11
No. 3 ..	3.20	1.50	0.70	0.70	0.11
No. 4 ..	3.25	1.75	0.80	0.70	0.10
No. 5 ..	3.25	2.00	0.90	0.70	0.10
No. 6 ..	3.30	2.50	1.00	0.60	0.08

The first charge No. 0 would be introduced to enable the best melting period to be employed for the iron requiring the most exact control. This first charge carries away the first dull metal and clears the bed coke area of excessive ash and sulphur (which may reach 0.15 per cent.), the metal following being of a higher temperature and under the best tapping control. This first charge of metal may be poured into unimportant castings, or when refined by soda ash, poured into a pig bed and subsequently used as refined iron.

Calculating Mixtures

To secure from the cupola molten cast iron of determined chemical composition presents some difficulty. The metal, in its descent of the cupola, undergoes certain changes. The iron may gain in total carbon, sulphur and phosphorus contents and lose in silicon and manganese. For any given type of cupola, melting and raw material conditions, these changes in composition can be forecast with reasonable accuracy.

The gains and losses in elements and relative percentages as charged into the cupola may be as follows:—

Silicon at 1.0 per cent. may lose approximately 0.16 to 16 per cent. of the whole. Similarly, silicon at 1.5 may lose approximately 0.18 or 12 per cent.; silicon at 2.0 may lose approximately 0.20 or 10 per cent.; silicon at 2.5 may lose approximately 0.22 or 8.8 per cent., and silicon at 3.0 may lose approximately 0.25 or 8.3 per cent. Compared with the original amount charged, manganese at 1 per cent., along with silicon content of 1 per cent., may lose as much as 30 per cent., the loss diminishing to about 15 per cent. with an increase in silicon up to 3 per cent.

Iron loss ranges between 0.5 per cent. in a 3 per cent. silicon, 1 per cent. manganese content iron, to 1.5 per cent. in a silicon, 0.5 per cent. manganese content iron.

Sulphur pick-up ranges from an increase of 20 per cent. in a 1 per cent. manganese, 3 per cent. silicon iron, to 80 per cent. in a 1 per cent. silicon, 0.5 manganese content iron.

Phosphorus does not alter in the actual amount present in the metal, but in the relationship to the total amount of cast iron left after the losses have occurred during melting. Phosphorus gain is therefore relative and may range between 1 per cent. in metal with low oxidation losses to 2 per cent. in metal with heavier metal losses.

The percentage gains and losses in elements, it will be noted, are inter-related to the amounts of the elements originally present in the metal. Furthermore, the amounts of the elements silicon, manganese and sulphur may be influenced by any special conditions which influence the total-carbon content of the metal, such as when introducing steel to the charge.

It will now be obvious that any attempt to produce metal of a definite composition must be based on an accurate knowledge of the composition of the materials (pig-iron, scrap, steel, etc.) placed in the cupola. With this knowledge, successful mixing depends upon right calculations of the proportions of the various constituents of the charges and the making of due allowances for loss or gain in elements.

Mixing for the common run of castings may be quite a simple matter. From the pig-iron analyses, together with scrap of known composition, one can see at once, without calculation, whether the manganese, phosphorus and sulphur content are within a certain suitable range, so that the only necessary control is that of silicon.

A simple method of calculation is based on a selection and proportioning-out of a range of materials, which will give the approximate required composition. By trial calculation from this the composition is finally arrived at satisfactorily. The number of trials will be determined by the degree of accuracy required and the acquired skill of the calculator. Because silicon is the element which varies most, it will be necessary to start off with a suitable selection to give the approximate silicon contents, but, also, with an eye to the requirements for other elements.

Table V, on the left-hand side, allows for a statement of the analysis of the materials selected,

TABLE V.—*Typical Cupola Mixture Calculation Chart.*

Grades of metal	Charge, lb.	Analysis.					Lb. × per cent. composition.				
		T.C.	Si.	P.	Mn.	S.	T.C.	Si.	Mn.	P.	S.
A. Pig iron	800	3.20	2.20	1.00	0.90	0.09	2,560	1,760	720	800	72
B. Pig iron	700	3.25	2.00	1.00	1.05	0.09	2,275	1,400	735	700	63
Foundry scrap	900	3.25	1.60	0.80	0.65	0.10	2,925	1,440	585	720	90
Steel scrap	300	0.40	0.30	0.03	0.40	0.05	120	90	120	9	15
Bought scrap	300	3.30	2.30	0.70	0.75	0.10	990	690	225	210	30
Total charged	3,000						8,870	5,380	2,385	2,439	270
Approximate composition before melting ..							2.96	1.79	0.80	0.81	0.09
Allowance for gain during melting ..							0.26	—	—	—	0.02
Allowance for loss during melting ..							—	0.19	0.15	—	—
Approximate analysis at the cupola spout ..							3.22	1.60	0.65	0.81	0.11

Notes on Cast Iron—Past and Present

and amount of each class of material which will have a reasonable chance to make up the charge, based on the analysis and the amount charged. The right-hand side of the table gives the amount of each material selected, multiplied by its composition, which, on totalling and dividing by the total amount of the charge, 3,000 lb., gives the composition of the material as charged. The estimation must allow for the gains and losses during melting. As an example, a mixture is required to give the following composition:—T.C, 3.18 to 3.22; Si, 1.60 to 1.65; P, 0.75 to 0.85; Mn, 0.60 to 0.70, and S, below 0.12 per cent.

After one or more trials, the results as shown in Table V may be reached.

The 10 per cent. of steel scrap would, in view of the highly carburising conditions, absorb carbon up to about 3.10 per cent. Sulphur gain would depend upon the amount and quality of the melting coke and flux, along with general melting efficiency. Silicon and manganese loss would also depend upon melting efficiency, especially in respect of oxidising conditions and melting rate. The degree of sulphur absorption would affect the final amount of manganese present in the ladle metal.

When lower carbon contents are desired, the steel additions are increased. Under special cupola melting conditions employing high steel mixtures, carbon can be controlled to under 3 per cent.

Recommended Analyses for Grey-iron Castings

The number of possible analyses for various classes of castings makes the choice of a suitable metal somewhat of a trial for the average manufacturer. With a view to narrowing down the choice, the Author has compiled charts, and recommended the use of the compositions which he has found satisfactory in practice. Compositions I to XIII in conjunction with the Charts, Figs. 2 to 4 and Table III, will give the desired analyses for castings indicated in the lists.

The following will serve as an example in the use of the charts, tables and lists of castings with code identifications:—

Composition required for 1-in. section textile machinery cylinder is indicated in the list. It will be noted that the 1-in. section metal is identified by the code letter P1 in the silicon range Fig. 3 and the remainder of the analyses in Composition V. In this case P1, together with Composition V, will indicate total carbon 3.20 to 3.25, silicon 1.5, phosphorus 0.65 to 0.75, manganese 0.65 to 0.70, and sulphur 0.08 to 0.10.

House Organ

Review. Vol. 1, No. 8. Published by Murex, Limited, Rainham, Essex.

This issue contains two main articles—one on the manufacture of Cemented Tungsten Carbide by Mr. B. E. Berry and a second on Zirconium by Dr. G. L. Miller. They are both really high-grade contributions to technical literature.

Notes from the Branches

Newcastle-upon-Tyne

The annual general meeting of the Newcastle branch of the Institute of British Foundrymen was held on April 14, with Mr. N. Charlton, branch president, in the chair, and some forty members and visitors in attendance. The chairman referred to the secretarial report which made favourable comment on the progress maintained during the session and expressed appreciation of the interesting and varied programme which had been arranged. In his presidential address, Mr. N. Charlton, who visited American foundries as a member of the grey ironfounders' productivity team, had given personal views on the means of increasing productivity in foundries in this country.

The members of the branch visited the Norwood Coke Works, Dunston, on October 14 last year. At the November meeting, Mr. L. Walker, a director of Noble & Lund, Limited, presented a Paper entitled "Cast Iron and the Development of Heavy Machine Tools."

In December the branch-president and three other members of the grey ironfounders' productivity team gave their views on the various branches of the American foundry industry. The visitors were so well received and members were so enthusiastic that the discussion would have lasted throughout the night had the chairman not brought the meeting to a close.

The president of the Institute, Mr. J. J. Sheehan, B.Sc., accompanied by Mr. T. Makemson, M.B.E., general secretary, visited the branch in January, and were welcomed by the branch-president. In a short address, Mr. Sheehan encouraged members to persuade their fellow craftsmen to join the Institute, and with the knowledge at their disposal, thus help in the everlasting fight against blowholes, rat-tails, scabs and all those other foundry defects. A new film on the sand storage and conveyor plant recently installed at the Coneygre Foundry, Limited, the president's works, was then shown, and this was accompanied by Mr. Sheehan's own commentary.

During the afternoon of February 10, members visited the assembly shops of A. Reyrolle & Company, Limited, Hebburn, where the use of castings in the manufacture of electrical apparatus was noted. March brought the report of Sub-committee T.S.23 on the "Repair and Reclamation of Grey-iron Castings by Welding and Allied Methods," given by Mr. Gordon Musted, a member of the Sub-committee.

After the adoption of the financial report on a proposal by Mr. H. Smith, seconded by Mr. C. Lashly, the following members were elected to office for the session 1951-52:—*As president*, Mr. C. Lashly, M.C.; as *senior vice-president*, Mr. F. J. Pittaway; as *junior vice-president*, Mr. R. M. Ainsley; as *members of branch council*: Mr. T. A. Purvis (re-elected), Mr. J. T. Fletcher, Mr. C. W. Stewart. Mr. F. J. Pittaway agreed to act as *representative to the general council*, and Mr. G. Elston and Mr. R. F. Hudson, as *joint representatives to the technical committee*.

In conclusion, Mr. Frank Hudson, the leader of the non-ferrous productivity team, presented a film entitled "The Brass Trail," which was taken during the team's visit to America. An interesting discussion followed this excellent film, and a vote of thanks to Mr. Hudson, proposed by Mr. Lashly, was carried with acclamation.

MR. F. W. E. SPIES, the popular president of the International Committee of Foundry Technical Associations, has been created an Officer of the Order of Orange-Nassau. We congratulate Mr. Spies on his well-merited honour.

Association of Bronze and Brass Founders

Annual General Meeting

At the annual meeting of the Association of Bronze and Brass Founders, the President, Mr. George F. Mundell was re-elected, as were all the other officers. Additionally, Mr. J. Fallows, of Polygram Foundries, Limited, and Mr. W. B. Leigh, of Gresham & Craven, Limited, were elected to the Council.

President's Report

Mr. Burrell, in the course of his report, said the past year, and especially the past few months, had caused members a good deal of concern and the Council, which had met five times since the last general meeting, had given careful attention to current problems.

Membership

The ordinary membership remained constant. The Association had suffered the resignations of members of considerable influence and, although they had assured us that this was not to be taken as any reflection on the usefulness of or their respect for the Association, it was nevertheless a matter of great regret. Happily there had been gains as well as losses. The new members, whom he heartily welcomed, had been interested mainly through the area meetings and the enthusiasm of those members who attended them.

He felt sure that the action taken by the Council to invite Mr. Frank Hudson, Mr. V. C. Faulkner, Mr. F. C. Evans and the American equivalent of the A.B.B.F. to accept Associate membership would have their full approval; this not only recognised the valuable services rendered to the Association by these gentlemen, but greatly strengthened the Association.

Area Meetings

Meetings had been held in all areas except the Scottish centre. He knew from experience that these area meetings were most valuable; they enabled the Council and the secretaries to report to members but, what was more important, they formed a ready means of bringing members' views to the Council and of urging action on subjects which interested members. He asked members to bring forward suggestions, because the Council were always happy to receive them; the area meetings were a source of ideas and of fellowship and he urged members to make full use of them. They were usually held quarterly but, if something of urgency and importance arose, there was no reason why a meeting should not be called specially to deal with it.

Metal Matters

The Council drew the attention of the Ministry of Supply as early as the commencement of November last to the unfortunate and severe effect on industry of the rationing of zinc. Since then it had been pointed out that members were in great difficulty due to the shortage of scrap and secondary metal and had been urged that virgin metal should be released to members at least for priority orders. The Council had also supported the action taken in Parliament to ventilate such matters. The Ministry promised to consider any such applications sympathetically—but they could only pay Paul by robbing Peter. A bolder buying policy by the Ministry 12 months ago would no doubt have averted or postponed the present troubles, but it was difficult now to prescribe a speedy cure—the best hopes were for a lessening of international tension, for there was no doubt that the shortage of non-ferrous metals, with the possible exception of zinc, had a political background. The Council would most certainly watch this matter carefully and initiate any action which might be usefully undertaken.

Statistics

There were at present no reliable figures of the metal requirements of the non-ferrous foundry industry. This was a serious matter, and the present published figure of, for copper, some 37,000 tons per annum was frankly misleading and detrimental to the industry. For this reason he urged members to comply with a request which they would shortly receive from the British Bureau of Non-ferrous Metal Statistics for simple figures of production for 1950 and possibly 1949. This Bureau was writing to all known non-ferrous founders in Great Britain in an attempt to produce statistics relating to the industry which will be of real value.

Conditions of Sale

The exceptional conditions under which the industry had been trading had led to suggestions that prices should be those ruling at date of delivery. The Council had, however, felt that this would be an undesirable step and that it was most desirable that, when an order was accepted, it should be at a fixed price; detailed advice on this had been given in the Bulletin of the Association.

Technical

Turning to technical matters, the President was pleased to note the continuing enthusiasm and initiative of the technical committee and to express the Association's appreciation of the work done by members both in the committee itself and in representing the Association on other bodies; Mr. P. D. Crowther would present a full report.

Research

The research group had now been formed, and he looked forward to it growing. Not all members who undertook the support the Group had yet signed the official application form for membership—he thought they should advise the secretaries of their intentions at an early date. Many members had expressed the view that the industry should give strong support to research work, the research group provided a means of doing this at a cost proportionate to the size of the firm, and which was not unduly onerous.

Association of Bronze and Brass Founders

Productivity Team

Since the last general meeting the Brass Foundry Productivity Team had been to America and compiled their report, which was the largest and most comprehensive report yet compiled. The Council had decided to order a large number of copies of the report. One copy would be issued free to each member firm, but the Council was not sure how many more copies would be required; many firms might wish to distribute them to certain employees, and members were therefore urged to let the secretaries know their requirements as soon as possible, as it was desirable to make the initial order as large as possible in order to keep down the published price. The members of the Team had worked very hard both during their visit and since their return to make available information which should be of great interest and benefit. The president had no doubt that when the report was published and the time came to discuss it they would be found ready to give of their time and energy to ensuring that it was fully understood and amplified where desired. The council was indeed greatly indebted to them and extended them their thanks.

A copy of the film taken during the visit of the Team was available and would be shown later. It was available to members on loan.

Recruitment and Training

The National Foundry Craft Training Centre to which during the year a hostel had been added, continues to serve the industry well. It did, however, need a regular supply of boys to train, and he asked members to consider if there were any suitable apprentices in their works whom they could enrol. This was one of the forces at work alleviating the bad reputation from which the foundry industry suffered and merited their best support.

Federation of British Industries

At the last general meeting the council was empowered to apply for membership of the Federation of British Industries if they considered that this was desirable. Whilst fully recognising the importance of that organisation, the council had felt that, having regard to other commitments, this step was not justified at the present time. They came to the same decision in regard to the National Union of Manufacturers.

Recently at the council meeting a delegation was appointed to meet the ingot manufacturers and representatives of the Ministry of Supply to see if they could get more metal for members.

In addition to the main items outlined, the secretaries, with the guidance of the officials of the Association, had continued to deal with the many day-to-day requests for assistance from members which was not the least valuable function of the Association.

Personal Remarks

The president expressed the gratitude to members who supported the Association the previous night at the theatre party and dinner and dance following. Members and their ladies numbered 64, which was a very good attendance and it was a very successful evening, but he thought members could do even better; by organising social activities in their areas members would strengthen the Association.

It was with the deepest regret that he reported the death in January last of Mr. A. Crowther, who was a valued member of the council. Due to the resignation of the Glacier Metal Company, Limited, the council and technical committee had lost the services of Mr. D. T. Holligan, who had served the Association so eminently since its formation. He was sure that members would wish to place on record their appreciation of those services.

His thanks were due to the very many members who served the Association so well, as members of the council, technical committee, or representing the Association on various allied bodies to which it was affiliated.

His personal thanks were freely offered to the invaluable secretaries—who were always ready to assist any member, and had made his year of office not one of labour but one of pleasure.

Technical Report

Mr. P. D. Crowther, chairman of the technical committee, in the course of his Report, said in the past year, during which time the technical committee had held its normal quarterly meetings, it had been occupied mainly with completing and advancing work which was already on its programme when he reported to the members a year ago. There had been some changes in the membership of the Committee. It had, with great regret, lost the services of Mr. P. T. Holligan, but were pleased to welcome back Mr. F. C. Evans. Mr. A. R. French had replaced Mr. E. F. Hodges as J. Stone & Company's representative.

The report on the "Operating Costs of Metal Melting Furnaces" was completed and published in May last and he believed it furnished much interesting information. There had been suggestions that the report should have given optimum efficiency running costs, but the Committee felt that the great value of the report lay in the fact that it gave actual running costs under normal conditions. The preparation of such reports involved expenditure of much time and money and in accordance with the policy of the committee, which had been endorsed by the council, this report had been made available only to members of the Association.

Work was all but completed on a report entitled "Metal Losses in the Foundry." This dealt not only with the ways in which metal was lost and how to minimise such losses, but also with methods of recovery of metal which was unavoidably lost. It was felt that at present, when metal was so short, the report would be of particular interest. It was, it should be pointed out, a preliminary report based on knowledge existing within the technical committee; it was hoped it would stimulate members to make their own investigations and acquaint the committee with the results.

The committee had carefully examined a number of draft standards for materials of interest in the foundry industry; it had also agreed with the

(*Continued on page 532 at the foot of column two*)

Cleaning Castings Chemically*

By R. J. Peters

In launching the manufacture of an advanced form of automatic transmission for passenger cars, Warner Gear Div., Borg-Warner Corp., gave considerable thought to the problem of cleanliness so vital in the operation of an automatic transmission. For example, the transmission case, a grey-iron casting of considerable design complexity, has many pockets and corners inaccessible to conventional cleaning or blasting methods. Yet it is imperative to have clean castings absolutely free from foundry sand.

Starting with this concept of absolute cleanliness, three major castings were selected—the transmission case, planet cage, and coupling—for chemical cleaning before machining. In addition, the transmission case is given an initial stress-relief treatment before cleaning to stabilise the structure and assure close dimensional tolerances in the machining stages.

The cleaning process selected for the purpose is an appplication of the well-known Kolene technique. Briefly, cleaning is done in an automatic cycle, self-contained unit using Kolene No. 4 reducing salt-bath of the electrolytic type. Not only does this process dissolve all sand in the pockets of the castings, but it also dissolves all sand inclusions in the surface of the castings. Moreover, it has been found that Kolene removes rust and scale at the same time.

Another attribute of the process is that it serves as a positive means of checking casting quality In the process of dissolving sand and removing rust and scale, this method of cleaning uncovers surface defects such as porosity and cracks, defects which ordinarily remain undetected until machining cuts are taken. This has a salutory effect on improving foundry practice, preventing loss of time and productive labour in machining.

* An abridged version of an article printed in the *Iron Age*, under the full title "Automatic Transmission Castings Cleaned Chemically," and reproduced by courtesy of the Editor.

Tool Breakage Reduced

Machinability has been greatly improved and tool-life extended by the preparation of clean metal surfaces free from sand and scale. At the same time, tool breakage, which can be responsible for shutting down a transfer machine line, is virtually eliminated.

The Kolene unit, developed in co-operation with the Warner Gear. Div., is a self-contained machine consisting essentially of three individual baths: The first is Kolene No. 4 salt-bath; the second, an agitated fresh cold-water rinse; the third, a hot-water rinse. The cycle of operation is completely automatic, served by a heavy-duty Jervis B. Webb monorail conveyor system. The closed conveyor system contains 14 special carriers, each designed to hold a total of 42 cases. Since each case weighs 42 lb., the total load per carrier is about 1,764 lb. Average floor to floor time is around 20 min. per carrier load. Fig. 1 shows a view of the loading and unloading station for the Kolene unit.

Smaller parts are loaded in special baskets that fit in the space for two cases, thus accommodating 21 basket loads per carrier. Each basket holds about 80 lb. of parts to assure a standard carrier

FIG. 1.—*Loading and Unloading Station for the Kolene Unit. One Carrier, holding 42 Transmission Cases, is lowered to Working Level, along with a Section of Load-carrying Rail. Cases on the Pallet in the Foreground are Stress-relieved and ready for Loading.*

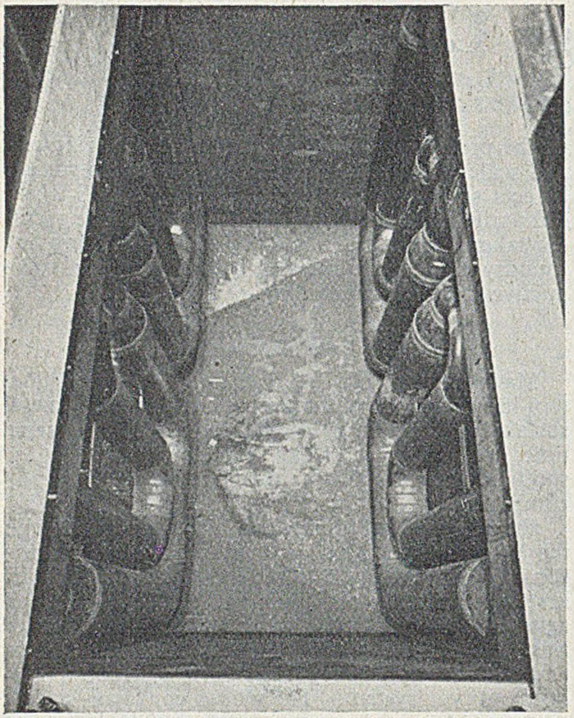


FIG. 2.—*Immersion Tubes for Heating the Kolene Tank Form a Specially-designed System. The Gas Flame is Induced into the Tubes by Suction Fans.*

loading of work at all times. Before cleaning, all transmission cases are given stress-relief treatment in a Hagan gas furnace; work is held in the furnace for 2 hr. at a temperature of 1,100 deg. F. (590 deg. C.).

The Kolene bath—the first unit at the loading end—uses Kolene No. 4, a catalysed molten salt-bath containing sodium hydroxide as the basic solvent. The bath is held at a temperature of 440 to 480 deg. C., controlled by Leeds & Northrup "Micromax" recording instrument. The bath is heated by means of Surface Combustion atmospheric gas-burner equipment; the flame is introduced through five specially-designed immersion tubes mounted in the tank (Fig. 2).

Electrically-energised Bath

The salt bath is energised electrically by means of a Udylite rectifier installation having a maximum d.c. output of 4,500 amp. at 6 volts. Current is applied only for chemistry, since this is not a plating bath. The amount of current required is quite moderate, about 57 kwh. handling 2½ carrier loads per hr. The amount of heat required is also moderate—around 2½ million B.T.U. per hr. max. In operation, whenever the salt, work, and negative current make contact, nascent reducing members are formed which dissolve sand and scale. Oxidation members are formed at the opposite pole (the pot) while reducing elements are formed at the work. Dissolved sand, oxides and other impurities sink to the bottom of the pot, where a suitable sludge disposal pan is provided for the collection and disposal of the residue. Sludge disposal as well as addition of cleaner is handled in a separate zone at the rear of the unit, making it possible to take care of these service operations without interfering with the operation of the unit in any way. A sludge pan is usually removed about once a week. No chemical additions are made to the Kolene bath, except for the replacement of drag-out.

Automatic Conveyor Used

The second stage of the unit is the water-rinse into which the work is immersed immediately upon leaving the Kolene bath. This 900-gall. tank is provided with a free-flowing supply of fresh water. To assure intimate rinsing of the work, the tank is fitted with two power-driven agitators, which give mobility to the bath. The hot-water rinse—the third and final stage—has a capacity of 900 gall. and is heated by steam to a temperature around 180 to 190 deg. F. (about 85 deg. C.).

The automatically-operated conveyor system is another of the major features of the installation. Loading and unloading is done at one station; at this point, the carrier as well as a section of the load-carrying rail is raised and lowered by means of a hydraulic cylinder. While the carrier is lowered for unloading and loading, the entire conveyor system is stopped.

Similarly, the carriers in the three zones of the cleaning bath are simultaneously lowered to immerse the work in the three baths, and raised when the cycle is completed. This operation is performed by another hydraulic cylinder. The working cycle is:—(1) Unloading and loading of the carrier; (2) simultaneously raising the loaded carriers; (3) sealing doors at the loading and exit ends; (4) automatic advance by one station, at a rate of about 11 ft. per min.

Three sets of hydraulic cylinders are involved in the operation of the unit; these are arranged for a specific sequence of cycling. The hydraulic system is controlled with a self-contained Vickers unit installed at the side of the machine. Another electrical control cabinet is arranged at the side for controlling the intermittent operation of the conveyor system.

The entire unit is sealed and protected by means of an exhaust system overhead.

Lift-out Crucible Furnace. Morgan Crucible Company, Limited, of Battersea Church Road, London, S.W.11, have just released a four-page leaflet which describes and illustrates a range comprising four sizes of an oil- or gas-fired lift-out crucible furnace. On page 3 there is a useful table which sets out for each size of furnace the melting performance figures when dealing with aluminium, brass, gunmetal, copper and cast iron. On the opposite page there is a diagram and a table from which the space and other data required for installation can be quickly appreciated. Finally, on the back page, data for shipping is tabulated.

Casting Faces Without Taper

By " *Chip* "

Taper is necessary on patterns to enable them to be easily removed from the mould. Whereas the moulder desires the maximum taper possible, occasionally because of other considerations, portions of the casting are required to be as free from taper as possible and the customer specifies on the drawing "this face to be cast square with face, A." When constructing the pattern, the patternmaker must make provision for complying with the customer's request. There are a number of ways by which taper may be eliminated on certain faces of a casting, the method employed depending largely on the position of the face and the number of castings required.

Fig 1(a) shows a simple case, face, B, is required to be cast square with the back and to be used without machining for the attachment of a mild-steel forging. In this instance, ample taper could be allowed on face, C, and if there was only one of these faces desired square the taper would be sufficient to allow of the removal of the pattern.

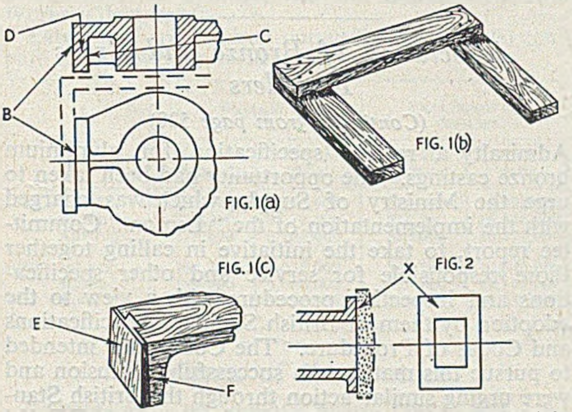


FIG. 1(*a*).—*Part-section of a Pattern on which Parallel Faces are required;* (*b*) *Improvised Strickle, and* (*c*) *Parallel Face formed by a Loose Piece.*

FIG. 2.—*Right-angle Faces produced by the Use of a Core.*

As it happened, however, there were two of these faces, one each side of the centre and thus the two square faces tended to bind the pattern in the sand. An improvised stripping plate shown in Fig. 1(b) could be used in accordance with the dotted lines in Fig. 1(a), but perhaps the better way would be to make the portion D of the pattern in two pieces as shown in Fig. 1(c), in which part, E is loose, being held in position with a dovetail, the generous taper at, F, allows of the main pattern to be easily removed and the loose piece is subsequently extracted. Another way would be to form face, B by means of a core, but this means would not be economical for the example chosen.

The case of a small pedestal, Fig. 2, jointed through the centre line is, because of other detail not shown, an example of the casting of a square

(*Concluded at the foot of column two*)

Restricted Vent Causes Waster

By " *Coroner* "

The need for the rapid evacuation of gas from a mould and core is well known among foundrymen, but occasionally a batch of wasters is encountered due to a moulder overlooking this simple fact. A particular example recently coming to the writer's notice well illustrates this. A casting carrying a number of cores was being made in fairly large batches quite successfully, when, for no apparent reason, scrap occurred because of gas holes. As the core was fairly large and exposed a substantial face area to the print impression in the under-surface of the mould top part, the defect could not be easily accounted for. Fig. 1 shows a sectional view of the core in position in the top box; A being the print and B. the core. At first it was suspected that the core was not sufficiently vented but it was found that the interior was filled with cinders connected to the print portion by a $1\frac{1}{2}$ in. dia. outlet, C, which, it was considered, would enable the gases to get away very quickly.

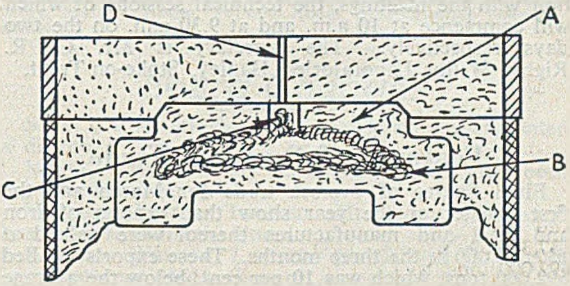


FIG. 1.—*Part Cross-section through a Mould, showing a Large Core contained by the Top Part.*

The next line of approach was to investigate the core assembly. It was found that a different workman was on the job, who, instead of ensuring that the large vent was connected to the atmosphere by means of a similarly large hole in the mould, simply relied on a $\frac{1}{4}$ in. dia. vent as shown at D. This was the cause of the gas holes, as the gas generated during casting, rushed through the large vent in the core and, when endeavouring to get away through the top part of the mould, became confined, setting-up a back-pressure which caused local blowing off the core, not sufficient, however, to draw attention of the pouring crew, but enough to cause defects. Reverting to a larger vent in the top part of the mould connecting the core with the atmosphere resulted in resumed production of good castings.

---

face by means of a core. In this instance, the core print is extended to cover the whole of the face X and this portion of the casting is carried in the core, a square face being more easily formed in a core than in a mould.

British Ceramic Society

The Spring Meeting of the Refractory Materials Section of the British Ceramic Society will be held in Sheffield on June 6 and 7, Mr. W. Boyd Mitchell, M.B.E., presiding. The morning technical sessions will take place in the Royal Victoria Station Hotel, Sheffield. The Papers to be presented are as follow: "Low-alumina Silica Bricks for Open-hearth Furnace Roofs," being presented and discussed in the following sections:—"Raw Materials," by Mr. W. Davies (United Steel Companies, Limited); "Manufacture," by T. R. Lynam, A. Nicholson, and P. F. Young (Oughtibridge Silica Firebrick Company, Limited); "Properties and Performance," by J. Mackenzie (United Steel Companies, Limited); "General Summary and Conclusions," by Dr. J. H. Chesters (United Steel Companies, Limited).

On the following morning, Thursday, June 7, there will be a Paper on "Trials of Refractories in Steel Plants," by J. Pluck (Steel, Peech & Tozer), and a discussion, on the refractory manufacturing and using industries abroad, under the title of "Foreign Impressions," introduced by Dr. J. H. Chesters, supported by two users and two manufacturers of refractory materials.

There will be a number of works visits in connection with the meetings, the technical sessions of which will commence at 10 a.m. and at 9.30 a.m. on the two days respectively. The secretary is Mr. G. R. Rigby, Mellor Laboratories, Hanley, Stoke-on-Trent.

Features of Overseas Trade

Final figures of oversea trade for March and the first quarter of the year show that exports of iron and steel and manufactures thereof were valued at £37,300,000 in the three months. These exports totalled 692,000 tons, which was 10 per cent. below the average quantity exported in 1950. Exports of non-ferrous metals and manufactures totalled £21,200,000 in the first quarter, compared with an average of £19,200,000 for 1950. This was due largely to increased exports of partly worked gold, which amounted to £1,900,000 in the opening three months of this year. Exports of all manufactured goods at £506,500,000 in the first quarter compared with £521,300,000 in the fourth quarter of 1950 and were 8 per cent. above the 1950 average.

Exports of raw materials in January-March, 1951, totalled £23,900,000, which was 9 per cent. below last year's average, coal exports being more than halved.

Speaking at Gillingham (Kent) recently, Mr. A. G. Bottomley, Secretary for Overseas Trade, said that in the last few years one-half of our exports had been provided by the metal and engineering industries and it was this sector of our economy which would be feeling most the effects of rearmament. In order to safeguard our essential defence and home needs there would have to be some cut in our exports of metals and other raw materials and at best we could do no more than maintain the 1950 volume of engineering exports.

Export of Iron and Steel Goods

From Monday last, the export of iron and steel goods under open general licence was permitted only if the value exceeded the value of the iron or steel content, calculated at £30 per ton. Under a similar previous announcement, which is revoked, the value was £21 per ton.

American Die-casting Methods

A team formed under the auspices of the Anglo-American Council on Productivity, with E.C.A. technical assistance, to study die-casting, left this country for the United States on May 8. Its 17 members have been drawn from the zinc and aluminium pressure and gravity die-casting industries through the co-operation of the Zinc Alloy Die-casters' Association and the Light Metal Founders' Association.

It is believed that not only is die-casting more widely used in the U.S. than in the U.K., but also that greater productivity is achieved in the manufacture of similar components. The team will be engaged primarily in seeking the reasons for these two differences, lead by Mr. C. R. Lyons, of the Imperial Smelting Corporation, assisted by Mr. H. E. Robinson.

Coke for Industry

The Minister of Fuel and Power stated recently that industrial consumers should receive the coke they need for current use during the summmer months. In addition, he proposed that, so far as the supply of the various qualities permitted, supplies should also be provided to enable them to build up their stocks by the end of October to an average of six to eight weeks' winter consumption.

Association of Bronze and Brass Founders

(*Continued from page* 528)

Admiralty a revised specification for aluminium bronze castings. The opportunity had been taken to urge the Ministry of Supply, which was charged with the implementation of the "Lemon" Committee report, to take the initiative in calling together those responsible for service and other specifications and inspection procedure with a view to the adoption by them of British Standard Specifications and Codes of Procedure. The Committee intended to pursue this matter to a successful conclusion and were urging similar action through the British Standards Institution; the representatives on the N.F.E./14 Committee of that body, Mr. E. R. Higgins and Mr. H. T. Rutter, could be relied upon to present the case fairly and forcefully.

The Committee looked forward to learning much from the labours of the Productivity Team—already a fracture test for gunmetal which the American Society requested Mr. Hudson to have investigated in this country was being tried out.

An event of the year of outstanding importance had been the formation of the research group which the Committee welcomed and which did not conflict with the work of the technical committee; indeed, the technical committee had no facilities for research; their work consisted of the presentation of their considered views on committees of various official bodies, and the preparation of reports from information supplied by members.

There was still a wide field of opportunity open to the technical committee to assist members and its members would be happy to do their best if firms would make their difficulties known; they would also be pleased to have suggestions for work of a more fundamental character which might usefully be carried out.

Iron and Steel Output Down

Shortages of certain raw materials are reflected in steel output during April. Production in that month was at an annual rate of 16,771,000 tons, compared with 16,822,000 tons in April, 1950, when output was affected by the Easter holiday. Last month's output was, however, higher than March, when some production time was lost by the Easter vacation.

It will be recalled that the Minister of Supply said recently that steel output this year would be restricted because of shortages of raw materials.

Pig-iron production declined heavily last month. The annual rate of 9,280,000 tons in April compares with 9,572,000 tons in March and 9,492,000 tons in April of last year. Last month's pig-iron output was at the lowest level since last August.

The South Wales Siemens Steel Trade Joint Board announced in Swansea last week that three West Wales steelworks would be closing shortly. The announcement said that because of the serious shortage of raw materials, very much aggrevated during the last few weeks, it had become necessary that these plants should cease operation almost immediately. Closure of the plants will lead to a lower output of steel ingots, but the supply of tinplate bars is to be fully maintained, the announcement added. The three works are the Bryngwyn Works at Gorseinon, the Landore Works at Swansea, and the Briton Ferry Old Works, Glamorgan.

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
March	184,100	9,572,000	318,200	16,546,000
April	178,500	9,280,000	322,500	16,771,000
1950—1st qtr.	186,100	9,677,000	320,700	16,679,000
March	186,500	9,696,000	329,800	17,147,000
April	182,500	9,492,000	323,500	16,822,000

Foremen of the Future

"There are, no doubt, many faults with our present foremen, but these are due largely to neglect in the past, unsuitable selection, and lack of training. The problem that faces industry to-day is the recruitment, selection, and training of prospective supervisors and the development of existing foremen," said Mr. F. J. Burns Morton, a director of A. E. Hawley & Company, Limited, when he spoke at the third national conference of the Institution of Works Managers at Southport recently.

Foremen of the future, he said, should have a better general education, more precise technical training, special instruction in supervision, and, above all, pre-training before appointment. For training younger supervisors, use could be made of technical colleges, formal lectures, textbooks, and periods of training and practice in various departments as assistant foremen.

Mr. Morton said that the training of older foremen could best be accomplished through the conference method taking concrete problems as distinct from general principles.

Mr. B. O. Davies has been elected chairman of the Tees Conservancy Commissioners in succession to Mr. George West Byng, who has resigned for health reasons.

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.

BELFAST, May 22—Steel-back sliding ladders, cast steel magnet brake shoe castings, etc., for the City Council. The Transport Department, Sandy Row, Belfast.

BIRMINGHAM, May 24—Tubes, fittings, tools, etc., for the City Council. The City Engineer and Surveyor, Civic Centre, Birmingham, 1.

BIRMINGHAM, May 24—Iron and mild steel bars, sections, plates, etc., tools, screws, cotter pins, etc., for the City Council. The General Manager, Birmingham City Transport, Council House, Congreve Street, Birmingham, 3.

BLACKPOOL, May 31—2,000-3,000 cast-iron stopcock boxes, for the Fylde Water Board. Mr. F. Law, engineer to the Board, Sefton Street, Blackpool.

COBH, May 26—Cast-iron or spun-iron water supply mains, and valves and fittings, for the Urban District Council. Mr. A. Powell, town clerk, Town Hall, Cobh.

MIDDLESBROUGH, May 25—Cast-iron manhole covers, gully grates, and step irons, for the Borough Council. The Borough Engineer, Municipal Buildings, Middlesbrough.

NOTTINGHAM, June 2—Cast-iron pipes, special castings, irregular castings, sluice valves, hydrants, gunmetal fittings, etc., for the City Council. Mr. B. W. Davies, engineer and general manager, Water Department, Castle Boulevard, Nottingham.

BIDEFORD, June 30—Supplying and laying approx. 1,000 yds. of 6 in. dia. spun-iron water pipes, for the Town Council. (Deposit, £2 2s.)

WEST KESTEVEN, June 1—Provision and laying of 4,800 yds. of 7 in., 5 in., and 3 in. dia. iron pipe water mains, for the Rural District Council. Elliott & Brown, consulting engineers, Stanley House, Pelham Road, Nottingham. (Deposit, £3 3s.)

Board Changes

Sanbra, Limited—Mr. H. Jones has been appointed a director.

Vokes, Limited—Mr. C. E. M. Hardie has been appointed a director.

Vauxhall Motors, Limited—Mr. Thomas Mackenzie has resigned from the board.

Sangamo Weston, Limited—Sir Samuel H. Brown has been appointed a director.

Swan, Hunter & Wigham Richardson, Limited—Mr. G. E. Hunter has retired from the board.

Hopkinsons, Limited—Mr. C. J. Hofton has resigned from the board. Mr. George Sewell has been appointed a director.

Barton & Sons, Limited—Mr. J. E. Hodgkin has resigned from the board and Mr. C. A. Roper has been elected a director.

Mullard Equipment, Limited.—Dr. C. F. Bareford, head of the Mullard electronic research laboratory, has been made a director.

Hunslet Engine Company, Limited—Mr. John F. Alcock, hitherto joint managing director, has been appointed chairman and managing director.

Aberdare Cables, Limited—Mr. H. D. Bell has resigned from the board and Mr. J. P. Gilliver and Mr. A. J. Nicholas have been appointed directors.

Obituary

Mr. A. H. Walker, proprietor of Geo. Walker, Sons & Company, iron, steel, machinery, and scrap merchants, etc., of Airdrie (Lanarkshire), died suddenly on May 5.

Mr. Harry Smith, who had been with the Coppee Company (Great Britain), Limited, for nearly 60 years, including many years as a director, died on May 5. He was also a director of the C.C. Syndicate, Limited, and the Notts & Derby Coke & By-Product Company, Limited.

British Blast Furnaces in the March Quarter, 1951

These tables are published through the courtesy of the British Iron and Steel Federation.

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the first quarter, 1951.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Clay Cross	—	—	1	—	1	1	2
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	3	—	3	3	4
Kettering Iron & Coal	—	—	1	—	1	1	2
New Cransley Iron & Steel	—	—	1	—	1	1	2
Renishaw Iron	—	—	2	—	2	2	2
Sheepbridge	—	—	1	—	1	1	1
Stanton Ironworks : Stanton-by-Dale ..	—	—	4	—	4	4.8	5
Staveley Iron & Chemical	—	1	3	—	4	4	4
Stewarts and Lloyds : Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	2	—	—	2	2	3
Total	—	7	17	—	24	24.8	30

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Brymbo Steel	—	1	—	—	1	1	1
Darwen & Mostyn..	—	—	—	1	1	1	2
Lancashire Steel Corp'n	—	2	—	—	2	2.4	4
Total	—	3	—	1	4	4.4	7

North-West Coast.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Barrow Ironworks..	2	—	—	—	2	2	3
Charcoal Iron	—	—	1	—	1	1	1
Millom & Askam	2	—	—	—	2	2	3
United Steel : Workington	2	—	—	1	3	2.5	3
Total	6	—	1	1	8	7.5	10

Lincolnshire.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Appleby-Frodingham	—	7	—	—	7	7.3	8
Lysaght, J. : Scunthorpe..	—	4	—	—	4	4	4
Thomas, R., & Baldwins : Redbourn ..	—	2	—	—	2	2	2
Total	—	13	—	—	13	13.3	14

North-East Coast.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Cargo Fleet Iron	—	2	—	—	2	2	2
Consett Iron	1	1	—	—	2	2	2
Dorman, Long : Acklam	—	3	—	—	3	3	4
Redcar	—	2	—	—	2	2	2
Cleveland	—	2	—	—	2	2	5
Bessemer	—	2	—	—	2	2	3
South Bank	—	—	—	2	2	2	4
Grangetown	—	—	—	—	—	—	2
Gjers, Mills & Co.	2	—	—	—	2	2	5
Pease & Partners	2	—	—	—	2	2	3
Skinningrove Iron	—	2	—	—	2	2	2
South Durham Steel & Iron	—	2	—	—	2	2	2
Total	5	16	—	2	23	23	36

Scotland.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Bairds & Scottish Steel : Gartsherrie ..	1	1	1	—	3	3	5
Carron	—	—	1	—	1	1	4
Colvilles	—	3	—	—	3	3	3
Dixon's	—	—	2	—	2	2	6
Total	1	4	4	—	9	9	18

South Wales and Monmouthshire.

Name of firm.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Briton Ferry Works	—	—	—	—	—	0.2	1
Guest Keen Baldwins : Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins : Ebbw Vale ..	—	2	—	—	2	2	3
Steel Company of Wales : Margam ..	—	2	—	—	2	2	2
Total	1	6	—	—	7	7.2	10

Scientific Instruments in Paris

In almost every field of activity, Britain and France are alive to the importance of the interchange of knowledge and ideas for the mutual benefit of both countries. One link which has certainly cemetented the *entente cordiale* in the sphere of the scientific progress of ourselves and our neighbours across the Channel is the exhibition of scientific instruments, which last year was held in London and enabled British scientists to see the latest developments attained by the French in this important aspect of the modern era. Reciprocating this year, 40 working exhibits of Britain's latest developments in research instruments were on view to French scientists at an exhibition, organised by the British Council, which was opened on May 11 in Paris by Prof. E. N. da C. Andrade, F.R.S. Some of the most recent equipment designed at Harwell for research on the medical and industrial uses of atomic energy was on display, together with contributions from Government research stations, universities, and industry.

The principal adviser to the exhibition was Prof. G. Ingle Finch, F.R.S., who has been Professor of Applied Physical Chemistry in the University of London at the Imperial College since 1936. He was one of the three British scientists to give lectures during the exhibition, the others being Prof. Andrade and Dr. V. E. Cosslett, F.R.S.

Another link between Britain and France forged during the exhibition, which closes to-day, was the award of the Holweck prize to the eminent physicist, Sir Thomas Merton, F.R.S., a director of Vickers, Limited.

European Steel Prospects

A report by the Steel Committee of the Economic Commission for Europe estimates the productive capacity of the European steel industry this year at over 69,000,000 tons. But the report, which has been prepared for the sixth session of E.C.E. on May 29, goes on to forecast that this figure will probably not be achieved because of insufficient supplies of raw materials. Last year many works had to draw on their raw material stocks to achieve the maximum production then attained in most European countries, and in the opening months of this year a more serious position developed.

It has been decided to reconvene the special panel on scrap, to investigate measures which could be taken in individual countries to improve the European supply position. Prospects for iron ore this year, the committee states, are also likely to be tight and by 1953 a serious shortage of ore is likely to exist because production plans for ore have not kept pace with pig-iron production plans.

British Blast Furnaces in the March Quarter, 1951—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of the first quarter, 1951. Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.	Weekly average in blast.	Total existing at end of quarter.
Goldendale Iron	—	—	1	—	1	1	2
Lilleshall	—	—	1	—	1	1	2
Round Oak Steelworks	—	—	1	—	1	1	3
Shelton Iron, Steel & Coal	—	3	—	—	3	3	3
Stewarts and Lloyds: Bilston	—	3	—	—	3	3	3
Total	—	6	3	—	9	9	13
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	13	57	25	4	99	100.2	140

Weekly Average Number of Furnaces in Blast during March Quarter, 1951, and Previous Four Quarters

District.	1950. March.	June.	Sept.	Dec.	1951. March.
Derby, Leics., Notts., Northants, and Essex	26	24.6	24.4	25	24.8
Lancs (excl. N.-W. Coast), Denbigh, Flint, and Ches	5	4.5	4.2	4.6	4.4
Lincolnshire	13.7	14	13.8	14	13.3
North-East Coast	23	23	22.8	23	23
Scotland	7.5	8	8.7	9	9
Staffs, Shrops, Worcs, and Warwicks	9	8.4	8.9	9	9
S. Wales and Monmouth	8	8	7.7	8	7.2
Sheffield	1.5	1	1.5	2	2
North-West Coast	7	6.6	6.4	7	7.5
Total	100.7	98.1	98.4	101.6	100.2

The following companies have furnaces in course of construction or rebuilding:—Barrow Ironworks Cargo Fleet Iron; Consett Iron; Lancashire Steel Corporation; J. Lysaght (Scunthorpe); R. Thomas & Baldwins (Redbourn); Sheepbridge; Skinningrove Iron; Steel Co. of Wales; South Durham Steel & Iron.

Provision of Capital for Industry

Calls on the services of the Industrial & Commercial Finance Corporation are increasing. The corporation was established in 1945, under Government auspices, to provide risk-capital not obtainable through normal channels. The number of applications received in the year ended March 31 last was 634, which compares with 548 in the previous year and 458 in the year to March 31, 1949. In his statement accompanying the latest accounts, Lord Piercy, the chairman, says that the quality of application was also more attractive, so that the corporation was able to make offers to new customers in 84 cases and to existing customers who required additional capital in 56 cases. This compared with 47 and 30, respectively, in 1949-50.

After payment of interest on loan capital and provisions of £150,000 for bad and doubtful debts, the corporation's activities returned a profit of £580,665, compared with £360,630, in the previous year. Lord Piercy points out that the return flow of repayments, which are re-lent, is now a significant factor in the business. Since the corporation began its activities in 1945, these have amounted to £1,301,000.

Taxation and Industrial Capital

The question of capital for industry was discussed in the House of Commons on May 8, when the Finance Bill was given a second reading without a division. Mr. Oliver Lyttelton warned that the present level of taxation was eating into the nation's industrial capital and the policy of the Government would, unless the nation was careful, lead to "naked inflation." He put forward the case that there was no reserve of taxable resources.

The tools of production were being taxed into obsolescence. The nation would not be able to maintain its competitive position or its standard of life unless industrial capital was kept intact and its plant up to date.

Mr. Lyttelton had given the impression that industry was desperately short of capital and that shareholders were starving, said Mr. Hugh Gaitskell, Chancellor of the Exchequer. That he thought, was such a complete contrast to reality that it just made nonsense. There was no sign in British industry of a disinclination to spend money on new machinery, and profits had been rising pretty fast.

Personal

Mr. J. Donnell, of Consett, and Mr. B. Conway, of Cleveland, have been elected chairman and vice-chairman, respectively, of No. 2 Area of the Iron and Steel Trades Confederation.

Mr. W. Wilson, M.I.B.F., foundry manager, Western Foundries, Southall, Middlesex, has been elected deputy-president of the Southall Chamber of Commerce and chairman of the industrial section.

Mr. J. Dyson Gregory has been appointed a director and general manager in charge in Canada of Climax Rock Drills, Limited, Montreal, a subsidiary of the Climax Rock Drill & Engineering Works, Limited, London and Carn Brea.

Lord Hives, chairman and joint managing director of Rolls-Royce, Limited, and a director of Renfrew Foundries, Limited, Glasgow, and Rotol, Limited, will receive an honorary degree of Doctor of Law at Cambridge University on June 7.

Mr. George H. Watt, assistant chief draughtsman of the North British Locomotive Company, Limited, Glasgow, who retired recently, has been presented with a radio from the executive staff and a silver tea service from the drawing-office staff.

Mr. A. L. G. Lindley, who has succeeded Mr. F. Lonsdale as general manager of Fraser & Chalmers Engineering Works of the General Electric Company, Limited, Erith (Kent), joined Fraser & Chalmers in 1918 as an apprentice. After spending some years as an assistant engineer in the mining department he was appointed in 1933 chief engineer for the British General Electric Company, Limited, in South Africa. He was later appointed assistant general manager and a director of this company.

Sir John Green has received a presentation of old Sheffield plate from members of the Sheffield Lighter Trades Employers' Association. He resigned from the presidency of the association last year, after holding that office for 16 years, on his appointment as deputy chairman of the Iron and Steel Corporation of Great Britain. The chairman at the ceremony was Mr. H. Clayton, joint managing director of C. T. Skelton & Company, Limited, manufacturers of contractors tools, of Sheffield, who succeeded Sir John as president of the association.

Wills

Jackson, G. W., a former director of Vickers-Armstrongs, Limited, Barrow	£29,122
Friedmann, Paul, of Ambores, Limited, metal manufacturers and merchants, of London	£20,375
Peppercorn, A. H., a former chief mechanical engineer at the Doncaster railway works	£15,208
Wright, W. H., managing director of Wright's Havelock Foundry Company, Limited, Leicester...	£14,979
Lyon, R. J. L., a director of Hendry Bros. (London), Limited, iron and steel exporters, etc., of London	£5,529
Ward, G. K., late a director of William Denny & Bros., Limited, shipbuilders and engineers, of Dumbarton	£86,310
Case, Harry, founder of H. Case & Sons (Cradley Heath), Limited, chain and builders' ironwork manufacturers	£5,338
Millar, A. W., for over 50 years secretary of the Bradford and District Amalgamated Brass Finishers' Union	£1,661
Howard, Joseph, for many years managing director of the Coombs Wood tube works of Stewart and Lloyds, Limited	£116,460
Owens, E. D. C., a former manager of the Cardiff and Swansea offices of the British Thomson-Houston Company, Limited, who previously served at Rugby	£5,827
Mallett, Dr. Edward, principal of Woolwich Polytechnic, formerly assistant professor at the City and Guilds (Engineering) College, and assistant engineer in the Post Office engineering department	£15,529

News in Brief

United States steel mill operations last week were scheduled at 103.7 per cent. of rated capacity, which is slightly below the previous peak of 104 per cent. Production expected was about 6,000 tons lower at 2,073,000 tons.

An industrial exhibition, arranged in connection with the Festival of Britain, is to be opened by Newcastle-upon-Tyne City Council at Newcastle Exhibition Park on May 29. A temporary Palace of Industry is being built and exhibits will also be accommodated in the new Stephenson Building at King's College.

The basis of the North British Locomotive Company's normal production has recently been broadened by the acceptance of an order for 25 large dragline excavators. These are to be built to the standard designs of the Baldwin-Lima-Hamilton Corporation of America, and are to the order of Jack Olding & Company, Limited, Hatfield (Herts).

Imports into the Tees during the three months ended March 31, totalled 624,757 tons, compared with 925,447 tons in the same period of 1950, a decrease in the arrivals of iron ore and scrap being particularly noticeable. Exports in the first three months of the year totalled 471,459 tons, compared with 433,187 tons in the corresponding period of the previous year.

The area membership—over 20,000—was the highest ever, Mr. J. Senior, divisional officer, told the annual meeting of No. 2 Area Committee of the Iron and Steel Trades Confederation at Middlesbrough. With the rise in prices he foreshadowed further claims for wage increases and indicated that there would be a fall in ingot production unless steel scrap and foreign ore supplies improved.

The new works, laboratories, and offices of Baird & Tatlock (London), Limited, scientific instrument manufacturers, etc., were opened at Chadwell Heath (Essex) on May 15 by the Minister of Supply, Mr. G. R. Strauss. Production is expected to be raised by at least 50 per cent. as a result of the new works, contributing to both the defence programme and the export drive.

A final dividend of 9 per cent., making 14 per cent., less tax, payable on £11,301,337 for 1950, is recommended by the directors of Guest Keen & Nettlefolds, Limited This compares with a 7 per cent. final, plus a bonus of 1½ per cent., for 1949, making 12½ per cent. on £11,283,150. In addition, a tax-free distribution of 5s. per £1 ordinary stock unit is recommended out of the capital profit arising from realisation of investments in companies which have been passed into public ownership.

In 1948 the council of the British Welding Research Association accepted an offer from the British Oxygen Company, Limited, to provide a prize fund for a competition relating to welding for three years. As no award was made during 1948-49, a single prize of £100 is offered this year and will be awarded for the best Paper submitted on a research into welding or its applications. Papers should reach the secretary of the association at 29, Park Crescent, London, W.1, before the end of the year.

Serious concern at the continuing cuts in electricity supply to industry was expressed at the recent monthly meeting of the London and South Eastern Regional Board for Industry. The board described as unreasonable the fact that loadshedding was taking place as late as May. The cuts had caused considerable loss of production to industry in the region. The board also recommended that the electricity generating industry be considered next in importance to the coal industry regarding allocation of raw materials—particularly of steel.

Raw Material Markets

Iron and Steel

Substantial reserves of foreign ore accumulated by British blast-furnace men have heretofore helped to soften the impact of the sharp contraction in the imports of this material which has been continuous during the past few months. But the effects of the squeeze are now manifest. Only two blast furnaces have been laid idle, but many are working below capacity, and as the steel plants are using more iron to compensate for the shrinkage in scrap supplies, the foundries are finding it very difficult to obtain adequate tonnages of pig-iron to sustain normal operations.

Engineering establishments are feeling the pinch very severely and the position in the light-castings establishments is better only in a relative sense. There is, in fact, a general shortage of all grades of pig-iron and bigger tonnages are being imported from the Continent.

The drop in the aggregate ingot production affects the re-rollers as well as the users of finished steel products. Normally a big percentage of the material used in the re-rolling mills is of Continental origin; but nowadays exportable surpluses in western Europe have fallen to very slender proportions and it is a misfortune that this should synchronise with a drop in British production. Thus, the re-rolling industry is constantly embarrassed by the scarcity of billets, blooms, slabs, and sheet bars. Wherever possible, defectives and re-rolling scrap is used, but the lack of billets is at present an insuperable handicap and the mills are working somewhat intermittently.

For the disposal of all classes of finished steel products there are abundant outlets. Oversea demand is keener than ever. Canada, Australia, and South Africa are making heavy claims upon British steel capacity, not all of which it is possible to satisfy. For one thing, shipping space is scarce, and owing to the labour troubles in New Zealand, freight rates to this destination have been increased 50 per cent. The big difficulty is to reconcile an increased demand with a diminished output and it is understood that the introduction of a system of controlled distribution is still under discussion. Meanwhile, delivery dates are being extended, and in many instances prospective buyers are being asked to renew their applications at a later date.

Pressure for sheets, light plates, and wire products is intense, while stockholders of other rolled steel products are assisting buyers who cannot obtain supplies direct from the rolling mills.

Non-ferrous Metals

Last week's tin market was fairly steady, but the tendency was downwards and at the close before the Whitsun holiday both spot and forward were quoted at around £1,080, the backwardation being virtually eliminated. This has not happened for something like eight months. Metal Exchange stocks, although not large, are certainly higher than they were, and it is to be hoped that this build-up will continue. Stocks in consumers' hands at March 31, according to figures published by the British Bureau of Non-ferrous Metal Statistics, were 1,587 tons, a fall of some 70 tons on the February figure.

Metal Exchange official tin quotations were as follow:

Cash—Thursday, £1,135 to £1,140; Friday, £1,075 to £1,080; Tuesday, £1,110 to £1,120; Wednesday, £1,130 to £1,135.

Three Months—Thursday, £1,120 to £1,130; Friday, £1,070 to £1,080; Tuesday, £1,090 to £1,095; Wednesday, £1,110 to £1,115.

Stocks of copper during March, according to the British Bureau of Non-ferrous Metal Statistics, improved by nearly 15,000 tons, being 108,926 tons at March 31. Consumption in March was 45,528 tons, of which nearly one half was in the form of secondary metal. In February, usage was 45,849 tons, about 19,000 tons of which was scrap. In view of the scrap shortage it is certainly surprising to see such a high usage of secondary metal and it must be presumed that the trade has been drawing upon stocks. Stocks of zinc went up from 32,556 tons to 34,985 tons at the end of March, consumption being about 1,350 tons down at 23,418 tons. Consumption of lead also declined, the March figure of 27,786 tons comparing with 31,666 tons in the previous month. Stocks fell sharply by about 13,000 tons to 32,470 tons. The lead position is certainly pretty tight at the present time, but some improvement is hoped for.

In regard to scrap, the situation is unchanged so far as current supplies are concerned, and it cannot be said that the new Order has done much, if anything, to promote a flow of secondary metal. It is believed that the Ministry of Supply has pretty well made up its mind about ceiling prices for brass ingots and also for extrusion brass billets, and that an announcement will be made in the near future. It seems probable, too, that an upper limit will be fixed for fire-refined copper ingots produced in the United Kingdom. Obviously, such a figure cannot exceed the current Ministry of Supply quotation for similar material. It is anticipated too that sooner or later an attempt will be made to do something about controlling the price of gunmetal ingots, but the fluctuations in the daily price of tin present a considerable problem. Plans to provide for stock returns of scrap and the licensing of scrap acquisitions are understood to be well advanced.

Steel Distribution Control

Possible arrangements for controlling distribution of general steel are under consideration. Announcing this at question time in the House of Commons last week, the Minister of Supply said that he proposed to discuss the matter with representatives of the industry.

Mr. Strauss said the automobile and ancillary industries received their due shares of controlled materials, and he regretted there was unlikely to be an early improvement in the supply of these materials.

Asked if he would consider those industries not working at full production, to see whether any diversion could be made to the armament programme, Mr. Strauss answered: "Yes, so far as it is possible to do so. We have asked all major contractors to do as much sub-contracting as they can where there is vacant capacity and available labour."

The Minister said that the new mill at Margam should be in full production by the end of the year, and that should relieve the situation to some extent.

Norwegian Plant for Disposal

Following reorientation of the Norwegian alumina industry, which is now concentrating on the manufacture of metallic aluminium, several hundred-thousand pounds worth of first-class equipment has been released. A/S Aardal Verk, the Norwegian Government-sponsored undertaking, has arranged with George Cohen Sons & Company, Limited, Wood Lane, London, W.12, to co-operate in the disposal of the equipment, most of which is unused and much of which has never been erected.

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

(Delivered, unless otherwise stated)

May 16, 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, £167; ditto, copper-free, £183.

Ferro-tungsten.—80/85 per cent., 31s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 33s. 6d. 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. 8¼d. 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. 9d. per lb.

Ferro-manganese (blast-furnace).—78 per cent., £36 1s. 1d.

Manganese Briquettes (5-ton lots and over).—2lb. Mn, £40 15s.

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 basic bot.

NON-FERROUS METALS

Copper.—Electrolytic, £210; high-grade fire-refined, £209 10s.; fire-refined of not less than 99.7 per cent., £209; ditto, 99.2 per cent., £208 10s.; black hot-rolled wire rods, £219 12s. 6d.

Tin.—Cash, £1,130 to £1,135; three months, £1,110 to £1,115; settlement, £1,130.

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, 10g. 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, £406.

Brass.—Solid-drawn tubes, 21¾d. per lb.; rods, drawn, 29¼d.; sheets to 10 w.g., 26⅜d.; wire, 27½d.; rolled metal, 25⅛d.

Copper Tubes, etc.—Solid-drawn tubes, 23¼d. per lb. wire, 226s. 6d. per cwt. basis; 20 s.w.g., 254s. per cwt.

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

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

Phosphor Bronze.—Strip, 37d. per lb.; sheets to 10 w.g., 39⅛d.; wire, 40½d.; rods, 36¾d.; tubes, 42d.; chill cast bars: solids —, cored, —. (C. Clifford & Son, Limited.)

Nickel Silver, etc.—Ingots for raising, 2s. 4¼d. per lb. (7%) to 3s. 3½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 2s. 10½d. (7%) to 3s. 9½d. (30%); to 12 in. wide × .056, 2s. 10½d. to 3s. 9¾d.; to 25 in. wide × .056, 3s. 0½d. to 3s. 11¾d. Spoon and fork metal, unsheared, 2s. 7¼d. to 3s. 6½d. Wire, 10g., in coils, 3s. 4d. (10%) to 4s. 3½d. (30%). Special quality turning rod, 10%, 3s. 3d.; 15%, 3s. 7¾d.; 18%, 4s. All prices are net.

Forthcoming Events

MAY 22

Institution of Production Engineers

Wolverhampton Graduate Section :—" Metrology," by G. H. Rutland, M.B.E., M.I.MECH.E., at the Wolverhampton and Staffordshire Technical College, Wolverhampton.

MAY 23

Institute of Metals

1951 Annual May Lecture at the Royal Institution, Albemarle Street, Piccadilly, London, W.1, at 6.30 p.m. Paper, " Science in the Service of the Community," by Sir John Anderson, P.C., G.C.B., F.R.S.

National Physical Laboratory

Open day at Teddington, Middlesex, from 10.30 a.m. to 5.30 p.m.

MAY 24 and 25

Institute of Vitreous Enamellers

Annual Spring Conference at the Grand Hotel, Bournemouth, beginning at 1.30 p.m.

MAY 24

Institute of Welding

North London Branch :—Works Visit to the General Electric Company, Limited, North Wembley. Further information from the secretary.

MAY 24 to 29

Institute of British Foundrymen

London Branch :—Works visits in French Ardennes. Departure Victoria at 2 p.m.

MAY 25

Incorporated Plant Engineers

Birmingham Branch :—" Laundry Engineering," by F. Q. Wheatcroft, 7.30 p.m., at the Imperial Hotel, Birmingham.

MR. C. POTHECARY is to take over the representation of Foundry Services, Limited, for the South West and South Wales in place of MR. B. H. WILLIAMS, who has been transferred to head office.

HOWARD CLAYTON-WRIGHT, LIMITED, Wellesbourne (Warwickshire), wishes it to be known that the company and its associated companies are not in any way connected with any concern making similar products and, in particular, flexible bearings.

MR. GEORGE CRADDOCK, M.P. for Bradford South, has been informed by Jowett Cars, Limited, Bradford, that they see no ground for reconsidering their decision to dismiss Mr. Frank Thomas, 50-year-old turner employed at their Clayton works, who went on a three-weeks' visit to Russia without being given leave of absence. Mr. Craddock had sent a telegram to the firm asking them to reconsider the dismissal. Mr. A. F. Jopling, joint managing director, Jowett Cars, Limited, has stated that before Mr. Thomas was chosen they were asked whether they would grant leave. They declined to do this.

EXECUTIVES OF Rolls-Royce, Limited, have arrived in Glasgow to discuss the preliminary plans for the new aero-engine factory at East Kilbride. It is hoped that the factory will be ready for production within a year. Rolls Royce chiefs are meeting representatives of East Kilbride Development Corporation and Scottish Industrial Estate. The latter will be responsible for the erection of the factory as agent for the Ministry of Supply while the Development Corporation will provide houses for employees and roads, water and other services for the factory. Railway sidings will be built. It is estimated that the total employment will be 3,500 recruited mainly from Glasgow and Lanarkshire. Rolls Royce have also leased smaller factories in adjoining areas for complementary operations.

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

PATTERNMAKER, experienced in foundry and patternshop estimating, would like opportunity as FOUNDRY ESTIMATOR.—Box 976, FOUNDRY TRADE JOURNAL.

GENERAL FOUNDRY MANAGER (age 45) desires change. Present position full control of foundries and pattern shop producing heavy, medium and light castings for machine tool, marine, electrical, and diesel engine work, ranging from semi-mechanised and core assembly production up to 35 tons in loam, green and dry sand. Sound practical training, commercial and technical experience, accustomed to full control, good organiser with modern ideas.—Box 966, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

PATTERNMAKERS REQUIRED.—MOYLE, KINGSTON-ON-THAMES.

PATTERNMAKERS (metal) for air-cooled cylinder work. State age, experience, and wages required.—THE BIRCO MOTOR CYLINDER CO., LTD., Oldbury Road, West Bromwich.

ASSISTANT to Foundry Manager for small Foundry, who specialise in high duty iron castings. Man with knowledge of machine shop routine preferred. State age and experience. Salary £800 p.a.—Box 968, FOUNDRY TRADE JOURNAL.

REQUIRED.—Experienced GRAVITY DIE DRAUGHTSMAN. — Apply, JOHN DALE, LTD., London Colney, St. Albans.

SKILLED MOULDERS, PLATERS TURNERS, BORERS, etc., required by Distington Engineering Co., Ltd., Workington, Cumberland.—For further details apply to the LABOUR MANAGER.

REPRESENTATIVE, calling on Foundries and Engineers Lancs. and Yorks., to sell Red Moulding Sand, on commission.—Reply Box 962, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required for Grey Iron Foundry in Birmingham. district. Plate work and light general castings. Able to quote, price, control labour and cupola. State age, experience, and salary required.—Box 958, FOUNDRY TRADE JOURNAL.

WORKS ENGINEER required by progressive Company of Non-ferrous Metal Manufacturers. Applicant will be required to take charge of the maintenance and constructional services. Position might suit post graduate. Please state full particulars, including qualifications, experience, and salary required.—"DIRECTOR," James Bridge Copper Works, Ltd., Darlaston Road, Walsall, Staffs.

SITUATIONS VACANT—*Contd.*

PATTERNMAKERS (wood or metal); opportunities for advancement in a very large modern shop. Housing accommodation can be arranged for suitable applicants.—G. PERRY & SONS, LTD., Hall Lane, Aylestone, Leicester.

EXPERIENCED FOUNDRYMAN, with managerial qualifications, will be accepted as SALES MANAGER by an East Midland Company manufacturing Core Binders, Fluxes, etc.—Box 972, FOUNDRY TRADE JOURNAL.

FOUNDRY METALLURGIST required for Steel Foundry in Scotland. Must be experienced in the production of alloy steel castings from electric Furnace (Ark) and Tropenas processes. This is a progressive position to the right person.—Reply, giving details of experience, age, and salary required, to Box 960, FOUNDRY TRADE JOURNAL.

PROGRESSIVE Company, manufacturing Copper and Non-ferrous Metals, require a REFINERY MANAGER of outstanding ability.—Please state full particulars, including qualifications, experience, and salary required, in confidence, to "DIRECTOR," James Bridge Copper Works, Ltd., Darlaston Road, Walsall, Staffs.

FOUNDRY SUPERINTENDENT required for Non-ferrous Mechanised Foundry employing about 100 hands, in the Glasgow S.W. area. Applicants must have had previous mechanised and non-ferrous foundry experience, and be capable of engaging all their own labour.—Reply stating age, experience, and salary required, to Box 950, FOUNDRY TRADE JOURNAL

APPOINTMENT OF SENIOR TECHNICAL OFFICER.

THE Division is considering the appointment of a Senior Official to be responsible to the Director of Research for :—

(a) The compiling and editing of the Division's research and development reports, technical bulletins, and other internal publications;

(b) the preparation of Committee and Panel Minutes, and for inter-Committee liaison, and

(c) the preparation of sponsored technical articles and data for publication in the technical press.

Candidates should be of graduate standard, and applications should be made to the DIRECTOR OF RESEARCH, British Steel Founders' Association, Broomgrove Lodge, Broomgrove Road, Sheffield, 10, furnishing details of qualifications and experience, before the 23rd May, 1951.

SITUATIONS VACANT—*Contd*

METALLURGICAL CHEMIST required to take charge of Works routine laboratory. Must have metallurgical and analytical experience in aluminium and non-ferrous alloys, cast iron and steel, as well as sundry materials connected with foundry work. To be responsible to Chief Metallurgist and capable of supervising small staff. Will also be required to assist in making-up metal mixtures for crucible and cupola charges. The post calls for a wide range of activities and requires a versatile and interested man with good qualifications. Salary according to age and experience, pension scheme.—Apply, with full particulars of training and positions held, to GENERAL MANAGER, John I. Thornycroft & Co., Ltd., Engineers and Shipbuilders, Woolston, Southampton.

FOREMAN required, to supervise production at Grey Iron Foundry. Sound knowledge of floor, machine and mechanised production essential. Applicant must have proved himself in similar capacity, and should preferably have experience of cupolas, metal and sand control.—Write, stating age, experience, and full history of employment, to JONES & ATTWOOD, LTD., Stourbridge, Worcs.

FOREMAN STEEL DRESSER required for large Glasgow Steel Works. Must be experienced in the heavy steel castings trade. Staff appointment; constant nightshift. Preference will be given to applicants who have held a similar position, but this is not essential if capable of controlling large number of men and obtaining best results from them.—Reply, giving full details of age, previous experience and positions held, to 1158, WM. PORTEOUS & CO., Glasgow.

UNION STEEL CORPORATION (OF SOUTH AFRICA), LTD.

EXPERIENCED FOUNDRY SUPERINTENDENT required to control the Steel and Iron Foundry at Vereeniging, Transvaal. Annual production 4,500 tons of steel and 2,500 tons of iron castings.

Applicants must have practical and technical knowledge of the manufacture of castings in plain carbon, alloy, and manganese steels up to 20 tons in weight, be fully conversant with estimating from customers' drawings, and also job costing methods. Previous positions held should be stated, also age and marital state.

Commencing salary £1,200 per annum, on an initial three years' contract, plus "cost of living" allowance at present £190 per annum for a married person. It is obligatory for the successful applicant to join the Corporation's pension, recreation and medical benefit funds.

Fare to South Africa for successful applicant and family will be paid by the Corporation.

Applications, endorsed with the reference "U/39," should be forwarded to the LONDON REPRESENTATIVE, Union Steel Corporation (of South Africa), Ltd., 535/546, The Adelphi, London, W.C.2.

FINANCIAL

LONDON Company, able to introduce considerable volume of work, wishes to acquire interest in Non-ferrous Foundry. Preferably in Southern England. Principals only, in strict confidence.—Box 900, FOUNDRY TRADE JOURNAL.

ENGINEERING OR ALLIED INDUSTRY.—Investment company, with substantial financial resources, desire to acquire an interest in (or would purchase outright) an Established Concern with good profit-earning record. Continuity of management and personnel essential. A sum involving £50/200,000 is envisaged.—Address Box 924, FOUNDRY TRADE JOURNAL.

BUSINESS FOR SALE

FOR SALE AS GOING CONCERN.—Ferrous and Non-ferrous General Jobbing Foundry, within 20 miles London. Well equipped with 2 Cupolas, 3 Brass Furnaces, ample yard space and room for expansion.—Further particulars available to principals from YEATMAN, MELBOURN & Co., Chartered Accountants, 68, Coleman Street, E.C.2.

AGENCY

SALES AGENCY, established over 20 years, with Manchester office, at present marketing Springs and Press Work, can accept further Agency for other type of work, Brass or Iron Castings, etc. —Box 964, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

WANTED, urgently, Hematite Iron Ingot Mould Scrap.—Full details to Buyer, DAVID BROWN-JACKSON, LTD., Hampson Street, Salford, 5.

WANTED.—500-lb. capacity Aluminium or Brass Oil-fired Semi-rotary Melting Furnace.—Box 896, FOUNDRY TRADE JOURNAL.

WANTED.—TWO 15- or 20-ton per hr. Cupolas, with or without charging gear, and with or without blowing machinery.—Box 914, FOUNDRY TRADE JOURNAL.

OFFER YOUR SURPLUS PLANT TO

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

WANTED.—Weighbridge, 20 ft. by 9 ft. approx., Dial type, for delivery near July.—Please send full particulars to Box 974, FOUNDRY TRADE JOURNAL.

WANTED.—One Secondhand Fordath Core Extruder, together with dies, if possible. Also 1 Royer Sand Mixer and 1 Pyrometer for cast iron.—Box 970, FOUNDRY TRADE JOURNAL.

MATERIALS FOR SALE

TWIN MATCH PATTERN PLATES in Cast Iron or Aluminium made from customer's own patterns or to specification.—ROBERT R. SHAW, Falkirk Road, Larbert, Scotland. 'Phone 300.

MACHINERY FOR SALE

"SKLENAR" FURNACE. 1-ton capacity. Coke fired. New 1944. Very little used. Price £700.—Box 942, FOUNDRY TRADE JOURNAL.

FOR SALE.—Battery of 5-Core Drying Cabinets, by Modern Furnaces & Stoves, Ltd. Complete with firebox, electric motor, fan, etc. Would sell cabinets separately.—Offers for quick sale to THE BROCKMOOR FOUNDRY CO., LTD., Brockmoor, Brierley Hill, Staffs.

MACHINERY FOR SALE—*Contd.*

MOULDING MACHINES. — Two Coleman No. 24A Davenport Type Machines. Jarr, Roll-over. Pattern draw 12 in.; 1,100 lbs. working capacity. Suitable for boxes up to 40 in. by 24 in. Price £350 each.—Box 288. FOUNDRY TRADE JOURNAL.

FOR SALE.—40-cwt. Avery Weighing Machine. 44½ in. by 40 in. platform. In good condition.—Apply R. W. COLLIN, LTD., Pallion Foundry, Sunderland. Telephone 4987.

MOULDING MACHINES.

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

Mumford Jar Ram Plain Jolt; table 24 in. by 18 in.

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.*

600

FANS AND BLOWERS.

75,000-C.F.M. encased type Fan, by BRITISH AIR CONDITIONERS. 2¼ in. w.g., 320 r.p.m., inlet 66 in. diam., horiz. bottom discharge 43 in. by 47 in., shrouded multi-vane impeller.

18,000-c.f.m. sheet metal encased Fan, by STANDARD & POCHIN. 4 in. w.g., 1,310 r.p.m., 29 in. diam. inlet, vert. upwards discharge 28 in. by 20 in., shrouded multi-vane 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. 1¾ in. w.g., 585 r.p.m., 30 in. diam. inlet, vert. upwards discharge 22 in. by 28 in., multi-vane 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. diam. inlet. top horiz. discharge 27 in. by 18 in., multi-vane impeller, arranged belt drive. Will also give 6,000-c.f.m., 1 in. w.g., 434 r.p.m.

Thirteen 10,000-c.f.m. sheet metal encased type Fans, by MATTHEWS & YATES. 3 in. w.g., 980 r.p.m., inlet 22 in. diam., 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

IN STOCK AT SLOUGH FOR IMMEDIATE DELIVERY.

SIX only brand new 10-cwt. FOUNDRY LADLES. £25 each to clear.

SAND THROWER, a.c., 3-phase, similar to Royer, new, £55.

Alfred Herbert SAND DISINTEGRATOR, £48.

Spermolin CORE SAND MIXER, £18.

Two complete small CUPOLAS, 30 in. diam., £150 each, including Keith Blackman Fans, etc.

25 practically new BALE-OUT FURNACES, cheap.

31 in. CUPOLA complete, by "Constructional," with spark arrester, Keith Blackman Blower and new lining—all at £250.

36 in. ditto complete, for £395.

ADAPTABLE MOULDING MACHINES. £45 each.

TITAN CORE BLOWER, as new, 150 lbs. £285.

WEIGHING MACHINES, by Avery. Type 282, as new, 3-cwt. size.

Large stock new Broomwade Compressors, new, A.C. Motors and Keith Blackman Fans.

ELECTROGENERATORS LTD.

Australia Road, Slough

Telephone: Slough 22877.

MACHINERY FOR SALE—*Contd.*

CRANES FOR SALE.

1 5-TON Electric Overhead Travelling Crane. 30 ft. Span, Electric Hoist and Cross Traverse, and Hand Long Travel. Floor control. 400/3/50.

1 3-Ton Hand Overhead Travelling Crane. 32 ft. Span.

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

1 New 2-Ton Electric Overhead Travelling Crane. 30 ft. Span, Electric Hoist and Cross Traverse and Hand Long Travel. £525, ex-works.

1 New 6-ton Electric Overhead Travelling Crane. 30 ft. Span, Electric Hoist and Hand Long Travel and Cross Traverse. £700, ex-works.

The above Cranes are in stock at Blackheath.

MOULDING MACHINE FOR SALE.

1 B.M. Pneumatic Jolt Squeeze, Type ATO. Max. box, 48 in. by 18 in.

CORE BLOWER.

1 300-lb. Titan Core Blowing Machine. Table 28 in. by 28 in., to take boxes 28 in. by 48 in. by 8 in. to 30 in. deep. Motorised, 400/3/50. Date made 1943. Very little used.

SAND MILL.

1 BM2. Sand Mill, by Foundry Equipment. Ltd. 4 tons per hour. Pan 6 ft. 10 in. dia. Completely reconditioned. Absolutely as new.

SHOT BLAST PLANT.

1 Tilghman, Type T.B., Tumbling Barrel Type. Complete with Shot Blast Apparatus, Separator, Dust Arrester, and Exhaust Fan. Barrel 3 ft. dia. by 3 ft. 6 in. long. First-class condition.

The above Cra n serae shrdlu cmfwy shrd

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

MACHINERY FOR SALE—*Contd.*

ELECTRICALLY-OPERATED 10-Cwt. Passenger Lift for Cupola. Height of lift approx. 15 ft. Carefully maintained and inspected.—Apply MONMER FOUNDRY, LTD., Willenhall.

SWARF Masticating Machine, by George White. Complete with 15 h.p., 400 volt, 3-phase Motor, and Star Delta starter. As new.—Apply H. B. BARNARD & SONS, LTD., Tipton.

QUANTITY "MORRIS" Worm-geared Pulley Blocks, ½ to 7 tons. ALL at less than half makers' prices.

1-ton capacity, Paterson-Hughes, underslung o/h. Electric Lifting and Travelling Crane, 18 ft. span, 3/50/400 V.

KING Electric Lifting Blocks, ½-ton capacity, push-travel, 3/50/400 V. One for use on "KING" Super track; the other for use on 5 in. R.S.J. flanged girder; both fitted articulated trollies and roller current collectors.

"KING" Super track and Tee Busbars, with hooded insulators available.

MORRIS 1-ton, 460 V. d.c., four-fall wire rope.

MORRIS 2-ton, 460 V. d.c., 4½ b.h.p., 1,180 r.p.m.

UNUSED 2-ton capacity Wandsworth Hand-operated Geared Winch.

HYLAND Hand-operated Ratchet Winch; all steel construction, ½-ton capacity.

Rope Pulley Blocks; self-contained load.

MORRIS ½-ton capacity, 220-volt d.c., Electric Lifting Block, four-fall rope. Height of lift 20 ft. Can be seen working.

LOW PRICES. OFFERS WILL BE CONSIDERED.

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

MACHINERY FOR SALE—*Contd.*

LOCKER Type No. 3 a.c. Electric Vibrating Feeder. Brand new.—Apply WHITLEY PARTNERS, LTD., Hunslet Road, Leeds, 10.

ALBION TWW WORKS

"POLFORD" FOUNDRY PLANT AND EQUIPMENT—IMMEDIATE DELIVERY.

"POLFORD" CORE SAND MIXER: 1 cwt. capacity, 7½ h.p. Motor; 3 cwt. capacity, 12½ h.p. Motor.

"POLFORD" ROTARY MIXER MILLER, with Aerators. 3 cwt. capacity, 15 h.p. Motor.

ALL THE ABOVE WOUND FOR 400 volts, 3-phase, 50 cycles.

"POLFORD" FURNACES, CENTRAL AXIS—COKE FIRED. 100 lbs., 250 lbs., and 400 lbs. capacity.

OIL FIRED—DITTO. 400 lbs. capacity.

"POLFORD" CRUCIBLE FURNACE—OIL FIRED. 200 lbs. capacity.

"POLFORD" COKE FIRED MOULD DRIER.

"POLFORD" VIBRATORY KNOCK-OUTS, of 1 ton and 2 ton capacity. Motor drive through vee belts. Ideal for knocking out Moulding Boxes, and a really first-class job.

"POLFORD" VIBRATORY SCREEN. Capacity up to 8 tons per hour.

THOS W. WARD LTD.
ALBION WORKS : SHEFFIELD
Phone 26311 'Grams: "Forward."

Remember . *Wards might have it!*

The 'PORTWAY' FOR GAS OR FUEL
PORTABLE CORE OVENS
for efficiency and reliability!

C. PORTWAY & SON, LTD., HALSTEAD, ESSEX

HOOKERLITE

- CORE TRAYS
- MOULDING BOARDS
- PATTERN BOARDS
- BATTENS FOR WOOD SCREWS

Are hard, durable, and unburnable. Light in weight, and have an accurate smooth surface.

"Hookerlite" Regd. Trade name.
Sole manufacturers and Suppliers.

W. J. HOOKER LTD.
4 MIDLAND CRESCENT, LONDON, N.W.3
Phone: HAMpstead 2495.

MACHINERY FOR SALE

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.

CAPACITY AVAILABLE

CASTINGS.—We can save your porous castings, ferrous or non-ferrous, by an approved impregnation Process; sample castings treated.—RECUPERO, LTD., Cannon Croft Works, Eastcote Road, Pinner, Middx. 'Phone Pinner 7529.

CAPACITY available for castings weighing from 1 lb. to 12 tons, including Quasi-Bessermised ingot moulds up to 10,000 tons per annum.—THE CROSS FOUNDRY & ENGINEERING CO., LTD., Gorseinon, near Swansea.

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.

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.*

THE Pattern Equipment Co. (Leicester), Ltd., has immediate capacity for all types of wood and metal patterns, equipment for mechanised foundries a speciality.—147, Mount Road, Leicester; Telephone: 23773.

NON - FERROUS DIECASTINGS.— Gravity Diecastings in Brass, Zinc and Aluminium Alloys. Small Pressure Diecastings in Aluminium and Zinc. Dies made for all castings.—CALPER, LTD., 267, Nether Street, Finchley, N.3. Telephone: FINchley 3248.

MISCELLANEOUS

ABOUT 10 tons Railway Rails lifted during alterations. Suitable for relaying of private siding.—LION FOUNDRY, Kirkintilloch.

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

FOR SALE.—Quantity of Cast Iron Moulding Flasks. 25-cwt. capacity Cupola, with fan and motor.—RUMSBY & SONS, Bungay, Suffolk.

MISCELLANEOUS—*Contd.*

PATTERNS in Wood or Metal; high finish and accuracy maintained; plate and multi-cored work a speciality.—HAYWOOD BROS., Littleborough, Lancs 8543.

WANTED, urgently, broken or crushed Plumbago Crucibles.—Please state quantity available and price to buyer, DAVID BROWN-JACKSON, LTD., Salford Works, Hampson Street, Manchester, 6.

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.

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.

CAST IRON chaired sleepers available; North Midlands 3,000. Midlands 6,000. South-West 5,000.—Offers to Box 412, FOUNDRY TRADE JOURNAL.

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

PATTERNMAKERS' Section

PATTERNMAKERS' Section

"Waterated" AIR

won't help★ your

PRODUCTION PROGRAMME

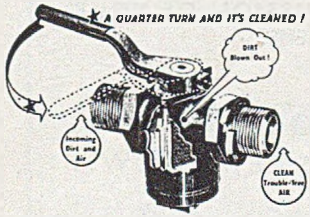
" Waterated Air "—that's the kind of air which makes tools misbehave, causes corrosion, spoils jobs like paint spraying or sandblasting and sometimes allows a " freeze-up." Dry air saves time and temper, reduces maintenance on tools and pushes production up.

The Victor Aridifier and Water Trap installed in your compressed air system will keep pipelines dry, providing a constant protection for your air-driven tools at a low cost. These two units are easily fitted and will give trouble-free service for years.

As we'd like to give you more details about this simple installation, why not write for a copy of " Considerations concerning Water in Air", a technical paper for practical men.

★ **you need the VICTOR ARIDIFIER!**

The VICTOR Self-cleaning AIR FILTER



A " THREE-WAY " cock and filter combined. A quarter turn of the handle reverses the filter which is cleaned by the air supply in five seconds, the dirt and scale being blown out to atmosphere. No need to stop the compressor, and no dismantling necessary. Just a flick of the wrist! Send for one today and try it out.

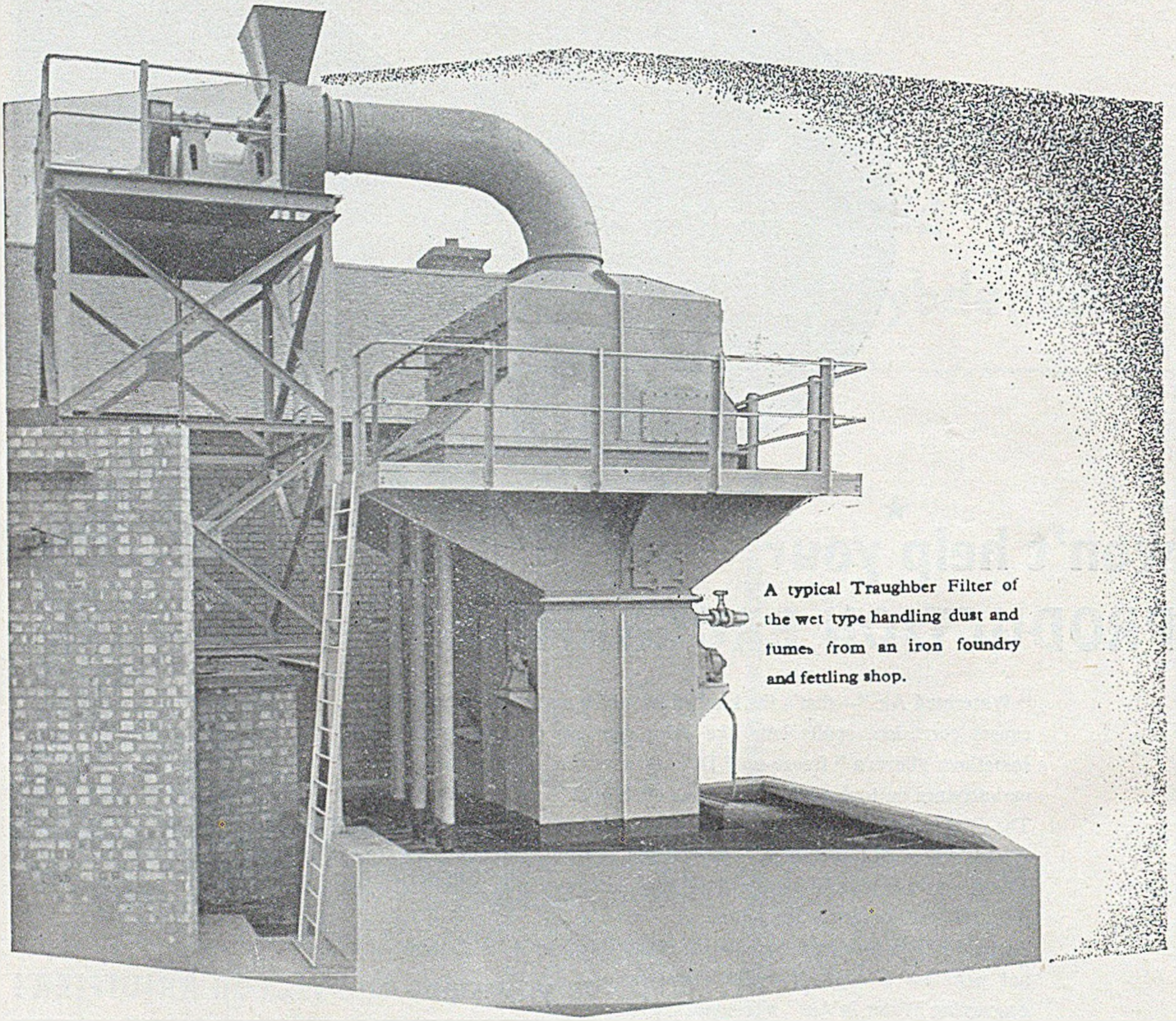
Price **22/6** Each

INDUSTRIAL Victor PRODUCTS

V.I.P's of the Industrial Field

VICTOR PRODUCTS (Wallsend) Ltd · **Wallsend-on-Tyne** · **England** · Phone: Wallsend 63271-2-3 · Grams: "Victor", Wallsend

Eliminate dust and fumes ...and increase production



A typical Traughber Filter of the wet type handling dust and fumes from an iron foundry and fettling shop.

Foundry conditions have received our constant study and attention.

Specially designed high efficiency, economical plants installed to deal with every dust and fume problem.

● OUR TEAM OF SPECIALIST ENGINEERS WELCOMES THE OPPORTUNITY OF SITE DISCUSSION OF YOUR PROBLEMS.

TRAUGHBER FILTER CO. LTD.

41/42 PARLIAMENT STREET · WESTMINSTER · S.W.1

Telephone: Whitehall 0748/9.

IN ASSOCIATION WITH JOSHUA BIGWOOD & SON LTD.

T.6

Staffa GRINDERS & DUST EXTRACTORS

FOR EVERY WORKSHOP OR FACTORY

10″ DOUBLE-ENDED GRINDER

Price: (Ex works)
£34. 10. 0.

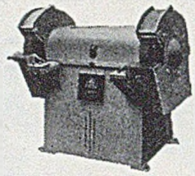
★

Also available

16″ Double-Ended Grinder

Price: (Ex works)
£105. 0. 0.

24″ DOUBLE-ENDED GRINDER



Price: (Ex Works) £242. 8. 0.

D.E.3. and D.E.4. type
Twin Portable

DUST EXTRACTOR UNIT

Price: (Ex works)
D.E.3. £70. 0. 0.
D.E.4. £76. 15. 0.

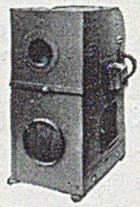
Also available

S.E.3. Single
Portable Type

Dust Extractor Unit

Price: (Ex Works) £48. 0. 0.

DUST EXTRACTOR UNIT



Price: (Ex Works) £114. 18. 0.

says Sam Staffa

'STAFFA' HEAVY DUTY GRINDERS

Robust, well-made machines; carry large reserves of power; include refinements such as adjustable spark flaps and work rests; heavy steel guards to wheels; V-belt drive for shaft running in ball-races; flush-mounted push-button starter with overload trips for 3-phase A.C.; provision for connection of dust-collection trunking. Delivery Ex Stock.

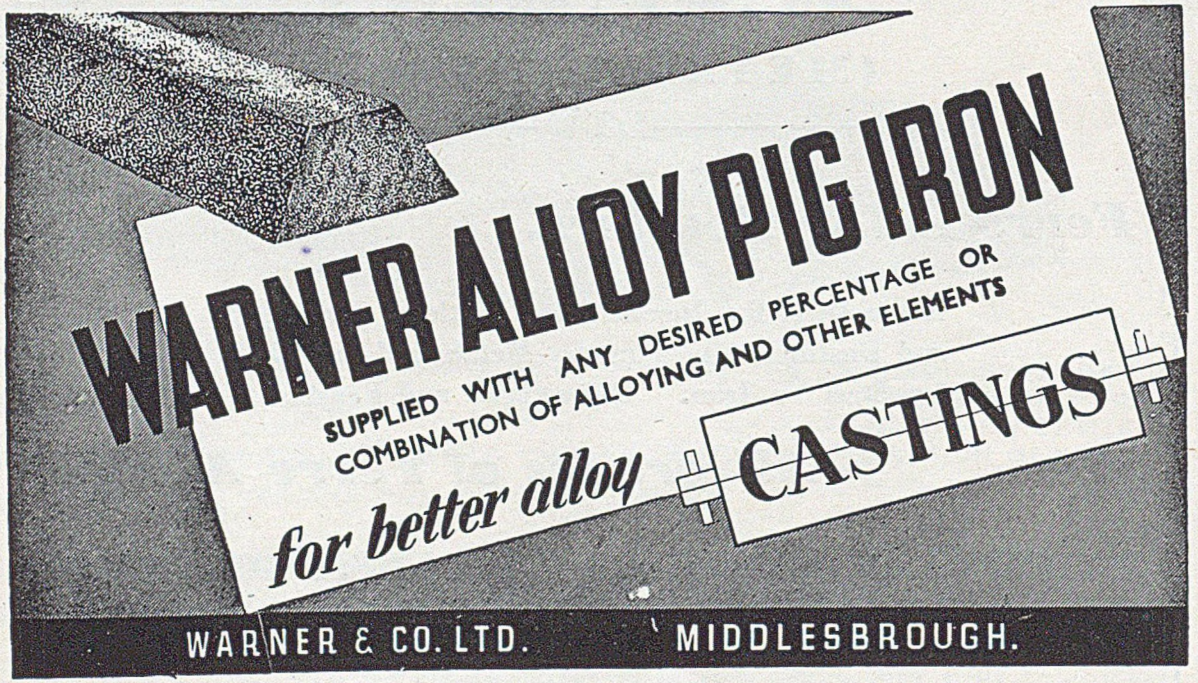
'STAFFA' DUST EXTRACTION UNITS

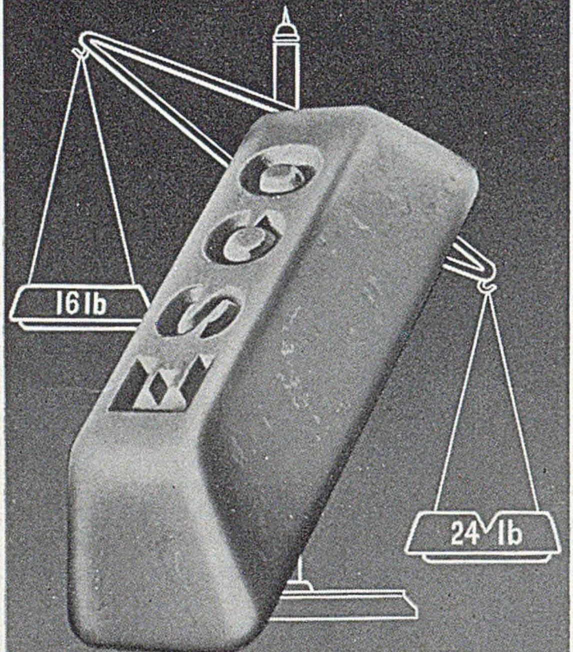
Self-contained; designed to take up minimum space; Filtration through bags via ducting to outside of building. Units suited for dust-collecting and polishing machines. No fixing to floor. Suction inlets adaptable for 1 or 2 m/cs.

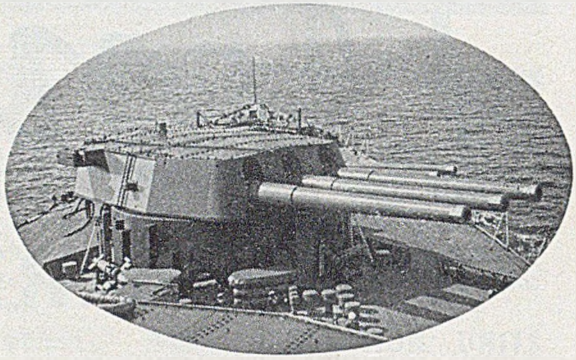
Write or phone now for full details: *Delivery Ex Stock*

CHAMBERLAIN INDUSTRIES LTD

Staffa Works, Staffa Road, Leyton,
London, E.10. LEYtonstone 3678




16 lb
24 lb



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.

1107

FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 90
No. 1811
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

MAY 17, 1951

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

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