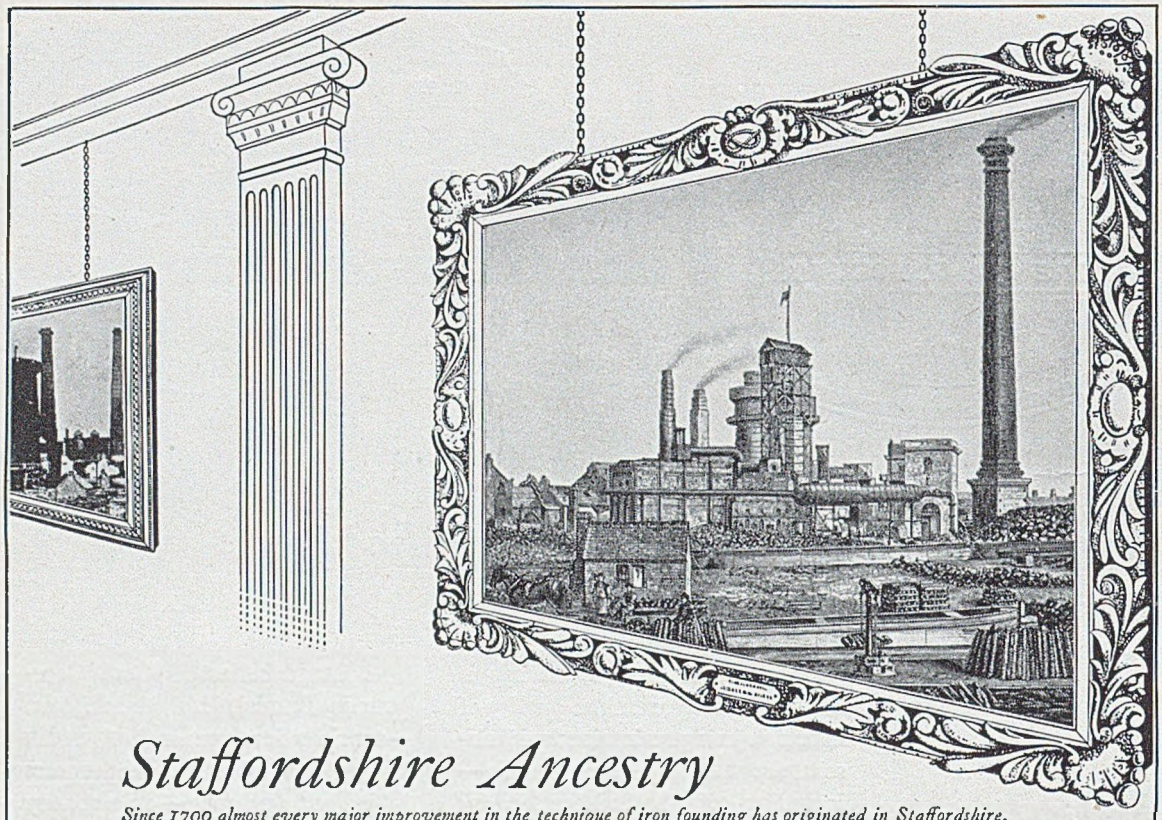
FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 90
No. 1799
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL
FEBRUARY 22, 1951
Offices: 49, Wellington Street, Strand, London, W.C.2

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



Staffordshire Ancestry

Since 1700 almost every major improvement in the technique of iron founding has originated in Staffordshire.

No. 4. THE DARLASTON STEEL AND IRON WORKS

The foundry, originally Bills and Mills, was established in 1814. On the death of the partners, it was taken over by those famous Ironmasters, the Lloyds of Wednesbury who, by their endeavours, contributed towards the expansion of Industrial England in the nineteenth century.

The years that have passed since those humble days of 1814 have slowly matured something beyond and above the paraphernalia of technical and scientific progress . . . . . Staffordshire craftsmanship . . . . . an inborn skill and knowledge, a keener eye, a surer hand. A rich legacy from our Staffordshire Ancestry.

For the past 136 years Pig Iron has been manufactured at Bradley & Foster's Darlaston Iron Works.
Today, Bradley and Foster's spectrographic control of raw material and finished product enables them to supply pig iron of consistent uniformity to the most exacting specification.

• *Pictorial reference is reproduced by courtesy of the publishers of Samuel Griffiths' "Guide to the Iron Trade of Great Britain" to whom grateful acknowledgment is made.*

Bradley & Foster LIMITED

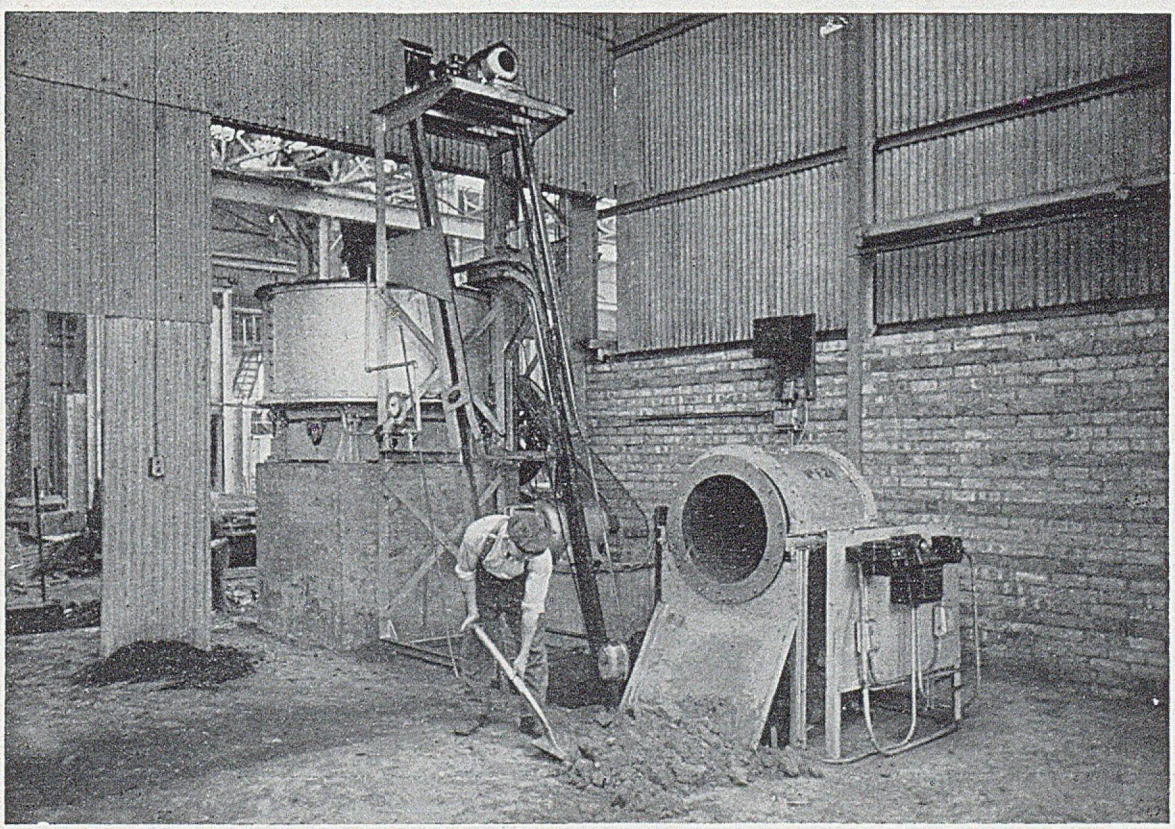
FOR QUALITY CONTROLLED
REFINED PIG IRON

DARLASTON · STAFFORDSHIRE

L.G.B.

PNEULEC *facing sand plant unit*

The illustration shows our facing sand plant unit which includes shovel fed rotary screen, collecting belt conveyor, magnetic pulley, loader and 6ft. 0in. diameter mill with disintegrator. The recommended batch capacity of the plant for facing is 6 cwts. and the normal batch cycle 6 minutes. This is a standard layout and there are many successful installations operating in all parts of the world. Further information will be gladly supplied on request.



Built in England by

PNEULEC LIMITED, SMETHWICK, Nr. BIRMINGHAM

BEETLE W.20

KNOCK-OUT PROPERTIES OF BEETLE CORE-BINDING RESIN "QUITE EXCEPTIONAL"

The knock-out properties of Beetle W.20 — the new core-binding resin — have been described by foundrymen as 'quite exceptional'. Opposite are details from the Beetle W.20 data sheet :

W.20 has good dry strength. Green bond agents are added to produce the required green strength.

Low viscosity — handling easy.

Quicker stoving is possible — stoving temperatures may range from 120°C to 220°C.

Permeability of cores not reduced.

Total gas evolution less than usual.

Fumes less troublesome than those of linseed oil—odour reduced to minimum.

All materials used to manufacture W.20 are British—no supply difficulties —delivery is quick.

Conclusions :

Beetle W.20 Core-binding resin can step up production and simplify the casting of intricately-cored parts. Not the least of its advantages is its all-British manufacture, ensuring promptness and continuity of supply at stable prices.

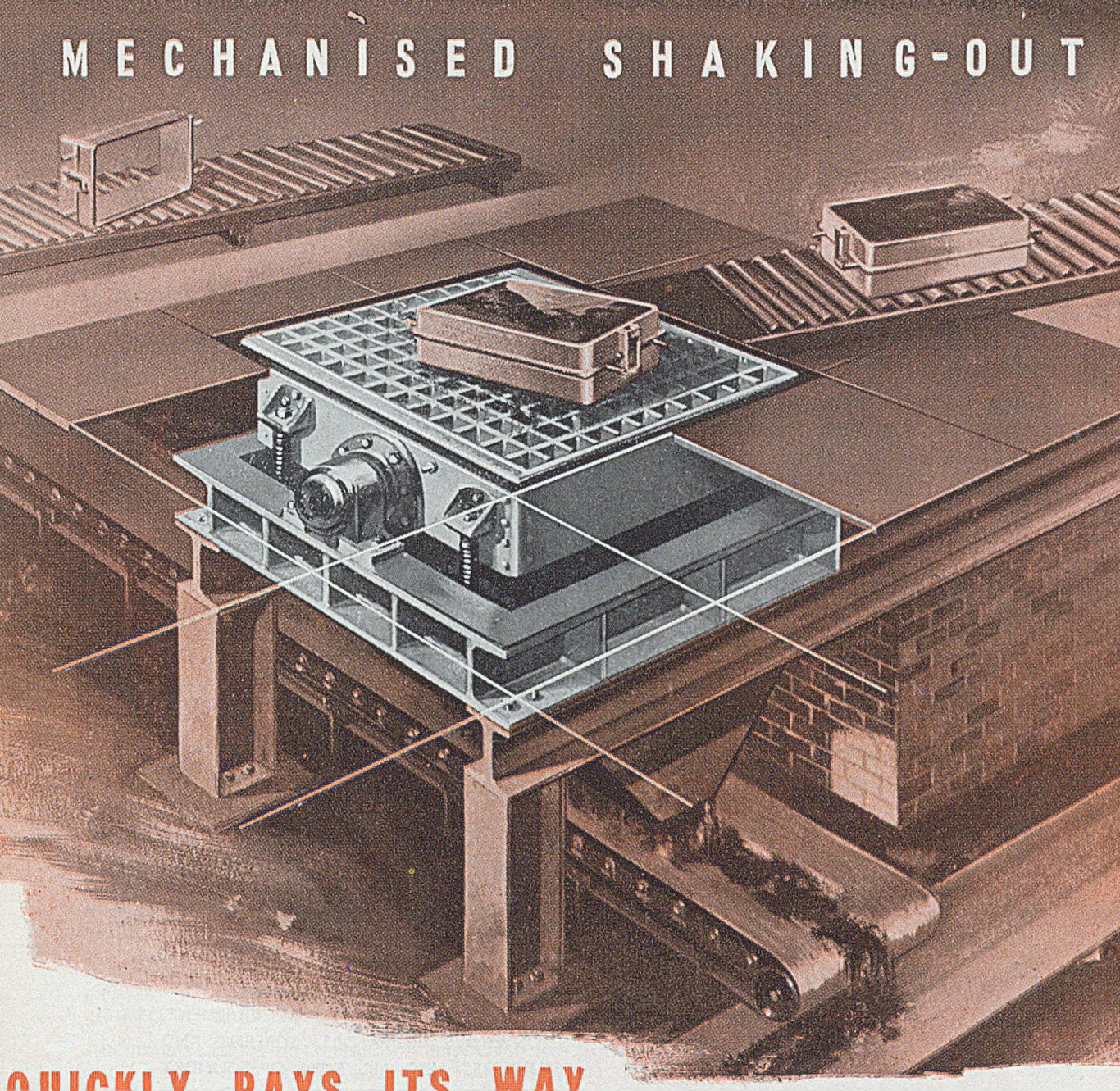
Write for Technical Leaflet CB1 to :

BEETLE BOND LTD., 1 Argyll Street, London, W.1

B·I·P GROUP

'BEETLE' is a trade mark registered in Great Britain and most countries of the world

MECHANISED SHAKING-OUT



QUICKLY PAYS ITS WAY

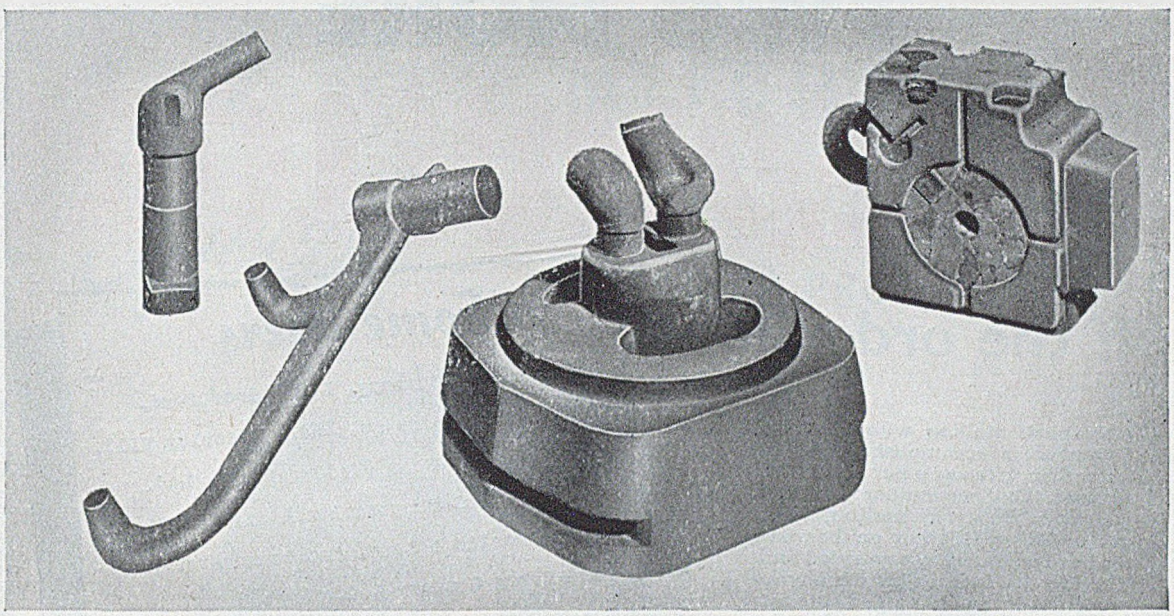
The Sterling Shake-Out Machine increases foundry economy and efficiency. Saving time, labour, reducing wear and tear on boxes to a minimum, shaking out and breaking up the sand completely. Made in sizes to take from 5 cwts. to 5 tons, they are a triumph of engineering brains over the brute force of a rough knock-out.

Sterling

SHAKE-OUT MACHINES

STERLING FOUNDRY SPECIALTIES LTD. BEDFORD ENGLAND

Cogent



ALUMINIUM CASTING

In the short period of two decades aluminium has emerged from the category of materials of speculative interest to occupy a front rank place in the group of non-ferrous metals.

It is constantly finding new applications and in many ways contributing to greater efficiency in all branches of engineering.

Aluminium casting, in sand and in metal dies with sand cores, now represents a very large and important branch of the Foundry Industry and the traditional procedures with suitable modifications have been adapted to its use.

Developments in Oil Sand practice cover approximately the same period of time as those of Aluminium Casting, and core production with cereal binders and oil has been an accepted feature of Aluminium Foundry work.

The picture reproduced on this page shows a series of cores made with G.B. KORDEK and Oil.

They conform to the requirements of Aluminium Castings production in respect of good green bond to prevent distortion, good dry bond to withstand handling and metal wash, and speedy decomposition after casting to avoid tearing and to facilitate shake out.

We are indebted to Messrs. Northern Aluminium Co., Ltd., Birmingham, for their kind permission to reproduce this picture.

TWO MORE SPEEDMULLORS

off the order list

Complete mulling with the Speedmullor is accomplished 4½ times faster than with any other mill. This is because the Speedmullor has lightweight rubber-tyred mulling wheels and mulls sand high up on the wall of the bowl where there is no speed limit. The full development of the physical properties in moulding and core sand is performed in complete cycles of 45 to a maximum of 90 seconds. The sand is turned over 200 times a minute resulting in the fullest uniformity of mixture. Ask us to show you a Speedmullor in operation.

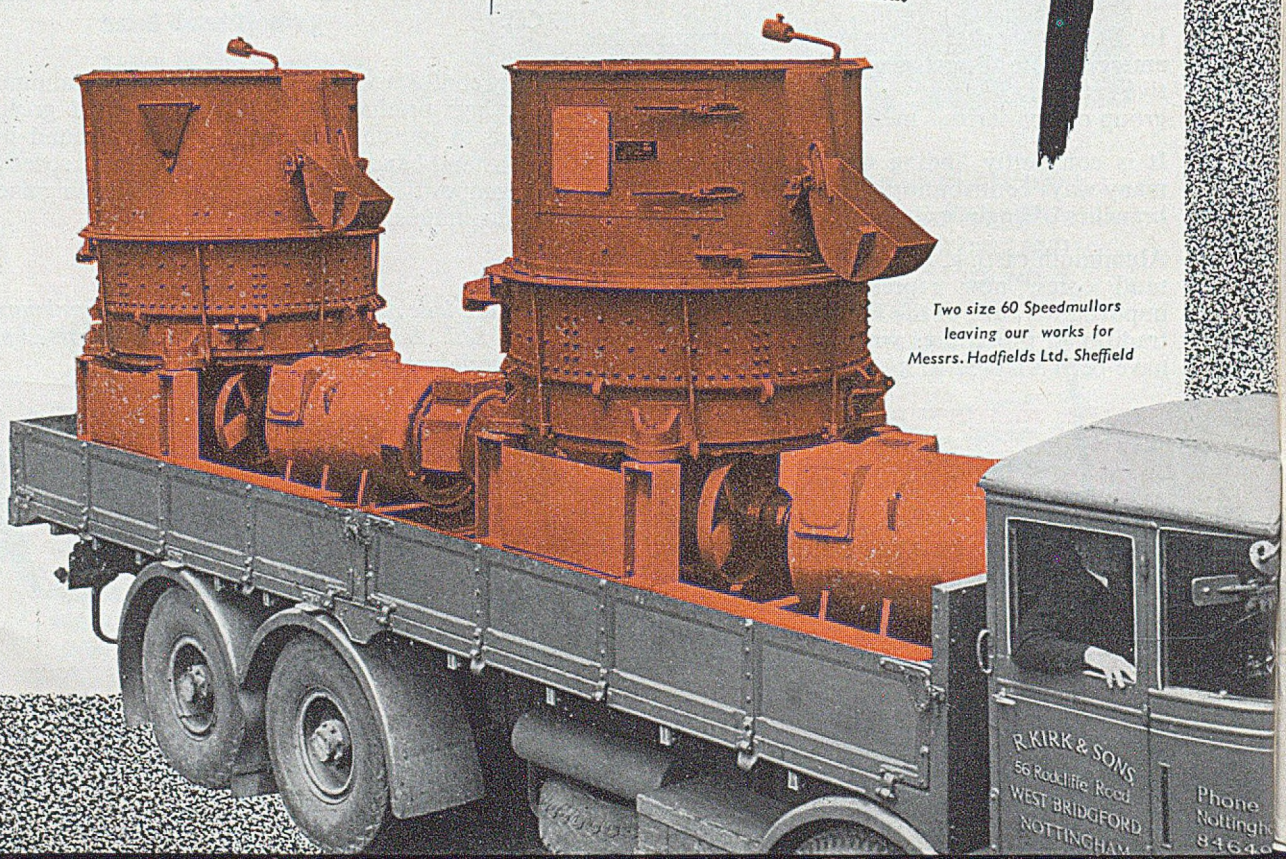
Made under licence from the Beardsley & Piper Co. Chicago by

Herbert Morris Ltd.

Loughborough England

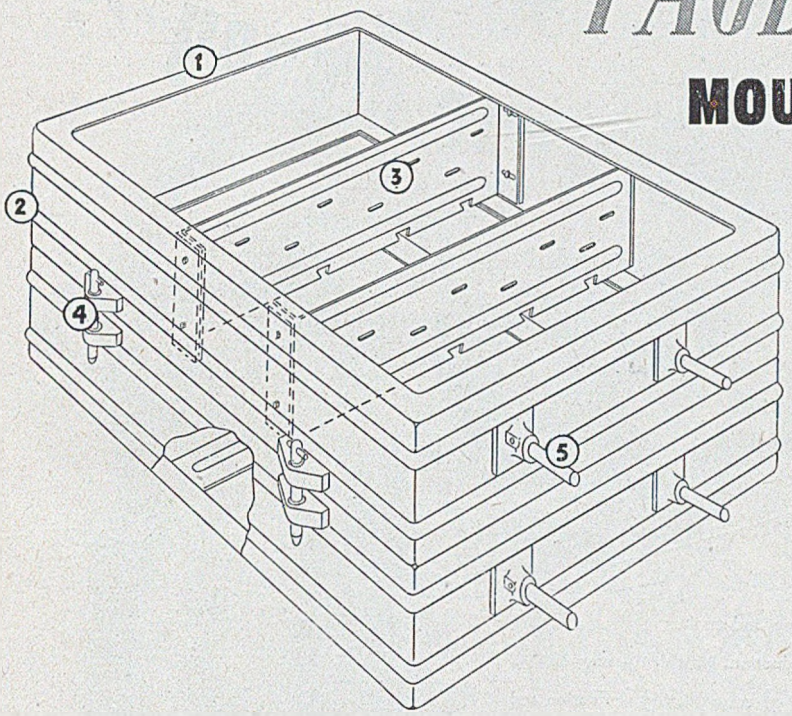
Some users

British Bath Company, Ltd., Greenford.
Brockmoor Foundry Co. Ltd., Brierley Hill.
David Brown & Sons (Huddersfield) Ltd.
English Steel Corporation Ltd., Sheffield.
Robert Ferlie & Sons, Auchtermuchty.
Ford Motor Company Ltd., Dagenham.
Gresham & Craven Ltd., Salford.
Hadfields Limited, Sheffield.
John Lang & Sons, Ltd., Johnstone.
Lloyds (Burton) Ltd., Burton-on-Trent.
Phosphor Bronze Co. Ltd., Birmingham.
Qualcast Ltd., Derby.
Shanks & Company Ltd., Barrhead.



Two size 60 Speedmullors leaving our works for Messrs. Hadfields Ltd. Sheffield

'PAGET' GENERAL PURPOSE MOULDING BOXES



1 *Wide flange for maximum sand support and good joint-faces.*

2 *Deep lateral swaging for wall and corner rigidity.*

3 *Ribs slotted and notched at joint-face edges, for sand-keying. All ribs are removable and adjustable up to 3¼ in.*

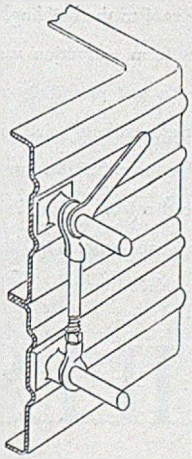
4 *¼ in. diameter ground-finished locating-pins, in removable hardened steel bushes.*

5 *1 in. diameter handles, located on lateral centre-line of each box to standardise clamps for boxes of similar depth.*

THE "PAGET" Moulding Box is an important new contribution to Foundry equipment, designed after full consideration of present-day needs and combines great adaptability with a high degree of accuracy. All ribs and stays are adjustable and removable, and frame and ribs are designed for maximum sand-keying. Accuracy of locating-pin centres is constant, and the quick-action clamps give absolutely positive locking. The Box is light yet very strong; the frame is a one-piece pressed steel section, and frame, ribs and stays are deep-swaged for extra rigidity.

A range of forty-two standard sizes is available, from 1 ft. square upwards and from 3 in. to 10 in. in depth, for which parts, standardised to strict limits, are interchangeable. Special boxes can be made for individual needs, to which alternative ribs can subsequently be fitted when required.

"PAGET" MACHINE MOULDING BOXES. These are similar to the General Purpose Box, with narrower flanges, one-piece "grip" type handle, and clamp fitting on spigots. Ribs and stays are not fitted as standard.



Link-type clamp with eccentric bush for quick and positive lock-action.
Clamps will fit all "Paget" Boxes of similar depth.

The Paget Engineering Co. (London) Ltd.

BRAINTREE ROAD - SOUTH RUISLIP - MIDDLESEX

RUISLIP 6011

D

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 :—

THE 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* : A. Hares, 648, Stapleton Road, Bristol, 5. *E. Midlands* : S. A. Horton, 163, Morley Road, Chaddesdon, Derby. *Lancs.* : R. Yeoman, 11, Sumner Road, Salford, 6. *Lincs.* : E. R. Walter, Ph.D., The Technical College, 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 : W. L. Lord, 123, Blackburn Road, Clayton-le-Moors, Accrington, Lancs. *Cape Town* : S. Wade, P.O. Box 46, Salt River. *East Anglia* : L. W. Sanders, Lake and Elliot, Limited, Braintree, Essex. *Falkirk* : D. Fleming, Robert Taylor & Company, Limited. Muirhall Foundry, Larbert. *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. *Secretaries* : **Peat, Marwick, Mitchell & Company,** 301, Glossop Road, Sheffield, 10. 'Phone and 'Grams : Broomhill 63031.

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.,** 20A, Collegiate Crescent, Sheffield, 10. 'Phone and 'Grams Sheffield 63801.

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 4466 ; 'Grams : "Iron" Swansea.

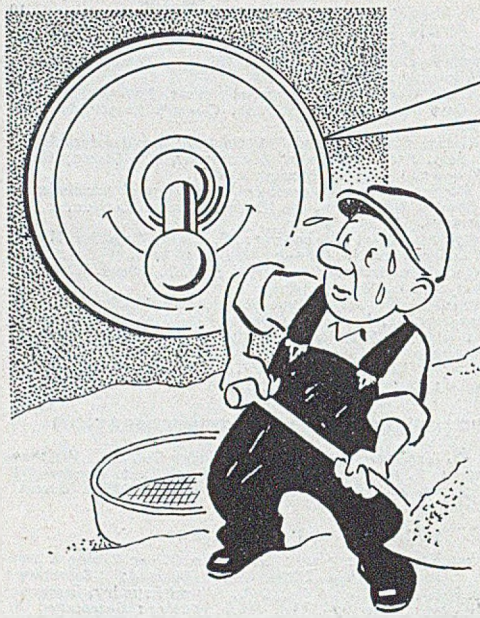
West of England Ironfounders' Association.—Secretary : R. Forbes Baird, 117, Church Lane, Handsworth Wood, Birmingham, 20. 'Phones: Northern 0343 & 0037 ; 'Grams : "Jacelace," Birmingham.

West Riding Ironfounders' Association.—Secretary : C. D. Buckle, 13 Cheapside, Bradford. 'Phone : Bradford 25346.

BRITISH CAST IRON RESEARCH ASSOCIATION

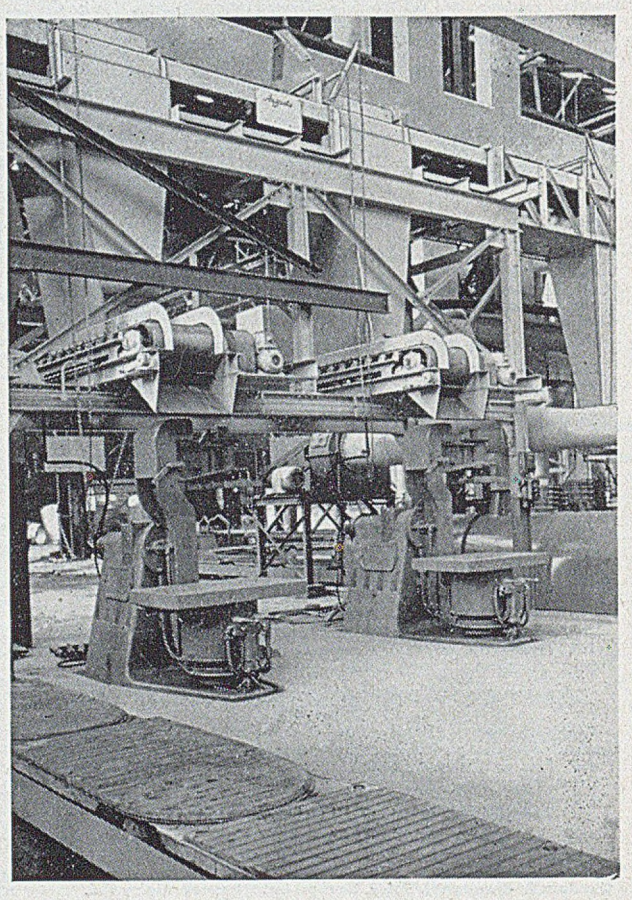
Alvechurch, Birmingham. 'Phone and 'Grams : Redditch 716.

Scottish Laboratories.—Blantyre Industrial Estate, Blantyre, Lanarkshire. ('Phone 486.)



MORE POWER AT YOUR ELBOW!

Since time's beginning, there have been two ways of doing things—the hard way and the easy; and the easy way was ever the outcome of thought. This is best demonstrated in the Modern mechanised foundry where the fatigue factor gives place to alertness. The brisk operative makes fewer errors; and it *all* adds up to higher output with lower overheads.



Photograph shows a comprehensive view of Sand Storage Hoppers attached to Overhead Distributing Belt Conveyor, Belt Feeder Conveyors for delivery of sand to Moulding Machines, with Mould Conveyor shown in the foreground.

Photograph by kind permission of Messrs. Ruston & Hornsby Ltd., Lincoln

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

Vol. 90 Thursday, February 22 1951 No. 179

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"

Coatings for Castings

It was with some surprise that we learnt that a foundry owner could bestow an almost unlimited number of surface finishes to his castings. The information came to use through a publication called "Metallic and Non-metallic Coatings for Gray Iron" issued by the (American) Gray Iron Founders' Society, which is reviewed elsewhere in this issue. Castings can be painted and, with the current trend of decorating industrial workshops, this might on occasion be done with advantage. Here the range and type of paints is extremely wide. However, beauty is not the outstanding characteristic of a casting, its suitability for use is the main criterion, thus, for example, tinning is extensively used where contact with food is encountered. Then, galvanising is much used for the protection of builders' castings. The Americans apparently attach considerable importance to metal spraying and list over twenty elements and alloys which have been successfully used. The electroplating of iron castings is practised in this country but not, we think, very extensively; however, for certain types—especially malleable—it is very useful. The use of vitreous enamelling is well known and appreciated as a coating for articles made of cast iron and installed in homes. We know of no more satisfactory and pleasing finish than this when nicely carried out. Some articles then well merit the appellation "beautiful."

There are coatings which are purely utilitarian, as for instance the use of aluminium paint as an aid to visibilty in the interior surfaces of box-like machine parts. Again, an oil dip or spray can prevent the rusting of castings lying in the yard for prolonged periods for removing locked-up stresses. The black finishes put on the pipelines essentially feature as protection against corrosion. There are treatments for bestowing different properties to the surface of cast iron, such as nitriding or the depositing layers of metals by a process analogous to welding. Shot-blasting and pickling also might be considered under this heading, as pre-requisites to the application of coatings. They at least change the general aspect of the product. The field revealed is one which invites the attention of those with inventive minds and one from which the industry may reap rich rewards.

There was held in London last year an Industrial Finishing Exhibition but it was very poorly attended and thereby lost much interest. We would like to see on a suitable occasion a composite exhibition of all the possible finishes that human endeavour can bestow upon castings and, preferably, it should be in the form of a non-commercial exhibit. It is fair, we think, to observe that the average foundryman is unaware of the wide range of æsthetic and utilitarian coatings that can be applied to castings. At the moment it is, unfortunately, the latter type which command the more attention, but if ever industrial conditions become what we still imagine to be "normal" then pleasing finishes to castings would assume real importance in the sales programme.

B.C.I.R.A. Conference on Malleable

Ashorne Hill, March 14 to 16

A conference on malleable cast iron organised by the British Cast Iron Research Association will be held from Wednesday afternoon, March 14, to Friday evening, March 16, at Ashorne Hill, near Leamington Spa, and application forms, which should be completed and returned to the Association as early as possible, have been sent out.

It is not at present possible to give a detailed timetable for the following Papers, and the accompanying programme is only provisional. A final printed programme will be circulated to delegates on arrival at the conference.

Author.	Firm.	Subject.
Wednesday afternoon, March 14.		
N. Gray ..	Guest Keen Baldwins Iron & Steel, Cardiff	The Pig-Iron Position.
J. Hunter ..	B.C.I.R.A.	Mechanisation of Malleable Foundries.
Thursday morning, March 15.		
O. Mattern ..	L. & C. Steinmuller, Gummersbach, Germany	The Hot-blast Cupola.
Dr.-Ing. K. Roesch	Bergische Stahlindustrie, Remscheid, Germany	Recent Hot-blast Cupola Developments.
H. W. Perrott ..	Alfred Herbert Ltd., Coventry	Pulverised-fuel Furnaces for Melting Malleable.
Thursday afternoon.		
P. C. Fassotte ..	Leeds	The Sesel Furnace.
W. D. Bullows .	Castings, Walsall ..	Oil-fired Rotary Furnaces.
S. W. Palmer ..	B.C.I.R.A.	Manganese/Sulphur Ratio in Whiteheart
Friday morning, March 16.		
Dr. F. Schulte ..	Birlec, Birmingham ..	Gaseous De-carburisation.
P. F. Hancock ..	Birlec, Birmingham ..	Controlled—atmosphere Annealing Furnaces.
Dr.-Ing. K. Roesch	Bergische Stahlindustrie, Remscheid, Germany	Experiences with the Gaseous-annealing process.
Friday afternoon.		
P. H. Shotton ..	Shotton Bros., Oldbury	Production of Blackheart Malleable
Speaker to be announced later		Pulverised-fuel Annealing Furnaces.
E. Hunter.. ..	Incandescent Heat, Smethwick	Controlled - atmosphere Furnaces for Blackheart.
Dr.-Ing. K. Roesch	Bergische Stahlindustrie, Remscheid, Germany	Production of High-duty Whiteheart Malleable Cast Iron.
H. Morrogh ..	B.C.I.R.A.	Nodular Irons v. Malleable Irons.

There will be cinema performances at 8.15 p.m. on the evenings of March 14 and 15.

Output of iron castings during 1950 totalled 3,480,892 tons—a new all-time record. The previous year's output was exceeded by 99,000 tons.

LAST SATURDAY 550 employees of Ley's Malleable Castings Company Limited, Derby, all of whom had over 21 yrs' service with the group, were entertained at a dinner given to mark the completion of 21 yrs' service by Mr. Francis D. Ley, managing director. Mr. Ley presented long-service certificates and £10 to 13 men who had completed 40 yrs' service, and watches and clocks to 51 men who had completed 21 yrs' service. This brought the total of 40-yr.-long-service certificates to 172 and 21-yr.-service clocks and watches to 1,049. He later stated that during the 21 yrs he had been with the group, over one million pounds had been spent in improving and extending the plant.

Institute of Metals

Annual General Meeting in London, March 13 to 15

The annual general meeting of the Institute of Metals will be held in London from March 13 to 15. Connected with it there will be an all-day symposium on "Metallurgical Aspects of the Cold-working of Non-ferrous Metals and Alloys." The following is the detailed programme:—

Programme

Tuesday, March 13, at Park Lane Hotel, Piccadilly, London W.1:—

10.30 a.m. Business meeting; reports of the Council and honorary treasurer and on the election of officers for 1951-52 followed by induction of the new president, Professor A. J. Murphy, M.SC., F.I.M., and a vote of thanks to the retiring president, Mr. H. S. Tasker, B.A., and other retiring officers. Then there will be the Presidential Address by Professor Murphy.

1 p.m. Luncheon at which there will be presentations of the W. H. A. Robertson Medal to Mr. Christopher Smith, and of the Walter Rosonhain Medal to Professor G. V. Raynor.

3 p.m. Discussion of Papers:—(1) "The Influence of Oxide on the Pressing and Sintering of Copper Compacts," by Hoar and Butler; (2) "Stress-ageing Treatment and its Effects on the Physical Properties of Copper-, Iron-, and Aluminium-base Alloys," by Gill, Smith and Harrington.

5 p.m. Meeting adjourned.

Wednesday, March 14, at Park Lane Hotel, Piccadilly, London W.1.

10 a.m. Symposium on "Metallurgical Aspects of the Cold-working of Non-ferrous Metals and Alloys." A general discussion, based on five Papers already published on this subject.

12.45 p.m. to 2.30 p.m. Adjournment for luncheon.

5 p.m. Meeting adjourned; symposium concluded.

Thursday, March 15, at 4, Grosvenor Gardens, London, S.W.1.

10 a.m. Joint discussion of Papers:—(1) "Modification in Aluminium-silicon Alloys," by Thall and Chalmers, and "The Solubility Relationships in the Aluminium-sodium and Aluminium-silicon-sodium Systems," by Ransley and Neufeld; (2) "Shearing of Metal Bars," by Chang and Swift, and "Shearing of Metal Blanks," by Chang.

12.30 p.m. Conclusion of the meeting.

Joint Meeting with the Acoustics Group of the Physical Society on "Internal Friction of Solids"

A discussion on "Internal Friction of Solids," organised by the Acoustics Group of the Physical Society, in association with the Institute of Metals and the Iron and Steel Institute will be held at 2.30 p.m. in 4, Grosvenor Gardens, after the conclusion of the Institute of Metals annual general meeting. The discussion will follow a series of contributions by well-known authorities, invited by the Acoustics Group of the Physical Society. More detailed particulars of the meeting will be sent to all who expect to be present.

The meeting will continue after a break for tea.

Core Oils. From Wm. Aske & Company, Limited, of Halifax, we have received a loose-leaf catalogue covering the well-known Baltiseed range of core oils and similar products. Newer notes are struck, with announcements about Zircon paste and synthetic-resin bonds. The catalogue is available to our readers on writing to Halifax.

Foundry Coke Merchants' Dinner

Members of the Foundry Coke Merchants' Association entertained very many of their friends to dinner in the May Fair Hotel, London, W.1, on Friday last, under the chairmanship of Mr. Arnold Carr. The guests were representative of the producers and consumers of foundry coke and of the educational and trade organisations serving the industry. The guest of honour was Mr. J. Y. Feggetter, representative of the producers' side. It was a happy evening; the speeches providing a blend of the serious and the not so serious.

The Toasts

The loyal toast having been honoured, Mr. H. Basil Darby proposed "The Foundry Coke Producers." For information on the production of foundry coke in this country he had turned to a standard year book, 1949 edition, which showed that coke-oven production was 13¾ million tons, of which 2.2 million tons were consumed by other than iron and steel and engineering. He supposed the latter figure included the coke consumed in the foundries. But the figures were formidable; they served to show the vast extent of the coke industry and to underline its vital importance to the nation at all times, especially now, when the country's very existence depended on making such efforts as had never been made before. The coke industry not only provided a basic raw material for the steel and foundry trades, but its by-products represented the starting point for countless chemical products which were essential in a thousand ways to our modern economy.

Mr. J. Y. Feggetter, in his response, said that one of the functions of the Association was to maintain good relations to the producers. The quantity of coke consumed for foundry purposes was about one million tons per annum; he was very pleased that 1950 was a record year for deliveries of coke and was also a record year for the ironfounding industry. The tonnage of iron castings produced was 3¼ millions, and the producers were indebted to their merchant friends for the smooth working which had been effected, enabling the castings industry to achieve such a record. He thanked them for their co-operation. A small proportion of the foundries, he supposed, must have joined the nationalised industries, and he was pleased to say that the coke section did not suffer from a surfeit of officials. In conclusion, Mr. Feggetter offered his best wishes to his hosts for another successful year.

Mr. Barrington Hooper, C.B.E., who proposed "The Foundry Coke Merchants," was in his usual good form and entertained his audience with a series of stories which illustrated or were suggested by the points he was making. He had been given five lines, he said, as a basis for his remarks in proposing the health of the merchants and their Association. The Association was celebrating its first decade of work; it was originated by a group concerned with the trade in the London area who had got together the producers in an effort to bring some form of organisation out of chaos.

The Chairman, in his response, said the Association was created by a group of people in London who had the idea of putting on to a sensible footing the handling of foundry coke, particularly in the London area. The coke was delivered to works by road, and at that time there was a lot of cut-throat competition, so that nobody could live. We did not live very well now, but we did exist. Then the need for a national Association was urged by many people, and after discussions it had become his job to create it; and he was very pleased that it had progressed during the ten years which had since passed.

Commenting on Mr. Feggetter's reference to the comparison of foundry coke in the United Kingdom as being a million tons per annum, he said that members of the Association were responsible for handling, he believed, more than 70 per cent. of that total quantity; so that as an Association they were performing a very useful service to the producers, now a nationalised body.

Foundry Supplies

Mr. F. A. Wilson, the Association's hon. dinner-secretary, proposed "The Foundry Trade," deputising for Mr. A. E. Bond, a prominent member of the Committee, whose disappointment in being unable to attend was shared by his many friends. When working in the foundry of Pease & Partners in 1920, said Mr. Wilson, Mr. Pennington—whose son was present at the dinner—had filled him with enthusiasm for the foundry trade. One thing which the foundry trade, in spite of mechanisation in its most advanced forms, would always retain was the almost unlimited field it offered for the genius of the craftsman. The foundry trade in the United Kingdom, through its own Associations—the Institute of British Foundrymen, the British Steel Founders' Association and the British Cast Iron Research Association, strongly supported by THE FOUNDRY TRADE JOURNAL—was doing a magnificent job by way of research to keep our foundry craftsmen ahead of all others throughout the world; and, still more important, it laid tremendous emphasis on the education of the rising generation to ensure a steady flow of skilled men in the years to come.

The merchants in the Association, he continued, formed a connecting link between the coke users in the foundry and the producers. There might be a time when they would have to exercise all their ingenuity in interpreting the foundrymen's requests as to when they would receive their coke (in language intelligible to the Coke Directorate); the merchants could, with equal facility, deal with either side.

Mr. R. B. Templeton, (past-president, Institute of British Foundrymen), in his response, said that, judging by the enthusiastic manner in which the toast had been honoured, all present were happy to support it.

In these times of rapidly-changing world economy, Mr. Templeton suggested, instability was the most troublesome factor the foundry industry and all other industries had to face, with the world more uncertain and insecure than at any time in history. Prices and supplies of raw materials were at a premium and would remain so until the situation cleared. It was beyond human power to predict whether there would be slump or boom conditions in the next few years, and anyone seeking stability must never ignore base metals. Two years ago the commodity values of grain and cotton were falling, but metal prices had remained firm and to-day they had risen to unbelievable heights. We had now the situation of an industrial world starving for its raw materials—its coal and coke, its ores and metals—with little prospect of satisfying its appetite for years to come. Discussing the reason, he said that wars quickly changed the face of the world and scarred it physically, scarred it very deeply in certain localities. Those scars, however, soon healed; but the devastating effect of war upset and revolutionised world economy for many years after the last shot had been fired.

Coke Merchants' Dinner

The Guests

The Chairman proposed "Our Guests." But first he expressed regret that there were some whom the Association had not the opportunity to welcome owing to sickness or to their being out of the country on missions of importance for Government or semi-Government business. Mr. Leslie O'Connor, the Director of Carbonisation, was extremely disappointed that he was not able to be present. Mr. J. J. Sheehan, the president of the Institute of British Foundrymen, was attending an Institute function in Monmouthshire. Again, Mr. N. P. Newman, past-president of the I.B.F., was in Europe. Mr. Greenwell, secretary under Mr. O'Connor, was unfortunately ill. A letter had been received late that afternoon from Mr. Sullivan, of South Wales, who was also ill. It was, however, a delight to welcome Mr. G. H. Bedford, who was representing himself and Mr. Sullivan. Mr. R. Causebrook, who had been for so long the hon. secretary of the London branch of the Association and who had resigned that appointment towards the end of last year, regretted that he could not be present; the chairman had met him that day at London Airport, from which he was travelling. It was pleasing that Mr. Pratt, of Crook & Company, had taken over the duties of hon. secretary of the London branch.

Mr. Dudley Evans, who had been the national secretary of the Association since its inception, had found it necessary to relinquish his post because of his advancing years; and one had a great deal of sympathy for him. All his friends in the Association wished him throughout the rest of his life all the happiness in the world. The chairman offered a warm welcome to Mr. S. Owen as national secretary of the Association.

Welcoming representatives of the National Coal Board, the producers of foundry coke, the chairman paid tribute particularly to the Association's friend Mr. Feggetter. The members of the Association would wish to express appreciation of the work of Mr. F. Arnold Wilson, as hon. organising dinner-secretary, who had done most of the work in connection with that function, and had obtained the illustration of the discharge of red-hot coke from an oven printed on the front of the menu. Thanks were expressed also to the Woodall-Duckham Company for their kindness in lending the Association the block; and to the publicity manager of the chairman's own company, who had had the menu printed in a very short time. Among the guests there were also representatives of those who had been absorbed by the National Steel Board, representatives of British Railways, a representative of the refrigeration-engineering founders (Mr. J. D. Farmer), and the Association's publishing friends, Mr. Barrington Hooper and Mr. V. C. Faulkner.

On the the iron-producing side there were men whose names had become famous. The chairman welcomed Mr. L. Wright, Mr. T. Brown (managing director of the Sheepbridge group of companies), and Mr. Templeton, who was so well known to the Association by his work in the foundry trade. Mr. Frank Rowe, who would respond to the toast, was also very welcome. He made steel castings and was a founder of no mean repute; he was one of the fortunate people who had not yet been nationalised.

Mr. F. W. Rowe (chairman of the British Steel Founders' Association) responded and quoted from a book he had read recently, written by an Italian craftsman in the 16th century, one Biringuccio, which indicated that foundrymen and foundry work had altered but little throughout the ages.

Leaders of the Industry

Mr. W. E. ASKE

Mr. Aske is the president of the Foundry Equipment and Supplies Association and chairman and managing director of Wm. Aske & Company, Limited, of Victoria Works, Waterside, Halifax. He received his early education at Heath School, Halifax, and later at the Halifax and Bradford Technical Colleges. His first job was in the foundry of Drakes, Limited, gas engineers, of Halifax, where he worked first on the foundry floor and then in the core-shop. Next he went to the Farington foundry of Leyland Motors, Limited, where he divided his time between the laboratory and core-shop. In 1926 the time arrived for him to join the family business, founded by his father the late Mr. Wm. E. Aske in 1904. In its early days it specialised in the supply of oils, paints, and general mill and factory furnishings, but in 1909 experiments were carried out in the production of

core oils and the product was marketed under the trade name of "Baltiseed." The business grew and on two occasions, the location of the factory was removed to larger premises, the last time being in 1939. In 1929, the business was registered as a private limited company, and when in 1937 the founder retired, Mr. Aske became chairman and managing director. He was elected to the council of the "Equipment" Association in 1946, became vice-president in 1948 and was elected president in 1950. During this period he was a member of the sub-committee of the Joint Standing Committee on Conditions in Ironfoundries. This was formed with the object of examining what steps could be taken to reduce the amount of fume given off during core baking and after casting. In this connection he collaborated with Mr. Wilks of the Fordath Engineering Company, Limited, and Mr. Wood of British Foundry Units, in collection of the data, which has recently been published as a White Paper, "Practical Methods of Reducing Fumes, etc."

THE SCOTTISH BOARD FOR INDUSTRY have recommended the setting up of a panel to inquire into the problem of Scottish metallurgical coke as it affects Scottish foundries. The Board are taking immediate steps to implement the recommendation on which representation by numerous founders and government departments is to be invited.

Pianoforte Frame Castings

Production at the Mildmay Ironworks of Booth & Brookes, Limited

IN EVERY PIANO, be it concert grand or humbler "upright," the backbone of the instrument is a triangular or harp-shaped grey-iron frame casting. The manufacture and preparation of these frames has for over 50 years been the speciality of the well-run foundry of Booth & Brookes, Limited, of Mildmay Ironworks, Burnham-on-Crouch, Essex. It happens very frequently, that the early establishment of a foundry as a successful unit rests on the production of a speciality or bread-and-butter line, but in later progress the modest beginnings are often lost to sight as new lines are developed. Not so with Booth & Brookes, production of pianoforte frames is still a staple line, though after reaching a peak production in 1923 with 30,000 castings it has since declined to a modest 2,500 per year. In size, the frames normally vary from 3 ft. long to 11 ft. long and 4 ft. 6 in. wide, and in weight up to 5 cwt., large and small examples being shown in Figs. 1, 2 and 3 (the smallest, 7½ in. long, being for the Queen's dolls house). An international reputation for excellence in this class of work has been established. Very few other firms in this country are engaged similarly.

History

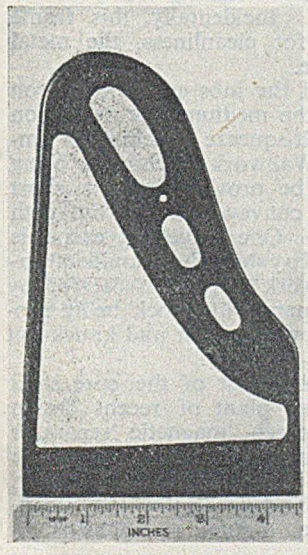
The foundry was built, on the same site as occupied to-day by the late Mr. J. W. Booth, a well-known Irishman, son of the inventor of eiderdown quilts, who also founded the United Irish League in London. Before entering the industry on his own account, Mr. Booth was agent for the piano-trade section of the Coalbrookdale concern in Shropshire. His choice of Burnham for erecting his own factory was influenced by his love of yachting, a hobby perpetuated in his sons, Mr. C. C. BOOTH, J.P., and Sir Paul Booth, now joint managing directors of the firm. Since the establishment of the works in 1899, with pianoforte frames as the main business, many other lines have been introduced and some discarded with the passage of time. What follows is a brief account of the present-day set-up and activities of this interesting "family" concern.

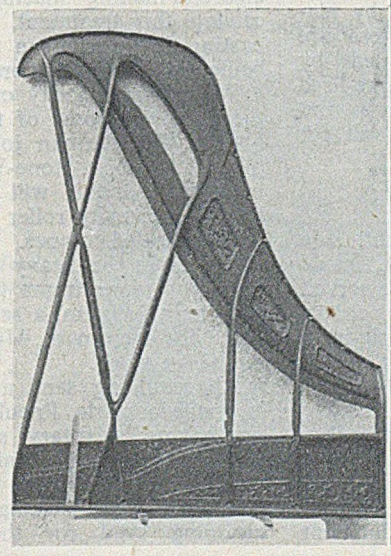
Examples of Pianoforte Frame Castings made at Mildmay Iron Works:—

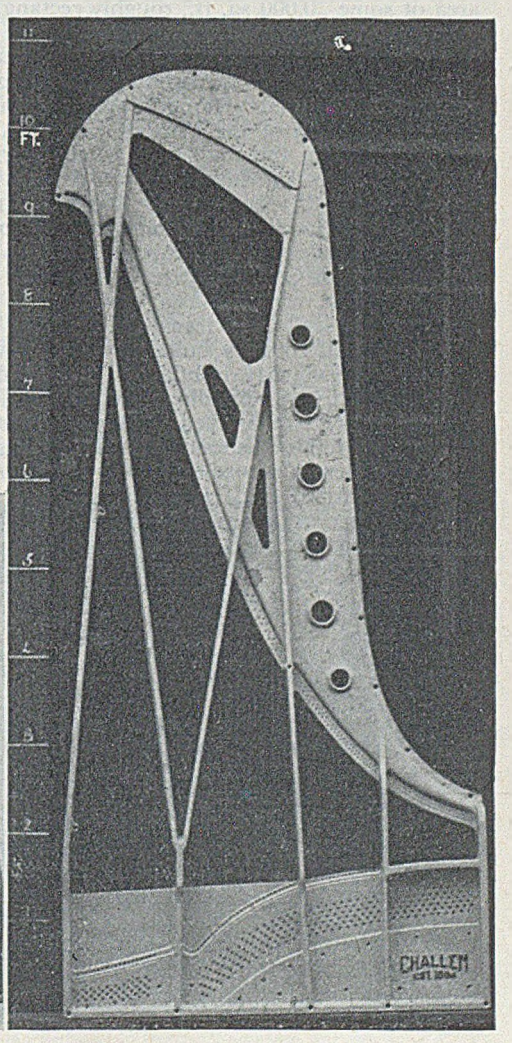
FIG. 1 (*left*).—*Casting, 7½ in. high, made for the Piano of the Queen's Dolls' House.*

FIG. 2 (*centre*).—*Piano Frame Casting made for Chappell & Company, approx. 5 ft. 6 in. high; note the Ornamental Panels.*

FIG. 3.—*Concert Grand Frame, over 10 ft. high, for a Challen Piano.*







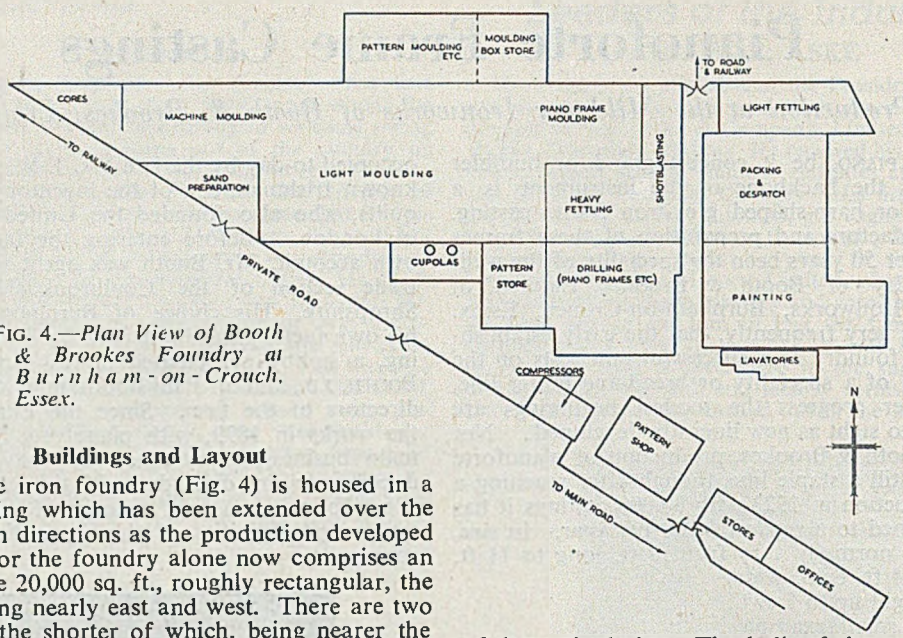


FIG. 4.—*Plan View of Booth & Brookes Foundry at Burnham-on-Crouch, Essex.*

Buildings and Layout

The entire iron foundry (Fig. 4) is housed in a single building which has been extended over the years in both directions as the production developed and which for the foundry alone now comprises an area of some 20,000 sq. ft., roughly rectangular, the long side lying nearly east and west. There are two main bays, the shorter of which, being nearer the cupolas, is devoted to the production of thin-section castings. The piano-frame moulding is now confined to one end of the "heavy" bay. A private road runs along the south side of the works, connecting with the railway at the western end and the main road at the eastern, so that raw materials, pig-iron, sand, etc., can be delivered by lorry and unloaded adjacent to the cupolas or storage bins. Finished goods are despatched from the north-eastern corner, which is also conveniently situated for both rail and road transport.

The original foundry building which now forms part of the long bay is built of brick and so are some of the newer buildings, but the majority of extensions are steel-framed buildings covered with corrugated iron or asbestos sheets. Floors are of sand or concrete according to the requirements of the work carried out. Lighting is largely by filament or mercury-discharge lamps, but these are being gradually replaced or supplemented by fluorescent tubes. Slow-combustion coke-fired stoves are used for heating most of the shops, but in the foundry the general preference is still for open braziers.

Melting Equipment

The melting equipment situated on the south side consists of two cupolas of standard design, inside diameters being 28 in. and 33 in.; they are served by an electric lift for raw materials. Hand charging is practised from a platform to which pig-iron, coke, limestone, etc., are brought in bulk. The smaller cupola is shortly to be replaced by a new unit incorporating mechanised charging of the skip type. Melting takes place during the afternoon, the first few charges being a high-duty iron mix for castings mainly to B.S.S. 1452/48, grade 17. Inoculation of this metal at the spout is effected with ferro-silicon added from a cone attachment of domestic design. The bulk of the production is of higher phosphorus (1·40 per cent.) iron, the daily total melt being a matter of seven or eight tons. Northamptonshire pig-irons are used for the ordinary irons with "Ford" and steel for the high-duty mix. The metal is tapped into two-wheel bogie ladles, 10 cwt. capacity, for distribution. Small castings are poured from hand ladles holding up to 40 lb., while pot shanks (140 lb.) are used for piano frames and the large jobs.

Moulding

Nearly all the moulding is in green-sand although a small proportion for heavier castings is skin dried. The drying is effected by a large paraffin blowlamp, such moulds as that for a side frame of a cigarette-making machine weighing 1¼ cwts. receiving this treatment. Incidentally, this frame casting is bottom-run for cleanliness, the metal being led through a core.

While the majority of the jobs are moulded on the floor, for some of the medium size repetition lines a Zimmerman jolt-squeeze machine is employed. Also, a Stone-Wallwork machine is being installed and this will be provided with a short length of gravity roller conveyor to link up with hand-operated cranes. One travelling crane is available in the heavy bay but the moulders engaged on piano-frame work (Fig. 5) are served by a monorail system, a separate lift block being provided for each man. Moulders pour and knock-out their own work.

All moulding sand and most of the core sand is conditioned in Pneulec plant of recent design comprising a rotary screen, magnetic separator pulley, a mill and a disintegrator. The rest of the core sand is prepared in a "Spermolin" mixer. Also used is a Coleman disintegrator for reconditioning sand for the moulding machines, a

"Distribond" addition being made. Generally speaking, local yellow sand is used in the foundry, but some Mansfield red sand is incorporated for special facing mixtures.

The core-making section is situated at the extreme end of the building. There is not a great deal of cored work, however, the entire staff of this department consisting of two elderly ex-moulders and two girls. Several sand mixtures are employed using oil and cereal binders and sea sand with proportions of the same moulding sands as used in the foundry to give extra green-strength and hot-strength. One drawer-type stove comprises adequate drying capacity for most of the work, but a larger bogie-type stove is used for certain of the larger cores.

Fettling and Despatch

A room-type shot-blast plant and a "Sand Wizard" (Fig. 6) are situated at the eastern end of the foundry, and separate fettling shops deal with the heavier and lighter types of castings. Blasting normally finishes at lunch time leaving the operators free to help with pouring during the afternoon. Compressed air for both fettling shops and foundry is provided by three Broom & Wade compressors, total capacity 220 cub. ft. per min., situated in a separate building. Most of the castings are despatched by road in the company's own lorry which makes the journey to London (approximately 50 miles) about three or four times each week and to East Anglia once.

Patternmaking

Highly-skilled patternmaking is essential to the successful production of pianoforte frames, and experience gained in this line has proved of great worth with other jobs. Patternmaking is housed in a two-storey building, the first floor being devoted to woodworking and the ground floor to metal. It is the policy of the firm to put extra work into patterns over and above normal, so as to simplify moulding and increase accuracy in the foundry. Minute details receive studied attention, such as the placing of registering marks in a core-box for lifting "eyes," so that the core shall be well-balanced. Equipment in the "wood" section includes two small lathes, a bandsaw and a planer.

Whenever possible, pattern plates are used in preference to loose patterns, and production of quite small quantities of castings is considered to warrant their use. A novel feature of the metal-pattern section is the production of "utility plates." Normally to make up a complete pattern plate for small castings, a number, say sixteen, of small pattern castings would be required. The utility plate arrangement, however, is such that four patterns only are made to comprise a quarter panel of a plate; the panel being held in position by a locking bar. The rest of the panels are furnished from other running lines similarly treated or a portion is stopped off. The method permits economical pattern-plate moulding of jobs which separately would not justify a full plate. A corner of the foundry has been set aside for the casting of metal patterns; melting equipment here is a Morgan tilting coke-fired crucible furnace used for aluminium and occasionally for brass.

Pattern Store

In order to cope with the pressure on accommodation, a new pattern store (Fig. 7) was provided a short time ago. Although at one time hundreds of different patterns were retained for piano frames alone, the number of these in use to-day is not large. Much space, however, is occupied by "jobbing" patterns, these being stored in racks according to customer. As jobs are requisitioned, loose patterns and core-boxes, etc., are laid out on a bench and the plated work on a rack so that the complete set is immediately available for use. Upon completion of a job, the pattern storekeeper is responsible for collecting the equipment, cleaning it, and putting it away. About 1,000 pattern plates and hundreds of loose patterns and core-boxes are stored.

FIG. 5.—*Pianoforte Frame Bay, showing Part-finished Moulds. Note the Overhead Monorail Hoists.*

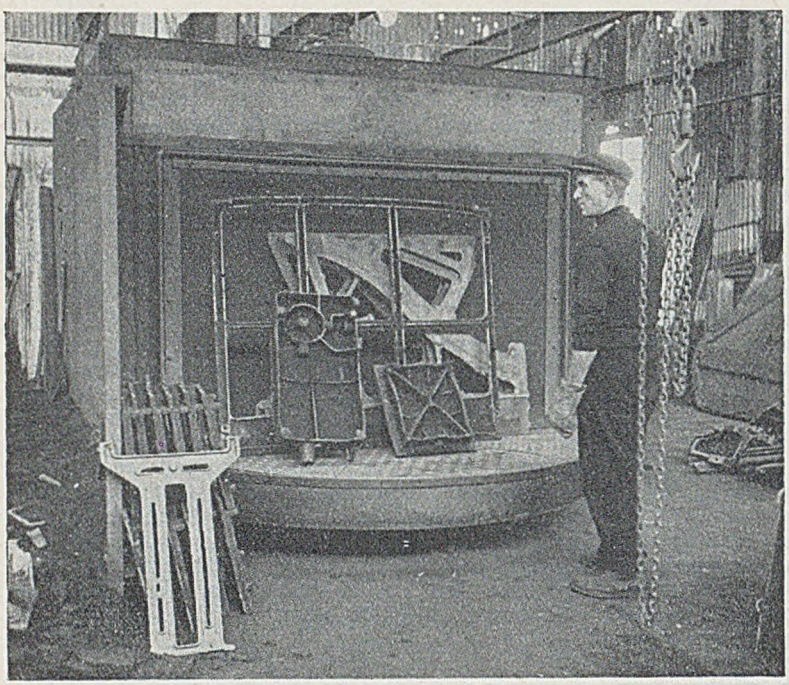


FIG. 6.—*Swing Table Shot-blast Plant for Cleaning the Castings. Casting on one half of the Table are cleaned while the other is loaded.*

Frame Production

The details of pianoforte frame production (Fig. 8) call for exacting foundry craftsmanship if the inequalities of casting contraction caused by thick and thin sections and locked up stresses are not to cause distortion or fracture, particularly on the larger jobs such as for instance concert Grand frames, of which Booth & Brookes are almost the sole producers. As soon as the metal has been poured, the tops are lifted off the moulds and, depending on the design, heaters are placed on certain sections or others are bared to prevent distortion during cooling. Each frame design requires individual treatment, and hence with a new pattern one or two trial castings may be necessary before the job is entirely satisfactory.

After Treatment

After fettling, the frame castings pass to the drilling and finishing shop. No jigs are employed for drilling, location being from cast-in dimples. Steel pins are cast in, these being inserted first in the pattern and left to stand proud in the mould when the pattern is withdrawn.

The castings are next inspected carefully and any rough places or small surface blemishes are made good with paste stopping before they receive two coats of white filler sprayed on. After each coat they are stoved for 4 hrs. at 180 deg. C. in an electrically-heated oven and then rubbed down with emery cloth. Finally, the frames are sprayed with bronze powder in a cellulose medium. This dries in about 10 min. in a warm atmosphere and two coats of clear cellulose varnish complete the job. Maximum attention to finish is, of course, paid to " Grand " frames for, unlike those of uprights, these are normally exposed to view in the instrument.

A separate shop is devoted to the grinding, polishing and drilling of cast-iron brackets, which are produced in large quantities for the leading pianoforte makers and serve to support the action mechanism inside the instrument.

Other Productions

Jobbing orders were accepted after the foundry had been in existence for only a short while. One early product was the castings for Sandow's dumbells and during the first world-war parts of hand-grenades and aircraft were made. During the boom years after the war the company went in for gramophone-turntable production on an intensive scale and produced up to 10,000 per week, machined, plated and covered with velvet ready for fitting to the gramophone. Since that time the company have continued to concentrate on thin and flat castings up to a maximum of 4 or 5 cwts. and on the production of medium quantity orders, which are unpopular with many larger and more mechanised foundries. Such work includes gas- and electric-stove parts, electrical switchgear, instrument and motor parts, and castings for cigarette-making machinery. Heavier work calling for a special quality metal and finish includes engineers' surface plates and architectural castings such as the ornamental panels for Marylebone public library. The production of " high-duty " iron was developed durring the recent war for " Asdic " gear covers for the Admiralty and this is to-day found most useful for meeting special requirements. Parts are also made for special-purpose machines of all types, for example a machine for carving wax models of ships' hulls for tank testing. One such machine was supplied to the National Physical Laboratory and another to the U.S. Navy. Other interesting pro-

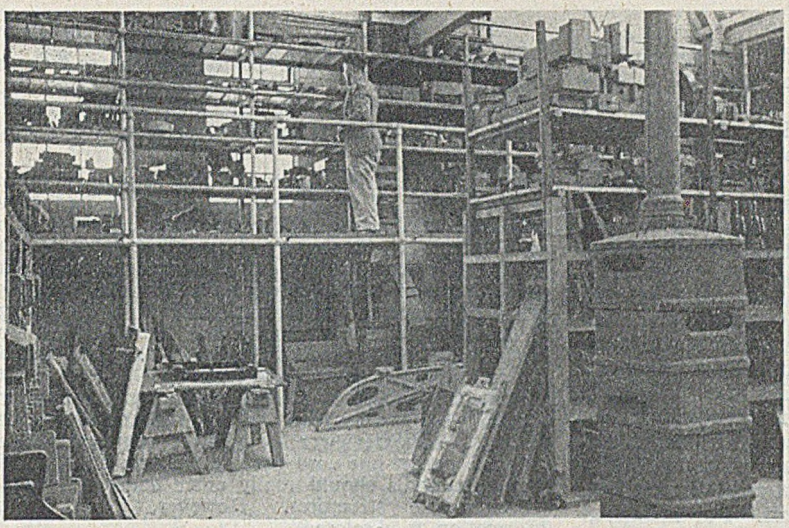


FIG. 7.—*Section of the Pattern Store, where Tubular-steel Racks are employed.*

ducts are parts of die moulds which are so shaped that they cannot be machined by normal methods. These are supplied as castings with a specially clean skin which then only requires to be hand scraped. The production of metal plaques has also been developed. As well as the actual castings which require great care in the moulding, the original carving is made by the works manager, Mr. H. Parnell. Plaques reproducing in relief the heads of many well-known men have been made, either as mementos or for sale to the public. Amongst them are John Redmond and Sir Edward Carson, and more recently Mr. D. Howard Wood, past-president of the Institute of British Foundrymen. The first one made was of "Ye Founder," the late Mr. J. W. Booth.

Labour and Welfare

When the foundry was started, the labour position in the area was extremely satisfactory. The piano trade was good in winter and quite a number of men who spent the summer yachting used to work for the company during the rest of the year. In common with most foundries to-day, however, there is now a shortage of skilled labour and plate moulding is therefore adopted wherever possible in preference to loose-pattern work.

Reference should be made to the careful attention devoted to the training which is given to all new labour on the foundry floor. Newcomers are put under one of two moulders; according to the class of work, he gives the pupil his entire attention for a week or so before leaving him more and more to manage on his own in subsequent weeks.

At the jubilee celebrations of the company last year, presentations were made to no fewer than twelve employees who had been with the company for more than forty years. The long-service record is held by a moulder who was a member of the original foundry staff. The works manager came for a month and so far has remained for 46 yrs. During this period he has seen the business develop

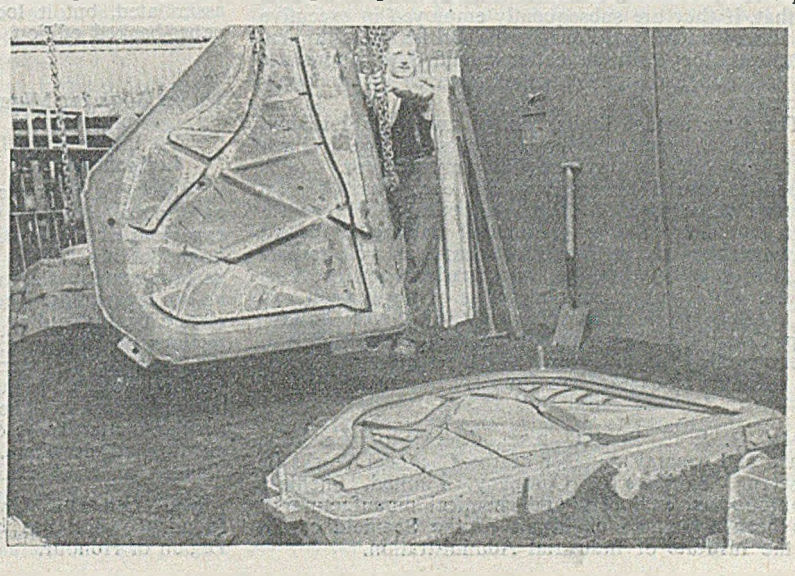


FIG. 8.—*Top and Bottom Half Moulds for a Grand Pianoforte Frame, for which Shaped Box Parts, carefully balanced about the Lifting Lugs, are used.*

Pianoforte Frame Castings

from a small undertaking into a flourishing foundry with 110 employees, and a weekly output of some thirty tons of finished castings. Continuity of the Booth family interest is assured by the two sons of Mr. C. C. Booth, both of whom are now prominently associated with the management. Special attention is given to welfare; as well as shower-baths and a well-appointed canteen, the works boasts a large recreation ground and runs its own cricket and football teams.

Conclusion

It is fitting to close with a few words on customer co-operation which accounts for so much of the healthy atmosphere permeating the "family" business. By fostering happy relationships with its customers, by giving service in countless ways, the company manages to thrive in face of competition from much larger and so-called more efficient but infinitely less "personal" concerns. For instance, quite often the company has co-operated in the design of customers' frame castings thus minimising risks of breakage and distortion. Sometimes even the "scale"—lengths of wires to give correct piano notes—has been determined on behalf of a client. With other castings, too, a similar policy is pursued, the initial stages of a contract being considered of major importance so as to imbue confidence and helpful collaboration from the outset. Such an approach pays handsome dividends in happy relationships which are at Booth & Brookes not considered second in importance to the monetary reward.

Mond Nickel Fellowships

The Mond Nickel Fellowships Committee now invites applications for the award of Mond Nickel Fellowships for 1951. The main objects of these Fellowships is to enable selected applicants of British nationality and educated to university degree or equivalent standard to obtain additional training and wider experience in industrial establishments, at home or abroad, so that, if they are subsequently employed in executive or administrative posi.ions in the British metallurgical industries, they will be better qualified to appreciate the technological significance of research and to apply its results.

There are no age limits, though awards will seldom be made to persons over 35 years of age. Each Fellowship will occupy one full working year. It is hoped to award five Fellowships each year of an average value of £750 each. Applicants will be required to define the programme of training in respect of which they are applying for award. as well as particulars of their education, qualifications and previous career. Full particulars and forms of applicaiion can be obtained from the secretary, Mond Nickel Fellowships Committee, 4, Grosvenor Gardens, London, S.W.1. Completed application forms will be required to reach the secretary not later than June 1.

MR. P. J. C. BOVILL, B.SC., director of the local board and general manager of the Chemical Works of Newton Chambers & Company, Limited, Sheffield (ironfounders, engineers, and chemical manufacturers), has been appointed chairman of the Sheffield centre of the Institute of Industrial Administration.

Book Reviews

Metallic and Non-metallic Coatings for Gray Iron, by C. O. Burgess. Published by the Gray Iron Founders' Society, Inc., and obtainable from Mr. V. Delport, 2, Caxton Street, Westminster. Price $1.75.

It is quite revealing to read in this 76-page pamphlet of the number of things one can do to the surface of grey-iron castings to produce specific effects. It is a field that is perhaps too little appreciated by the general founder, but one of real and increasing importance. The pamphlet opens with metal spraying, which of course can be carried out with a wide range of metals. The book actually lists twenty-two, all of which have been successfully sprayed. Here indeed is a rich field for experimentation.

Next, the processes of tinning and galvanising are detailed, followed by lead and lead/tin and aluminium coatings. The reviewer thought the next section was rather a border-line case for the welding on of hard-facing materials should really enter under a heading of composite structures. However, much useful information is disclosed.

Calorising and chromising which enter into the cementation class are both quite interesting processes for certain duties. Another wide range of surface treatments is dealt with under the heading of electro-deposition. All the normal elements are included and some of the finished products illustrated. This finishes part I, and the second section, captioned Non-metallic Coatings, opens with paints, lacquers and the like. Browsing through this section, the technical salesman will receive valuable tips as to how to make instruments and shop-ware and so forth much more presentable. The reviewer found this section of exceptional interest. Finally, the part devoted to vitreous enamelling is reached, and here there is plenty of information available in both America and this country, but perhaps also many founders have not yet realised its sales value. The reviewer found one type of coating not mentioned, that is the silicon carbide surfacing for potato peelers! This, however, is of particular rather than general interest. The value of the book is enhanced by a very extensive bibliography which enables the reader to pursue much further any subject which interests him. This is a very well edited book with its technology written so as to be easily assimilated, but it looks just a little expensive for a paper-backed edition.

V. C. F.

Pocket Book for Miners and Metallurgists (5th Edition). Compiled by H. Power. Published by Sir Isaac Pitman & Sons, Limited, Parker Street, Kingsway, London, W.C.2. Price 25s.

When this book was first published, some 58 years ago, it may have been that either pockets were more capacious or the book was smaller. A book, properly bound of nearly 550 pages, is distinctly heavy. The general contents start with arithmetic, taking the subject up to logarithms. Then information is given on heat, electricity, hydraulics and geology, followed by eleven sections on purely mining matters. About this point, the metallurgist enters, but the information disclosed has been selected for those engaged in the metalliferous mining industry. The text is interspersed with much tabular matter, some of which would certainly be difficult to find elsewhere.

MR. CHARLES GAILLY, the well-known French foundry owner, has been created a Chevalier of the Legion of Honour.

Repair and Reclamation of Grey-iron Castings

I.B.F. East Midlands Discussion

At the December meeting of the East Midlands branch of the Institute of British Foundrymen over which MR. S. A. HORTON presided, the report of the sub-committee T.S.23—The Repair and Reclamation of Grey-iron Castings by Welding and Allied Methods*—was presented by MR. F. A. BALL (a member of the committee) and discussed.

This discussion was opened by MR. RUSSELL who asked which method Mr. Ball recommended as the best for shallow cavities or surface defects such as blowholes, say, 2½ in. long by 1 in. wide. Was it necessary to gouge out to increase the depth? As to the " buttering " process, did one get any slag formed between each layer, which could readily be removed?

MR. BALL in reply said surface defects were to be treated in the same way as cracks of the same size. It was essential to take out the defect. If the defect was on the surface of the metal, metallic arc welding was to be preferred. If it was a wide crack, there would be no need to Vee it out; a straight groove would be satisfactory, providing there was no unsound metal underneath. With more complicated cracks, it might be necessary to preheat. In the case of the " buttering " process, using metallic arc, a slag was left on the surface of each bead, but most modern electrodes gave a slag which was readily removed by lightly chipping.

Pressure-resisting Castings

MR. L. HEARNSHAW said that his experience of pressure castings indicated that welding was not very successful, but in view of the Report it made one realise the possibilities of welding. Did Mr. Ball recommend welding for high pressure gas castings tested up to 50 lb. Many specifications stated "No plugging, welding or burning of any kind without the written consent of the engineer."

MR. BALL indicated that it was because of such conditions that the sub-committee was formed. It was realised that there was much good quality welding carried out, as well as the obviously bad. It was hoped that in time the position would be such that welding would be recognised as a reasonable and acceptable method of reclamation. The best way of overcoming clauses of that type was, it was hoped, to show the people the Report and to assure them that a perfectly satisfactory weld had been made. In the case of pressure castings, it was largely a case of whether it was reclamation of a new casting or the repair of a casting which had been in use. If it was a case of repairing a casting which had been in use, the first thing was to find out why it broke. If it was because the working pressure was too great it would be futile to repair it. In the case of castings tested up to 50 lb. per sq. inch, it depended on the size of the casting. With a fairly simple casting a full fusion oxy-acetylene welding repair, using a weld metal with the least difference in properties from the casting was preferable. Assuming it was a reasonable casting, the oxy-acetylene method would be a good method.

Practical Details

MR. BUTTERS, who apparently expected some practical demonstration germane to the subject, said that in the case of welding by oxy-acetylene, a fire would surround the casting, but how was the temperature which was stated should be approximately 600 deg. C. to be ascertained. Again, with bronze welding, it was suggested that castings should be raised to approximately 200 deg. C., and yet with two presses which were being bronze welded, work appeared to have been carried out without any preheating. In the report there had been mentioned a type of flux, but no details were given. His firm did a small amount of welding to reclaim pattern plates which are a fairly expensive job to set out, and they resorted to the same method of bevelling off the edges and they did not preheat. Was heating really necessary?

He was pleased to see the metallic arc welding had a longer list of advantages, and wondered whether it was expensive.

Bronze Welding

MR. BALL, referring to bronze welding and the need for preheating, said the casting actually required preheating locally to temperatures which the range mentioned, before one could actually weld. It was necessary to raise the temperature of the surface to 900 deg. C., before the brass would wet the cast iron. It was possible to preheat locally by means of oxy-acetylene without preheating the whole of the casting. Suitable fluxes were made by several of the companies supplying welding equipment.

In the metallic arc process, it was found that by controlling the composition of the welding rod one could control the amount of phosphorus that could be present in the iron. The process was not expensive. The electrodes themselves were somewhat more expensive than cast iron or bronze rods, but the actual process was usually cheaper, as the small amount of preheating necessary enabled one to carry out the job quickly. He recently carried out a repair using metallic arc welding for mending a testing machine which was unfortunately broken, at a time when it was urgently required. Practically no dismantling was necessary, no preheating, and the whole welding operation took not more than two hours. With any other method it would have been necessary to dismantle the machine completely.

* Report printed in the JOURNAL August 24, 1950. Previous discussions, September 28, 1950, and January 25, 1951.

Ropair and Reclamation of Grey-iron Castings

In the case of full fusion welding, a temperature of 600 deg. C. was fairly easy to assess, as it was a dull red. There were available various crayons, paints and salts which were well capable of indicating temperatures.

Flame Adjustment

MR. BUTTERS asked how did the operator know when his flame was oxidising?

MR. BALL said the oxy-acetylene flame, after lighting, should be adjusted by varying the regulator pressures until there was a yellow fringe or halo round inner blue cone. This was a carburising flame or one having excess of acetylene. The acetylene pressure was then reduced until this yellow fringe just disappeared. This was a neutral flame. A further decrease of the acetylene pressure, or an increase of the oxygen pressure, would give an oxidising flame. The small inner blue cone in an oxidising flame was sharp pointed and appeared very slightly ragged, as with the hot flame of a bunsen burner. Continuing, he stressed that temperatures could be controlled by Tempilsticks or the like. Welding cast iron was a skilled job to be undertaken by an operator experienced in this field. Any man who had only been a short time on welding should try his hand on some odd pieces of scrap, and should not consider undertaking the actual welding operation itself until he had gained considerable experience.

It was not always possible to guarantee a fully-machinable weld, no matter what arc welding method was used, without pre- or post-heating. Where a small part of the cast iron was raised locally to a temperature of well over 900 deg. C., as that zone cooled down very rapidly it became extremely hard. The welder then deposited a second bead on the top of the first one, and this tempered the hardened cast iron. To obtain a machinable weld, it might be necessary to give heat treatment to the casting itself in certain cases.

MR. LILLEYMAN asked what steps should be taken in the case of the casting in the furnace becoming too hot?

MR. BALL said the remedy was to remove the bricks, stop off the air, and rake away charcoal. It should be realised that experienced operators could build a furnace, light it and leave it, and obtain the correct temperature. There should be more room in the furnace than was needed just for the casting.

Weld Hardness

MR. J. LISTER said the lecturer mentioned possible decarbonisation of the edge of the parent metal, would he enlarge on the possible effect of this, and also in the case of welding high-phosphorus iron was there any migration or segregation of the phosphide adjacent to that weld.

MR. BALL insisted that there was no decarburisation, but due to the heat effect there was a narrow zone in which the carbon went into solution, in the actual casting itself, and with a rapid rate of cooling hardening resulted. One did not get an actual removal of the carbon, nor was there any real migration of the phosphide within the casting. The trouble with the nickel alloy rods was that when they picked up appreciable phosphorus they were liable to give cracked deposits.

MR. L. HEARNSHAW said that when dealing with iron with prosphorus content of 1 to 1.2 per cent., did Mr. Ball consider it advisable to attempt welding of this grade of iron.

High-phosphorus Iron

MR. BALL replied that in general, it was more difficult to weld high-phosphorus irons, and he would exercise great care in preheating. He would avoid welding high-phosphorus irons, although welding was possible on relatively simple jobs. It would appear that burning-on was particularly applicable to high-phosphorus irons.

MR. HILL asked whether the committee formed any comparison between the efficiency of welding, by burning on and by the other welding processes, when attempting to repair high-phosphorus iron.

MR. BALL said that actually, the committee did not make that point. High-phosphorus irons were apparently easy to repair by burning on, and this type of iron appeared to be more difficult to repair by any other method.

MR. ROLLESTONE asked if any trouble was experienced after welding with weld decay or corrosion.

MR. BALL said one should take the precaution to see that the actual welding flux was removed as completely as possible, as most of them were hygroscopic. With nickel alloy and bronze deposits, these were relatively corrosion resisting, and would stay bright when the casting had lost its colour. One point he hoped would be mentioned was the welding of nodular or spheroidal-graphite cast iron. Those castings were proving amenable to welding. They were low in phosphorous which enabled one to weld by the metallic arc process nearly as easily as with steel welding.

Cannon Iron Foundries Anniversary

Congratulations from the King rounded off the historical pageant, staged in the Civic Hall, Wolverhampton, last week by the Cannon Iron Foundries, Limited, Deepfields, Bilston, in celebration of the 125th anniversary of its foundation.

The King's letter was in answer to "affectionate and loyal greetings" sent by the directors, management and workpeople of the firm. Mr. A. F. Oatley, managing director, reading the message to a gathering which included some 1,400 workpeople and their friends, said: "The King greatly appreciates our kind sentiments and sends his sincere thanks and congratulations to the firm on the achievement of our 125th anniversary."

The pageant, which preceded the reading of this message, depicted typical English men and women of the ages through which the firm's history had passed. Guests of the evening included Mr. Ronald Sankey, high sheriff of Staffordshire, together with the Mayors of Wolverhampton and Bilston, the chairmen of the Urban Districts of Willenhall, Tettenhall and Coseley, and representatives of the North-Western and Midland Gas Boards.

Core-blower Application and Operation*

By G. W. Fearfield

This Paper, which forms an exhaustive treatise on the whole subject of core-blowing, has been for convenience of presentation arbitrarily divided into two sections. In the part printed this week, the present-day need for core-production to march in step with machine moulding shows the necessity for using core-blowers, especially for small-to-medium cores. General conditions governing machine selection are given and air requirements are outlined with emphasis on moisture elimination. Choice and mixing of sand, core-box materials and design, of blowing holes and their location as well as such problems as wear prevention are dealt with at length. Finally, in the first section, the theory of venting is outlined and two possible but not recommended methods are described. The second section shortly to be printed suggests additional venting methods and then quotes a wealth of practical experience arising out of the use of core-blowing machines.

MODERN PRODUCERS of foundry plant have developed moulding machines of high capacity, varying designs and operation. These machines, together with the use of high-class patterns, are producing moulds at high hourly rates. In many instances, these patterns are equipped with core prints necessitating cores being produced at the same rate. Coupled to this high output there is also the factor to be considered of two or more patterns being mounted per plate. These conditions demand the production of enormous quantities of cores per shift. It will be appreciated from these remarks that requirements of a foundry for cores may be in the region of 500 to 800 per shift per job, and in some cases, more. Consequently, under hand-making conditions, four or five coreboxes may be required, and possibly six or seven operators. Coupled with these "quantity" conditions, the general-engineering and motor industries are demanding castings to finer tolerances than in the past, where machining operations are reduced to a minimum in an effort to reduce costs.

From these observations it will be apparent that a quicker method of production of cores must be found to keep abreast of foundry requirements. The problems of quantity and quality lead one to examine the application of the modern core-blower. Possibly the initial question asked by potential operators is "under what conditions can a core-blowing machine be operated to best advantage?" Operating conditions, types of work, and production requirements are the governing factors and, as these sets of conditions may vary with different jobs (there are, similarly, no fixed methods of application), each individual job must be tackled as a separate problem. The core-blowing machine is primarily a production tool, and is generally intended for use in the production of small- to medium-size cores. Satisfactory operation of these machines requires first-class core-box equipment, together with plates. driers, blow-plates, sand, etc.

General Considerations

The blowing machine consists normally of three essential components:—(1) blowing head; (2) air diaphragm to the blowing head, and (3) sand and air outlet to the core-box, generally known as the blowing plate. Whilst the blowing machine has become more widely used in this country during recent years, its introduction into the industry is not new. The machine as it is known to-day has been developed extensively during the last 20 years The number and types of machines are many and varied, and the selection of the type of machine to be employed depends largely upon the type or types of cores to be produced. This selection should be influenced also by the possibility of future requirements, and the ability to develop the use of the machine to its fullest extent. Machines afford to managements a cheaper and more accurate method of core production, but, whilst operating costs are comparatively small, initial expenditure for core-boxes, driers, etc., is heavy.

To produce cores successfully on these machines, much investigation and control must be extended to core-box construction, and in a lesser degree to blowing-head design. If these points are given careful consideration, the machines then become very efficient and accurate media for production purposes. The results recorded and practices described in this Paper refer chiefly to the vertical-type machines, which operate as shown, but whilst stressing this, certain general conditions will still apply to horizontally-operated machines, but only to a limited degree. Maximum production from these machines is only obtained by utilising them to their fullest extent.

Where maximum production is required, the servicing of the machines should be thoroughly studied, as any neglect at this juncture will result in the economics of the project going rapidly astray. To appreciate fully this point, one should remember that the actual blowing time is between three to five seconds, and, when planning core-box construction, this should also be kept in mind.

Although it was stated earlier that certain general conditions apply, in actual practice there are no hard-and-fast rules, each job being considered on its merit. Core-blowing is a specialist job, and development work as such proves very interesting. Before attempting to consider in detail the machine and its ancillaries, one should be conversant with the primary object, that is, filling and ramming sand in the core-box cavity as quickly as possible, expelling to the atmosphere all air, thus ensuring an evenly-rammed core.

* A Paper read before the Lancashire Branch of the Institute of British Foundrymen, Mr. D. Fleming presiding.

Core-blower Application and Operation

Air Supply

For successful core-blowing, regard must be initially focused on air supply and its volume. It is of utmost importance that an adequate volume of air be available, that it be at constant pressure, and free from excessive moisture. A 3- or 4-in. dia. air supply line is desirable, and should as far as possible be free from excessive bends and acute turns.

The Author's machines are coupled directly to an air receiver of 9 cub. ft. capacity, whilst 20 yds. away is a larger receiver of 90 cub. ft. capacity. These machines are located at the extreme end of the air-supply line, and without these receivers, the volume would be insufficient. The air pressure required appears to be a controversial matter amongst different operators, but, in the Author's opinion, between 90 and 120 lb. per sq. in. seems to be the most practical range. Small cores, blown as a unit, weighing about 1 lb. or less, and of uniform dimensions, can be blown quite successfully at lower pressures, but the risk of soft spots is ever present; consequently low pressures are not generally recommended. Personal experience has been that any job developed for core-blowing at 95 lb. per sq. in. will not give consistent results at lower pressures; thus the necessity for constant pressure. A drain cock is situated at the lowest position of the small air receiver, the receiver being in a lower position than the air inlet to the blowing diaphragm. This is opened twice a day; it reduces to a minimum the risk of moisture in the air being supplied to the machine. If not properly controlled, moisture from the air supply can be very troublesome, and create unforeseen troubles such as lack of clean withdrawal of the box from the core and apparent reduction of the flowability characteristics of the sand. An air pressure of 100 to 110 lb. per sq. in. will give consistent results, and should be aimed at as far as possible.

Sand

The types of cores to be produced, and their methods of drying, will materially affect the mixture of sand to be employed. It will be found in some cases that the sand used on core benches is usable and in other cases quite unsuitable, but unfortunately this condition does not always apply. The major requirements are: the sand should be free blowing with as low a moisture content as possible, so as to prevent sticking. To ensure these conditions, it is essential that the base silica- or core-sand should be dried, and efficiently cooled.

A medium- or large-grain-size sand is advisable rather than small-grain sand, this being especially desirable where air vents are incorporated in the core-box design, the tendency being for sand as well as air to escape through the vents, resulting in a cavity in the core; also, due to its density and weight, one finds the sand reluctant to flow for any but short distances. By the use of medium-grain-size sand, quite contrary to expectations, one finds quite a good surface finish on the core. This is due to the manner in which the smaller grains of sand, by virtue of their reduced weight, are propelled further and travel through cavities left by larger grains, collecting at the surface of the corebox and packing there tightly. This gives a core of maximum permeability, but does not infer that artificial venting is unnecessary.

Mixing

Mixing of the sand is best obtained by the use of a batch-type mixer, a strict control of time being kept to prevent over milling. Whilst not generally appreciated, this is a very important factor, as failure here will result in a rapid depreciation in quality during blowing operations, resulting in a toughening of the sand, which in turn reduces flowability, and may be responsible for failure to blow a balanced core. The following is the Author's base mixture:—504 lb. of Congleton sand and 7½ pints of core cream. The mixing time is 4 min. and the test figures on a standard test-piece:—Tensile 210 to 240; green compression 0.8 to 1.0 lb. per sq. in. and scratch test 80 to 85 hardness; the cores are dried for 70 to 75 min. at 200 to 210 deg. C.

This sand is chiefly used for cores which are dried in driers or shells and the mixture has been used very successfully over a period of 2½ to 3 yrs. Great care should be taken to ensure that as little variation as possible is introduced to an existing satisfactory mix.

A second mixture, though not generally recommended, except for "straight type" work, is:—504 lb. of sand; 8¼ lb. of cereal; 1⅛ pints of core oil; and 8 pints of water. The mixing time is 4 min., and the test figures in this case are:—Green compression 1.3 to 1.6 lb. per sq. in.; tensile 160 to 170; and scratch hardness 80 to 85. The cores are dried for 70 min. at 190 to 200 deg. C.

As will be observed from the latter figures, the flowability characteristics of this sand are much lower than the previous one, and consequently this mixture is limited in its application.

Core-boxes

The selection of the core to be blown will materially affect the construction of the core-box, and will in all probability be the main factor in determining whether its construction should be from cast iron or aluminium. Much of the success of core-blowing depends to a large extent upon this selection of core-box construction and design. Cast-iron core-boxes, whilst high in their resistance to wear and able to withstand rough use, have a major disadvantage in their weight. Where small cores are to be produced, the cast-iron box, suitably lightened, can be, and is, a first class tool, but for economic reasons it is desirable to blow small cores with 3, 4, 6 or 8 in a box, the multiple weight being considerable. This factor of weight is further emphasised in relation to speed when one considers that a core-box may pass under the blowing head at the rate of 3 per min., or faster; thus fatigue amongst the operators would be high, and a corresponding reduction in the number of blows would result. For these reasons, one is led to consider and examine the potentialities of aluminium core-boxes. Owing to its physical properties, it is known that aluminium is less resistant

to wear than is cast iron, and this indicates the necessity of reinforcing aluminium boxes at wearing points, to withstand the action of sand and air being forced into the box at high pressure. This abrasive action, as will be appreciated, is very severe, and will quickly cause failure unless efficient preventive measures are taken. The prevention is simple and easily arranged if carried out initially. The first essential is that the core-box should be of square or rectangular section for ease of locating under the blowing head, and should be suitably reinforced externally by $\frac{3}{8}$ to $\frac{1}{2}$ in. ribs to prevent distortion in working.

Design

Close co-operation between planning department, pattern department and core-shop are essential to produce best-quality tools and ensuring that a good workable product results. The position of blowing holes must be decided at an early stage to enable sufficient reinforcements to be added at these points; the job should then be sent to the pattern-shop for the carrying out of instructions. This pre-planning co-operation prevents any ugly and difficult additions being made at times when production is required. It should be remembered when designing core-boxes that the sand is unable easily to flow around sharp corners, square sections, or into off-centre pockets, thus a liberal amount of radii, fillets, and tapers should be added wherever possible. Assistance on these points greatly enhances the possibilities of a good, clean, solid core being produced. It cannot be over-emphasised that the core-box can spell success or disaster to any core-blowing project, be it large or small. The normal wall section of the core-box should be $\frac{3}{8}$ to $\frac{1}{2}$ in., this dimension conferring stability when inserting air vents.

Generally speaking there are three types of core-boxes:—(1) A knock-out box with one open end; (2) a two-part box with two open ends, and (3) a two-part box totally enclosed, necessitating the use of shells.

Blowing Hole

The blowing hole in the core-box, which permits the sand to enter, should be carefully chosen in its relation to individual characteristics of the core. The selection of its position and size will be influenced by reference to past experience of the properties of sand flowability. Sand being conveyed in an air stream will not depart from a straight path unless induced by other means, and this must be realised when considering the placing of breathers or vents at a later stage.

Normal practice is to use a hardened steel bush in the blowing hole, to protect the box against the abrasive action of sand and air, the bush being serrated at its base to prevent it from picking up sand. Having selected the face through which the core is to be blown, it is generally-accepted practice to blow from the highest point of that face, so that restriction of sand entering the box is reduced to a minimum. Where this is not practical, it will be found necessary to blow through more than one blowing hole, a method of particular advantage where long, or off-centre pockets are to be filled. These blowing holes will require spacing in relation to the volume of sand entering the box at given points. Their size will vary according to individual requirements, but the smaller the hole the greater the pressure retained. The Author's practice has been to use a series of small holes, and this has proved beneficial as compared with one large one. Generally-accepted sizes range from $\frac{3}{16}$ to $\frac{3}{4}$ in., and sometimes 1 in.

Where the design of the core-box necessitates lengthy blowing holes, trouble is experienced if the diameter is down to $\frac{3}{16}$ or $\frac{1}{4}$ in.; one finds that after initial blowing the sand rams tightly and subsequently blowing fails to dislodge it. An allowance of $\frac{1}{32}$ in. taper from the core-box face assists in overcoming this trouble.

Whilst not essential, a small countersink at the top of the blowing hole is advantageous, this helping to reduce leakage between core-box face and blow plate. The use of cast-iron core-boxes eliminates in most cases the necessity for steel blowing bushes, but again they are an advantage at times of replacement.

Loose Pieces

Loose pieces must be arranged with a large bearing-surface register in the core-box, in order to prevent their being lifted and dislodged from their correct recess. They must of necessity be accurately bedded in the box, any discrepancy permitting sand to enter behind the pieces will prevent correct withdrawal of the core from the box. Where small loose-pieces are surrounded by large volumes of sand, it is advisable to construct them of heavy metal, cast iron, preferably, or brass, taking every precaution to reinforce the bearing surface of the core-box with steel plates.

Another important consideration is the selection of vertically- or horizontally-parted core-boxes relative to the machine table. It will well be appreciated that any possible escape of sand will take place at the parting line. This not only ruins good core-boxes, but spoils what may otherwise be a good core, by leaving a series of pinholes or cavities along the entire joint line. Upon the type of parting selected will depend as to whether a plain flat or baffle-type parting be employed. If the selection is for vertical parting, then a baffle is considered essential.

Parting Line

The core-box parting must provide, as far as is practicable, a perfect seal, any slackness or discrepancy at this point will result in ruining the core-box in a comparatively short period. The greater the efficiency of the seal, the larger the pressure retained in the core-box, allowing the energy to be used in directing and diverting the sand where required. From experience, a useful guide is that the outer edge of the core-box should not be less than $1\frac{1}{2}$ in. from the profile of the core, thus creating a large bearing surface by means of which a good seal results.

Some controversy centres around the necessity for steel facing on each half. In the Author's opinion this is considered to be good practice, and essential on vertically-split boxes, but on horizontally-parted

Core-blower Application and Operation

boxes, it has been found that over long periods aluminium partings have given perfectly satisfactory results. When putting a baffle in core-boxes, whichever parting may be used, the parting should be broken at 1 in. or less from the profile of the core, thus reducing to a minimum the margin of sand or air leakage that is possible.

Preventing Wear

The position of registering dowels should be placed well away from the core profile, as this not only ensures a perfect register, but reduces to a minimum the element of leakage from the female dowel. The top and bottom faces of the core-boxes should be faced with steel or aluminium depending upon size; and be machined parallel to the base, the whole being located squarely under the blowing head.

All employees who operate core-blowing machines should be firmly impressed with the real necessity for absolute cleanliness of core-boxes. This simple instruction contributes towards the life of the core-box, and certainly of the seal. Even with cast-iron boxes, if dirt or dust be allowed to remain, the joint will be quickly ruined, resulting in costly repairs.

Probably the second most important position exposed to excessive wear is that immediately beneath the blowing holes. If effective prevention is not sustained here, once again a costly repair will be necessary. Steel, copper and brass have all been used, but obviously steel is the best buffer of all. Where small blowing holes are maintained, a small vent directly underneath will suffice, but before attempting to use these preventives, one should have previous experience with blowing as the efficiency of the blow may well be impaired.

Proper and adequate clamping arrangements should be available with the box, and handles or finger holes should be provided to facilitate ease of handling both to and withdrawal from the machine. Core-boxes should wherever possible be of standard dimensions, even if group sizes are arranged, to enable a series of different jobs to be blown in sequence. More will be said concerning standardisation at a later stage. Wherever possible, horizontally-parted boxes are preferred, thus eliminating the use of automatic clamping devices which sometimes add restrictions. Due consideration should be given to the use of driers. Failure to consider simultaneous production of vertical and horizontal partings results in the project becoming very limited in its application.

Venting

When blowing commences, the following conditions apply. Air is present in the core-box at atmospheric pressure; sand and air are then introduced under pressure. To attempt to fill the core-box cavity with sand, it is necessary to expel all traces of excessive air. Failure to expel air at the correct time and place will result in air pockets in the core being produced, which in turn produces an imperfect core. This problem brings along a secondary one of ensuring that sand is packed in the core-box cavity at its correct density, and along its entire outside edges. It is at this stage with the inexperienced man that patience and perseverance are rewarded. The expulsion of air is carried out by various methods, and is usually termed "venting" or "breathing." The combined venting area must be equal to, and preferably in excess of the combined blowing-hole area.

Methods Not Recommended

Whilst the following two methods are briefly described, they are not as a personal opinion to be commended except under very special circumstances.

(1) A series of fine V gates or grooves are filed on the joint of the box allowing air to travel to the outside atmosphere. These grooves should merge into an outlet exhausting at one local point, direct exhausting being avoided in an attempt to prevent accelerated cutting action along the face of the box. This method is usually only practised where cast-iron boxes are used, and from previous remarks which emphasised the value of good air-tight joints, it is a practice not recommended, as it will be found subsequently that the joint of the finished core leaves much to be desired.

(2) A second method possibly satisfactory on half cores or simple symmetrical work is as follows. The joint of the box for a distance of 1 in. from the core profile, and along 90 per cent. of its length, is milled to a depth of 5 thousandths of an inch and a series of holes $\frac{1}{32}$ in. dia. are drilled at the extreme edge at distances of $\frac{1}{8}$ in. to $\frac{1}{4}$ in. apart. This method requires the core joint to be re-dressed. Whilst appreciating that the recess is only 0.005 in. deep it is surprising the amount of sand which tends to penetrate outwards from the core, even considering that the core-box may be of cast-iron construction.

(To be continued)

Steel Foundry Research

An agreement has recently been reached between the British Iron and Steel Research Association and the Research and Development Division of the British Steel Founders' Association whereby the latter becomes responsible for the co-operative research and requirements of the steel-foundry industry.

Work which has been initiated by B.I.S.R.A. in the steel castings field is to be continued under the auspices of the Research and Development Division of the B.S.F.A., certain facilities and funds having been placed at the disposal of the Division by B.I.S.R.A. so that the combined programme of work now confronting the Division can proceed without interruption.

This new and important step also provides close co-ordination on subjects of common interest between B.I.S.R.A. and the steel founders' research organisation, to their mutual advantage. It is recognised that the Steel Castings Division of B.I.S.R.A. has successfully supervised and greatly extended steel castings research since the Steel Castings Research Committee of the Iron and Steel Institute ceased to operate about five years ago, but the time has now come for the steel foundry industry to take over and support this work in a manner best suited to its own particular needs.

British Iron and Steel Research Association

1950 *Report of the Steel Castings Division*

DURING 1950, the work of the Steel Castings Division of B.I.S.R.A. continued on a similar scale to 1949. In addition to reports published on foundry steel melting, fluidity, continuous temperature measurement, split thermocouples, oxygen in the cupola, standard test-blocks, density of radiographs, the mass concentration of airborne dusts and the fate of siliceous materials in the body, detailed reports on hot-tearing, surface finish of castings, and the bonding of sands are awaiting publication by the Iron and Steel Institute. In addition to the work by the divisional staff, a substantial amount of work was again carried out by committee members in their own laboratories, particularly by members of sub-committees. Members of the committees were drawn from 43 different establishments. Work was also undertaken under contract by a number of University departments, four bursaries being sponsored by the Division.

Melting Research

Much of the activity of the field team was concerned with the design and construction of the experimental cupola and converter melting units which are to be installed at the new Sheffield laboratories; advice on the construction and layout of these furnaces being given by a group of the melting sub-committee.

The study of de-sulphurisation and de-phosphorisation indicated that any immediate outstanding developments were unlikely and attention therefore was directed to other investigations until further fundamental information has been obtained by the chemistry department. In collaboration with a works, a technique was developed for measuring continuously the temperature of a steel bath, and this technique will assist the studies of the changes occurring during the melting process. A Pt/Pt-Rh thermocouple with a specially-designed protective sheath, fitted into the refractory wall during the lining of the vessel, was used and by this means continuous temperature records over nine blowing operations over a total period of several hours for a 2-ton side-blown converter were obtained. Considerable variation was observed in the temperature rise associated with the carbon removal, but it is clear, however, that the oxidation of silicon is responsible for much of the increase in temperature. Efforts have been directed also to obtaining samples of metal and gas throughout the blowing operation. It has been found that, with an open sampling tube system with a works side-blown converter, an air blast of 500 cub. ft. per min. would be required to keep the tube open. A closed system using a 3 in. diameter sampling tube with a butterfly valve halfway down is therefore under trial.

The physics department commenced further aerodynamical studies with a model converter in which a reaction is promoted to simulate the conditions during the blow of a normal vessel. The attendant motion of the liquid surface and the bulk of the liquid are also being studied. The information obtained with different well contours will, no doubt, assist in reducing ejection losses. To ensure that the conditions in the laboratory studies are similar to those in practice construction of a periscope to view the conditions in a furnace during operation was commenced.

Refractories in Converters

The need for research into refractory wear in converters was substantiated by a survey of the consumption of refractories in steel-foundry melting furnaces. This indicated that refractory costs are highest in the converter process, less with the acid electric-arc melting process, and very small for ladles. In the cupola and converter, the patching costs were far higher than the original lining costs, indicating that there might be a point at which patching becomes uneconomical.

Experiments continued with the strain-gauge technique whereby it is hoped to overcome the arbitrary assessments of the wear of refractories in converters and electric-furnace roofs. Works experiments continued, one member claiming that increased vessel life can be obtained by more careful ramming and by longer drying periods, these being made possible by the use of an increased number of converter shells.

As the previous study of used converter linings indicated that the life of a lining is largely governed by the viscosity of the fused material between the grains of the refractory, attention was devoted in the further studies in the refractories department at Sheffield University to the properties of bonding agents at high temperatures. These findings will also have application in other types of furnace. the effect of controlled particle additions on the properties of pitch was studied and preliminary investigations carried out on the effect of bond content on the refractory properties of silica aggregates containing a bond of known composition.

Electric Steel Making

Further discussions on acid electric-arc steelmaking indicated that information is required on (1) the reason for sulphide inclusions round the grain boundaries following an interrupted boil, (2) the optimum FeO content at the commencement of the carbon boil, (3) the merits of single and double slag processes, and (4) the means for reducing the susceptibility of the process to hot-tears. A survey of refractories consumption showed that it is highest with roof and side walls, the consumption

British Iron and Steel Research Association

increasing with furnace size. It would appear, nevertheless, that there is no acute refractory problem requiring immediate attention with the process. The study of the reason for the long life of hearths and the effect of lime and furnace atmosphere is being conducted by the joint electric-furnace refractories committee.

Fluidity

Following the earlier investigation on the fluidity of steel, which had shown the effect of additions of various elements on the distance the metal would run in a spiral mould and in particular the restraining influence of those elements (Al and Ti) having a tendency to oxide film formation, a further, more robust, constant pouring rate ladle was constructed to compare the properties of fluid steel made commercially by different processes. The fluidity of commercial acid H.F. steel was found to be little different from that obtained in the laboratory studies. There was a slightly higher point of inflexion in the curves relating the length of spiral to temperature. Difficulties were experienced in obtaining fluidity spirals from a commercial acid electric-arc furnace owing to the lower melting temperature. Attention was given, therefore, to the construction of a spoon capable of being poured at a constant rate. This will enable samples to be taken from the furnace prior to tapping and offers promise of a potential works method of controlling fluidity.

In the further laboratory work exit velocities of steels and pure metals from an open-end spiral were determined to ascertain how the metal freezes in the channel and the factors preventing it from flowing. It has been observed that 1 per cent. of Al causes a marked broadening and visible breaking up of the stream of metal, as compared with ordinary steel, when falling in air.

Solidification of Steel

In the further investigation at the Royal School of Mines on the mechanism of freezing, by means of the casting of steel blocks at various inclinations to the horizontal, it has been observed that at whatever angle the blocks were cast, the structure of the lower portion of the block was invariably equiaxial and that at the upper portion columnar dendritic. This is in accord with the previous findings that solidification progresses by the formation of crystallites which fall through a liquid mass of metal at the freezing temperature.

The studies of the factors affecting adherence of sand to the casting (burning-on) at Sheffield University have now been completed. It has been shown that penetration of the metal into the mould is the immediate cause of sand adherence and that the penetration does not take place progressively but occurs rapidly on the attainment of specific conditions and then remains reasonably constant; casting temperature, metal fluidity and mould permeability being major factors governing this condition. It has been found that penetration occurred with uncoated moulds when the temperature at the mould face immediately after pouring exceeded the solidus temperature of the steel.

Hot-tearing

The study of the factors affecting hot-tearing, *i.e.*, the cracking of the steel soon after pouring, due to the metal being insufficiently strong to resist contraction stress, has now been almost completed. The experiments continued to be carried out on a straight test-bar cast in a special moulding box so arranged that varying resistance to its contraction could be applied. At the same time the tension in the bar and the skin temperature of the steel at the point where tearing occurred were recorded.

Following the earlier investigations of the effect of casting temperature and composition, the effect of deoxidation practice was studied. The most important finding was from additions of up to 0.1 per cent. Al, to silicon-killed steels. A marked decrease in resistance to hot-tearing resulted from additions of Al in the range 0.025 to 0.05 per cent. to steels containing more than 0.04 per cent. of sulphur. This is in accord with previous American work which showed that the impact resistance of cast steels was reduced if aluminium additions of this range were made.

Moulding Materials

Attention was again given to the possibility of saving dollar expenditure by replacing Wyoming bentonite by other bonding clays, and a number of materials obtained from deposits in the Mediterranean area were found to have satisfactory properties. A further sample of Kenya clay gave somewhat inferior results. It was found that additions of Tixotone, a German activated bentonite giving high green-strength, could improve the green-strength of other clays deficient in this respect, but generally at the expense of reduced dry-strength.

Following earlier extensive *ad hoc* work on core-bonding agents, attention was directed to the more fundamental aspects of bonding. It has been found that whilst base exchange capacity is necessary for the formation of thick moisture films, the chief factor differentiating one clay from another as regards the green-strength conferred and the form of the green-strength/moisture-content relations, is the particle size of the clay in the wetted condition and, its related property, the wettable surface area. Experiments were conducted therefore on the effect of additions of fine particles to clays with a view to the utilisation of home produced materials. Additions of colloidal ferric hydroxide were found to increase the green-strength markedly, and very fine particles of carbon-black also exerted a pronounced effect. In further fundamental work the effect of the heating of clays on their bonding properties was studied. An investigation of the various methods of measuring the plasticity of sands indicated that the shatter test and the bulk density of the sand before compression appear to give the most consistent indication of optimum plasticity.

Dust Hazards

A sub-group of the foundry moulding materials committee was formed in view of the silicosis problem to further research on non-siliceous materials indigenous to Britain, such as sea-water magnesia, stabilised dolomite and calcined serpentine. Preliminary tests with calcined serpentine showed that there is no breakdown on milling, as occurred with olivine. Both green- and dry-strengths were satisfactory, though the open texture of the particles led to some difficulty in drying moulds.

Surveys of the dust conditions have now been carried out in over 40 foundries, in collaboration with the Factory Inspectorate investigator; an Owen's jet counter being mostly used. A preliminary examination of the data showed that the dust concentrations ranged from 200 to over 12,000 particles per ml, with free silica contents up to 50 per cent.; no single factor being observed to account for the differences, though it is apparent that many processes are showing high concentrations due to contamination of the atmosphere by adjacent dusty processes. It would appear that the dust concentration decreases with increasing floor area per man and with increased weight of the casting, and that high concentrations are associated with portable grinders. A ciné technique showed that with these portable grinders a fine dust cloud rises round the operator and that only the visible larger particles which are probably not toxic are removed by the dust-extractor unit. Since it has been suggested that the dustiness of the fettling operation, which is associated with the highest incidence of silicosis, is aggravated by the use of pneumatic chisels, consideration has been given to the use of electrically-operated chisels incorporating a local exhaust system. The prior addition of wetting agents to the moulds to suppress the dust was also investigated. An examination of different types of mask to prevent the inhalation of the dust indicated that it is necessary to use a positive pressure type of mask, similar to a diver's helmet, in order to avoid fatigue of the operator and hence to ensure that he will use it continually.

The marked effect of the degree of local atmospheric pollution has been noted as adding to the complexity of the problem since some authorities have suggested that the critical silica concentration for producing silicosis is dependent in some measure on the total dust concentration. If such proved to be the case the location of future foundries will be of major importance. The work at the Reading University on the movement of silica in animal systems and the effect of the inhalation of siliceous dusts has continued. The instrument developed by the physics department has been used for recording continuously the concentration of the dust.

Physical Properties

The report of the extensive study of the effect of high-temperature homogenisation treatments on physical properties of steel has been completed and passed to "*Metal Treatment*" for publication.* Attention has been devoted to ascertaining the metallurgical reason for the improvements after homogenisation which have only been observed in the case of sub-standard steels produced by the acid-electric process. A study of the recorded manufacturing history did not indicate the reason for the inferior properties. No appreciable influence of homogenisation on the properties has been observed with cast steels of good metallurgical quality. A review of earlier published work on this subject has been published.

Creep.—Following the review of the published data on the creep properties of steel castings, a programme of research was drawn up for initiation when testing facilities become available. It has been recommended that attention should be given to the method of finishing and deoxidising the molten steel, to the comparative behaviour of the columnar and equiaxial crystal zones in sound static castings, to the effect of static *versus* centrifugal casting, and to the effect of homogenising prior to the normal heat-treatment.

The study of the effect of sulphur and phosphorus on mechanical properties, which demonstrated the deleterious effect of sulphur on ductility and impact strength, has now been wound up and the results are to be published. Tests on specimens from this investigation indicated that S. and P. within the range tested, exert little influence on magnetic properties.

Magnetic Properties.—A survey of published Papers on magnetic properties showed that there is a dearth of information relating to cast steels. The information on wrought materials indicated that all elements with the exception of Co and Ni reduce the saturation value, the reduction being particularly marked with alloying elements whose atoms occupy insterstitial positions in the lattice. A large grain size has now been stated to be required for direct current, whereas with alterating current there is an optimum value.

Weldability.—The study of the effect of steel-melting practice on weldability continued, and for a 2 per cent. Ni/Cr/Mo steel slightly better weldability was observed with materials from a basic electric furnace than from an acid converter. No direct comparison of the weldability of 1 per cent. Cr/Mo steels made by these processes has been possible as yet owing to differences in the Mn and Mo contents of the specimens tested. It has been found possible by preheating to 100 deg. C. to weld satisfactorily an acid converter 1 per cent. Cr/Mo steel which cracked on welding at room temperature. Consideration has been given to the reasons for the abnormal bend properties observed on certain occasions in commercial steels, and to the correlation of bend and reduction of area properties.

Non-destructive Testing

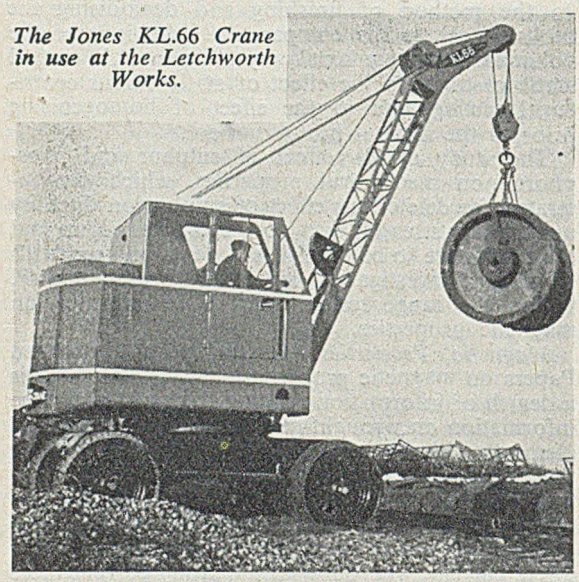
In view of the interest in the new radioactive isotopes now available, a further report giving

(*Continued on page* 214)

* Summary printed in the JOURNAL, January 18, 1951.

New British Mobile Crane

BRITISH MOBILE CRANE DESIGN has been given a still greater lead by the introduction of a new 6-ton crane known as the Jones KL 66. Designed and made by K. & L. Steelfounders & Engineers, Limited, of Letchworth, who are members of the 600 Group of Companies, it embodies a number of new and original features aimed to meet the diverse and often arduous duties demanded by users. Whilst high speeds are required for duties such as grabbing and magnet operation, the handling of fragile merchandise, and the accurate placing of masonry and structural members in building and civil engineering demand great sensitivity of control. The KL 66 is designed to satisfy both extremes of duty with equal efficiency and with a degree of reliability hitherto unknown. Our illustration shows the crane in use for handling steel castings on rough ground. The controls of this crane are



The Jones KL.66 Crane in use at the Letchworth Works.

simple and foolproof in operation and are so placed as to avoid fatigue to the driver. As on a lorry, there are only three foot pedals (for engine-clutch, travelling brake and engine speed respectively), so that a man who can drive a lorry is at once at home with these controls. Steering is by a large-diameter wheel, set at the optimum angle for easy manipulation, and when the superstructure is slewed to the rear of the crane steering is automatically reversed to normal action—which is very important from a safety point of view. The levers are light in operation and are placed conveniently so that any chance of confusion is avoided. The general dimensions of the crane are as follows:—Overall width, 8 ft.; overall height with jib lowered, 11 ft. 4 in.; tail radius, 6 ft. 3 in.; weight with 20 ft. standard jib, 13½ tons, and stability margin on level ground, not less than 50 per cent. The maximum duty of the crane is 6 tons at 9 ft. radius, with proportionately smaller loads at longer radii. The KL 66 is distributed in Great Britain by George Cohen, Sons & Company, Limited, and is exported by K. & L. Steelfounders & Engineers, Limited.

MR. E. H. PATTERSON has been appointed general manager of R. Y. Pickering & Company, Limited, of Wishaw. From 1925 until recently he was with G. & J. Weir, Limited, Glasgow.

Latest Foundry Statistics

According to the January Statistical Bulletin of the British Iron and Steel Federation, the average number of people engaged in iron foundries on December 9 was 148,302, about 2,020 more than a year earlier and 908 more than November. There was an increase of female employees to the extent of 210. In the steel-foundry industry employment was slightly lower at 18,955—a loss of 6 only. The average weekly quantity of steel melted for steel castings was 8,000 tons—a figure requiring no comment. What is interesting are the figures for alloy steel castings, which were 1,310 in 1948, 1,480 in 1949, and 1,780 tons in 1950. These figures are, of course, weekly averages of metal melted.

British Iron and Steel Research Association

(*Continued from page* 213)

guidance as to the most suitable radioactive elements for specific applications, with other pertinent information on the size of source and gamma-ray intensity, was circulated to founders.

The comparison of ultrasonic and radiographic techniques whilst showing a general correlation between the findings by both methods, indicated that a rigid comparison of observations may divert attention from the differing merits of the individual methods. The study of the effect of radiographic technique on the quality of radiographs has now been completed and a report prepared for publication. Work commenced also on the standardisation of radiographic technique to take a form between that of a specification and that of a code of good practice. A simple standard test-block for ultrasonic examinations has been developed, which will assist the comparison of results obtained in different establishments.

Additional Fundamental Work Initiated

Fundamental work on ultrasonics, which the Committee previously agreed was necessary for an extension of this testing method, was carried out by two members, and indicated that with the use of barium titanate in place of the normal quartz oscillator it is possible to halve the minimum distance below the surface at which a flaw can be detected. Work commenced on the use of a " radar " type scanning process.

A recent survey of the developments in the field of fluoroscopy indicated that with new electronic methods of fluorescent screen intensification and amplification, it is quite possible that steel sections up to about 2 in. thickness may be examined with the same sensitivity as is obtainable at present with the use of X-ray films.

Work was also commenced on the principles governing the " sentencing " of castings, the correlation of the results of non-destructive testing with physical properties, and with improved methods for the presentation of ultrasonic results.

THE A.P.V. Company Limited is moving its four factories to Crawley New Town and recently organised a meeting of all its staff to discuss the layout, amenities and other questions.

Iron and Steel Take-over

AT MIDNIGHT on Wednesday last the Iron and Steel Corporation of Great Britain became sole shareholder of 80 of the principal iron and steel companies of Great Britain, comprising the bulk of the iron and steel industry. The corporation comprises a chairman and six other members. The Minister of Supply has power to appoint four additional members, and Mr. Hardie, chairman of the corporation, at his Press conference last week, expressed the hope that, at the appropriate time, these four members would be appointed from within the steel industry. The majority of the corporation would then have practical experience.

Mr. Hardie said that the nationalisation of the iron and steel industry was different from that of other nationalised organisations in that the individual companies retained their identity. The corporation, in addition to its statutory obligations under the Act as the sole shareholder of the publicly owned companies, had all the responsibility, obligations, powers, and authority as would be the normal practice in a commercial and industrial undertaking operating as a holding company.

The responsibilities of the corporation covered a very wide field and would include the provision of finance for the publicly owned companies, approval of major development schemes, prices policy, appointment of directors and appointment of special executives in the companies, and general conduct of the industry.

The Act had preserved in a special sense the responsibilities and powers of the directors and executives of the publicly owned companies. The corporation would wish to approve the selection of directors and special senior executives, but the individual responsibility for operating the companies would fall on the directors and executive managements. The transfer of the companies to public ownership would not mean that they were merged or would disappear. Each company continued in existence with its own prestige, *esprit-de-corps*, and own name. The corporation had asked managements to continue at their posts and to carry on producing, manufacturing, and trading. It especially wished the individual character and enterprise of the companies to be maintained and developed.

There were 92 companies scheduled for taking over under the Act, but 12 were subsidiary companies, leaving in all 80 companies with over 100 subsidiaries. Mr. Hardie emphasised that any control or direction of these companies and their subsidiaries would be through the chairmen and the boards of directors of these 80 companies.

Trade Associations

The Chairman pointed out that the publicly-owned companies are the predominant members of the British Iron and Steel Federation, the Joint Iron Council, and the Association of Iron Ore Producers. The corporation has given the Federation a general outline of the proposed long-term arrangements contemplated by the corporation, and is at present discussing with it the interim period organisation.

The Minister of Supply would, after consultation with the appropriate organisation, appoint a council to represent the interests of consumers of the products of the corporation and its companies. The corporation would give every assistance to the council and would encourage it to be of the greatest use to consumers.

The corporation, Mr. Hardie said, would survey the raw materials situation "from a new and from a very wide angle." There must be progressive long-term planning for 25 to 50 years ahead for the main raw materials.

On the question of development, he said that certain of the great schemes which had been carried out should be the forerunners of other schemes which must ultimately be developed "for the rationalisation of production of steel sections, billets, rods, plates, etc." The corporation must now view the undertakings from a much wider national angle. The second stage of the development schemes of the industry was at present under consideration by the boards of the publicly-owned companies. Those schemes must be considered from a wide national angle and in keeping with the capital investment policy of the Government and the rearmament programme.

The corporation had inherited the advantage of the export sales organisation of the companies. He wished the companies to continue with this good work.

On February 15 the corporation became responsible for the whole financial obligations of the publicly-owned companies. It was responsible for the issue of Iron and Steel Stock in payment of the purchase price, but it had no part in fixing the purchase price.

The members of the Iron and Steel Corporation of Great Britain, appointed on October 2 by the Minister of Supply are:—Mr. S. J. L. Hardie (chairman), Sir John Green (deputy chairman), Sir Vaughan Berry, General Sir James Steele, and Mr. W. H. Stokes (full-time members), Mr. J. W. Garton (part time), and Mr. A. R. McBain (temporary part-time member).

Iron and Steel Values

A further list of 19 iron and steel securities for which values have been agreed with stockholders' representatives has been issued by the Ministry of Supply. A first list was published in our issue of February 8.

Out of 146 securities, the number now agreed is 106, of which 55 are quoted and 51 unquoted. The remaining 40 securities are all unquoted. The total compensation value of the 106 agreed securities is about £213 million. The agreed values and "conversion dates" in respect of the remaining securities will be announced in due course. Following is the latest list:—

LOAN CAPITAL (PER £100 STOCK)

English Steel 6% 1st mortgage debenture. £115.
Samuel Fox 5% 1st mortgage (perpetual) debenture, £117.
South Durham 4½% perpetual debenture, £108.

PREFERENCE STOCKS AND SHARES (£1 UNLESS OTHERWISE STATED)

Dixon's Ironworks 5% cumulative, 20s.
English Steel 7% preferred ordinary, 35s.
Guest, Keen, Baldwins 6% redeemable cumulative, 25s.
Kettering Iron & Coal 5% cumulative £10. £11 10s.
Round Oak 6% cumulative, 28s.
W. Wesson 10% cumulative, 44s.

ORDINARY STOCKS AND SHARES (£1 UNLESS OTHERWISE STATED)

Dixon's Ironworks, 14s. 6d.
English Steel deferred, £15 5s.
Guest, Keen & Nettlefolds (South Wales), 46s.
Hadfields 8s. 6d., 26s. 3d.
Hallamshire Steel & File 5s., 52s.
Kettering Iron & Coal £10, £50.
Patent Shaft & Axeltree, 35s. (1945).
Pease & Partners Lingdale Ironstone Mines, 22s. 6d.
Shelton Iron, 32s. 6d.
W. Wesson, £10 12s. 6d.

Personal

MR. J. M. BROMLEY has joined the sales staff of Rockwell Machine Tool Company, Limited, at the Birmingham office.

MR. B. C. MORTON, a former president of the Engineering Employers' Association, was last week installed as the new president of the Halifax Chamber of Commerce.

DR. ALWYN GWYNNE EVANS, senior lecturer in Chemistry at Manchester University, has been appointed Professor of Chemistry by the council of the University of Wales. He succeeds PROF. D. JONES, who retired last September.

MR. P. C. SHARP, former secretary and director of the Brush Engineering Company, Limited, who recently left Loughborough to work in the company's London office, received presentations from his friends and colleagues at Loughborough on Friday last.

MR. F. R. STAGG, chairman of John Smith (Keighley), Limited, crane makers, and deputy-chairman of T. W. Ward, Limited, of Sheffield, was presented with a piece of Sheffield plate as a birthday gift by Mr. W. H. Robinson on behalf of the Keighley staff and employees at a social and dance.

MR. AMBROSE FIRTH, chairman of the Brightside Foundry & Engineering Company, Limited, has been elected president of Sheffield and District Engineering Trades Employers' Association, in succession to Sir John Green, who resigned the presidency last September on his appointment as vice-chairman of the Iron and Steel Corporation.

WITH THE TERMINATION of the Steel Castings Division of B.I.S.R.A., the Council of the Association has recorded its appreciation of the valuable work performed by the Division under the leadership of Dr. Newell. Dr. Newell has decided to change his activities and has acquired a farm in Northamptonshire. We join his many friends in wishing him every success in this new venture.

MR. JOHN MASON, managing director of Mason & Cox, Limited, of 44, Holland Street, Adelaide, South Australia, is to visit this country (arriving in May) with the object of purchasing foundry plant. Mr. John Mason is the son of one of the eight founders of the Institute of British Foundrymen. His address during his stay in England will be c/o the English, Scottish and Australian Bank, 5, Gracechurch Street, London, E.C.

MR. C. K. F. HAGUE, deputy chairman and managing director of Babcock & Wilcox, Limited, has just returned from South Africa where he laid the foundation stone of the new £500,000 factory which is being built for Babcock & Wilcox of Africa (Pty.), Limited, at Duncanville, Vereeniging, about 35 miles from Johannesburg. The new factory, which is expected to commence operation early in 1952, will be engaged in the manufacture and assembly of steam-raising plant.

P.O.W. Employment Restrictions

Employment restrictions in Great Britain affecting former prisoners of war are to be removed gradually. Those concerned, mainly of German, Italian, and Ukrainian nationality, will be free to change their employment four years after the date on which they were given civilian status. On January 1, 1952, all former war prisoners will become eligible for release from employment restrictions whether or not they have completed the four-year qualifying period.

Obituary

MR. OSWALD WANS

One of the very few remaining engineers who could claim a direct association with the pioneering work and early development of the high-compression oil engine at the end of the last century and at the beginning of this one, Mr. Oswald Wans has died at Lincoln. He retired in 1949 from his position as chief engineer of Ruston & Hornsby, Limited, the Lincoln engineers, though remaining a director of the company.

Mr. Wans, who was born in 1879, served his first apprenticeship at the Bryan Donkin Company, Limited, before going to the Sturtevant Engineering Company, Limited, the Simms Manufacturing Company, Burn & Company (Howrah, India), and John I. Thornycroft & Company, Limited. He became technical manager of Ruston & Hornsby, Limited, in 1918, chief engineer in 1930, and technical director in 1937. When he retired he had seen the high-compression oil engine develop from the original Hornsby hot-bulb type of power unit to the modern high-speed and highly efficient fuel-oil engine.

MR. R. C. STANLEY

The death of Mr. Robert Crooks Stanley, president of International Nickel Company of Canada, Limited, referred to briefly in the JOURNAL last week, has robbed the non-ferrous metals industry of one of its great servants. Among his outstanding contributions to the progress of the industry was the discovery of "Monel," the white alloy of nickel and copper. Mr. Stanley conceived and developed the process for producing the alloy direct from ore without separating the nickel and copper. In the last war he was responsible for greatly increasing nickel production and was awarded the Platinum Medal of the Institute of Metals for his outstanding services to the industry in 1948.

He was a director of the Amalgamated Metal Corporation, Limited, Babcock & Wilcox Company, the American Metal Company, Limited, the General Electric Company, and the United States Steel Corporation. He was also a member of the advisory committee of the Mond Nickel Company, Limited.

MR. JAMES HERD, a partner of Herd & Mackenzie, shipbuilders, of Buckie (Banff), died last Tuesday at the age of 73.

MR. JOHN CLARK, formerly with Bruce Peebles & Company, Limited, manufacturing electrical engineers, of Edinburgh, died on February 10.

MR. RICHARD LYON, a director of Hendry Bros., (London), Limited, iron and steel exporters, etc., died recently as the result of a street accident.

MR. ALBERT HARTLEY, joint managing director of Hartley & Baldwin, Limited, nut and bolt manufacturers, of Burnley and Darlaston, has died at the age of 61.

MR. OLIVER WILKES, who died recently at the age of 75, founded a business of general lock manufacturers and brass founders at Walsall in 1906. He retired a few years ago.

MR. C. E. MEARS, sales engineer with David Brown & Sons (Huddersfield), Limited, died on February 9 after a short illness. He was in his 65th year and had been connected with the company for 22 years.

MR. D. J. MCKENNA, one of the original members of the staff and for many years secretary of the Cleveland Scientific and Technical Institution, which opened at Middlesbrough in 1921, died recently in retirement.

News in Brief

POWER-GAS CORPORATION, LIMITED, Stockton-on-Tees, celebrates its golden jubilee this year.

THE MINISTER OF SUPPLY gives notice that the certified increase in the price of manganese ore for the manufacture of blast-furnace manganese is 3½d. per unit.

AN ORDER worth £25,000 for 18 steam hammers, of falling weight varying from 15 cwt. to 30 cwt., has been placed with R. G. Ross & Son, Limited, Glasgow, by the South African Railways.

A MODERN IRONFOUNDRY, which will be operated by its wholly-owned subsidiary company, John Booth (Preston), Limited, has been acquired by Dorman Smith Holdings, Limited, Salford.

TO COPE with an enormously increased industrial consumption of water the Tees Valley Water Board has decided to spend £250,000 on new waterworks at Broken Scar on the upper reaches of the Tees.

THE DIRECTORS of Keith Blackman, Limited, ventilating engineers, etc., London, are raising £50,000 of new money by an issue of 100,000 10s. ordinary shares at par to ordinary shareholders in the ratio of one for five.

THE REPUBLIC OF IRELAND imported iron and steel and manufactures (excluding cutlery and machinery) to a total value of £667,920 in November last (£619,784 in November, 1949), making £6,905,669 (£6,144,606) for the 11 months.

AFTER YEARS as the Cinderellas of the educational system, technical colleges were coming into their own, said Mr. A. D. D. McKay, chairman of the Dundee Technical College Staff Association, speaking at the annual dinner on Saturday last.

LARGE STOCKS of finished steel are reported to be piling up at the works of the Cargo Fleet Iron Company, Limited, Middlesbrough, because of the wagon supply position which became acute two months ago when severe weather interrupted rail traffic.

PERMISSION to work limestone and other minerals at Tunstead Quarry, Chapel-en-le-Frith (Derbyshire), has been granted to Imperial Chemical Industries, Limited, by the Minister of Local Government and Planning. A condition imposed is that trees shall screen the workings.

MR. E. A. W. HORNET has been appointed secretary of the British Internal Combustion Engine Manufacturers' Association in place of MR. P. C. SALTMARSH, who has accepted an appointment with an engineering company.

MR. JOHN BERNARD THOMAS, who recently retired from his position of chairman and managing director of Hadfields, Limited, Sheffield, has been presented with a gold cigarette case by the directors and local directors of the company.

TWO LARGE TANKERS, 545 ft. long, 71 ft. wide, and 40¼ ft. in depth, each to carry 19,000 tons d.w., have been ordered by Atlantic Oil Carriers, Limited, from the Fairfield Shipbuilding & Engineering Company, Limited, Govan, Glasgow. They will be fitted with single screw double reduction geared turbines.

A SCHEME prepared by the North of Scotland Hydro-Electric Board, estimated to cost £374,000, which will further extend the grid system in the north of Scotland, has been confirmed by Mr. Hector McNeil, Secretary of State for Scotland. Overhead transmission lines are to be erected in Inverness-shire from Fasnakyle transforming station to a new station to be erected near Fort Augustus, and will be connected later to the generating stations of the Garry and Moriston projects.

F. W. BERK & COMPANY, LIMITED, chemical manufacturers, which in July last distributed a 50 per cent. share bonus, plans to follow this up with a bonus issue of one ordinary 2s. 6d. share for each share held. The board also proposes to offer for cash 800,000 new ordinary shares (two for every three held), price to be fixed later. Shareholders registered on March 12 will qualify for the bonus and the issue. The 2,000,000 new shares will not rank for any final dividend declared for 1950.

TO ASSURE ADEQUATE SUPPLIES for military needs the use of aluminium has been banned, as from April 1, in more than 200 non-defence products in the United States, and further curtailments will become effective as from June 1. The National Production Authority has also limited the use of aluminium by manufacturers during March to 65 per cent. of the average monthly usage during the first six months of last year.

EDUCATING THE WORKER was the only way of reducing works accidents due to the personal element, said Mr. H. G. W. Debenham, a director and general manager of the Skinningrove Iron Company, Limited, Saltburn-by-the-Sea (Yorks), when he spoke at a dinner at Croft (Yorks) held by the Newcastle and District and Teesside Industrial Accident Prevention Committee. He stated that 80 per cent. of the accidents at the Skinningrove Works last year had been due to the personal element.

A BRITISH SUBMARINE abandoned some time ago on a beach near Scalpay, on the Isle of Skye, is being broken up and the scrap metal will go to the steel mills. After the war the submarine was used as a "guinea pig" for extensive experiments and underwater explosives tests. The breaking up work is being handled by Metal Industries, Limited. The derelict vessel is being cut with oxy-acetylene burners on the beach, and the salvaged metal shipped to Clydeside.

THE 55TH ANNUAL MEETING of the American Foundrymen's Society is (as previously announced) to be held at Buffalo, New York, from April 23 to 26. Whilst the particulars of Authors and titles of papers to be presented are not available to us, there is ample time allowed for their presentation despite the numerous courses (usually held at 8 o'clock in the evening) and a symposium on gating—a five-hour event to occupy most of the second day.

THE COUNCIL OF INCORPORATED PLANT ENGINEERS have decided to open a branch at Southampton as soon as possible. Engineers interested are invited to write to the general secretary at 48, Drury Lane, Solihull, Birmingham. The inaugural meeting of a branch at Edinburgh will be held at 7 p.m. on March 7, at the Royal Hotel, Princes Street. Engineers, whether members or not, are cordially invited to attend. The acting honorary secretary is Mr. W. Renton of 48, Broomhall Avenue, Edinburgh, 12.

BRITISH RAILWAYS are to restore on March 1 the "Green Arrow" registered transits service for full wagon loads of freight traffic for export, except traffic to Ireland. The fee will be 5s. per consignment in addition to the usual carriage charges. Under this scheme a full consignment of goods is registered through to the port; every railway contact point *en route* receives an advance advice of the consignment's passage, and a constant watch is maintained until the goods are finally delivered. The sender can also ascertain in advance when delivery can be effected.

UNDERSTOOD to be the first example since the war of an American firm acquiring a British firm with similar interests, the Independent Pneumatic Tool Company, of Aurora, Chicago (Ill), has acquired control of Armstrong Whitworth & Company (Pneumatic Tools), Limited, Gateshead-on-Tyne. Mr. W. Scott, managing director of the U.K. company, becomes chairman of the company, and Mr. R. G. Faverty, of the U.S. company, has been appointed managing director. It is stated that increased emphasis will be given to the new subsidiary's exports to Canada and the U.S., and component parts will be exported to the U.S. for assembly by the parent company.

Raw Material Markets

Iron and Steel

Increases in the maximum prices of iron and steel came into operation yesterday (Wednesday). The new prices are mainly the result of the recent increase in the price of coal and coke.

The increases are included in the Iron and Steel Prices Order, 1951 (SI No. 252) made by the Minister of Supply, which also consolidates previous Orders and provides for certain minor changes. Details of the price revisions are given in the list of current prices on page 28.

The position in regard to pig-iron supplies is still precarious. The best that can be hoped is that there may not be further deterioration during the next few weeks. As yet there is no news of any stoppages, but blast-furnace men are operating on slender reserves of fuel and deliveries of pig-iron are already in arrears. Deficiencies embrace all grades from high-phosphorus irons to hematite. Foundry stocks are generally below permitted levels and there is a note of growing urgency in the applications for increased allocations.

Re-rollers have an abundance of orders on their books to ensure full employment for several months ahead. Home demand for light re-rolled products is very active and a substantial volume of export business has been accepted. The difficulty is that consumption of semi-finished steel tends to outpace the supply. The smaller sizes of billets which are used for the manufacture of light sections, bars, and narrow-gauge strip, are especially scarce, and steelmakers are under constant pressure to increase their deliveries. Even defective material and crops command a ready sale.

Generally, the output of the finishing mills is bespoke for many months ahead, and as there are still many obscurities to be cleared up concerning the transition to State ownership, sales departments are not inclined to enter into further commitments at present. Rearmament orders have not yet absorbed very large tonnages, but are expected in the near future to engage a much increased capacity. Meanwhile, steel users are pressing for maximum deliveries as a safeguard against the development of more severe stringencies as the year advances. Sheets are almost unobtainable, orders for plates subject to long delay, and increased specifications are being issued by many consumers who apprehend an early advance in prices.

Non-ferrous Metals

The Ministry of Supply has announced details of the zinc and copper allocations in the coming months. For virgin zinc the period covered is the month of March, for which the allocation is fixed at the same rate as for February. In regard to copper, that is imported copper sold by the Ministry of Supply, the rate is also unchanged from February, but the authorities state that this applies to both March and April. Orders placed this month, however, for delivery in April would mean a premium addition to the price, but this betokens no change of policy, being, in fact, the regulation that has obtained for some time past. But one adjustment in the shape of a concession has been made. Previously buyers could only order forward in the current month up to two-thirds of that month's quota, but now the full quota may be purchased. For example, during this month a consumer could place orders with the Ministry to the extent of his February quota, for delivery in March and April if he desires, the latter month, however, bearing a premium.

Of more moment perhaps, and certainly more fraught with surprise, is the news that lead of virgin quality purchased from the Directorate of Non-ferrous Metals is on ration, with effect from February 1, the permitted tonnage being 90 per cent. of the average monthly consumption last year. From what can be seen of the lead situation, it would seem that the Government must have made up its mind to stockpile, for supplies seem to be coming along satisfactorily.

Tin has indulged in some acrobatics; after climbing rapidly to £1,615 last week, and thus establishing a new high record, the market reacted, apparently on a report of possible changes in United States stockpiling plans which might result even in a halt being called. The present strategic reserve is unofficially estimated at not less than 200,000 tons, in addition to which the R.F.C. holds, it is believed, upwards of 20,000 tons. In any case, the break in tin values over here was severe.

Trading in scrap has been quiet, and it is obvious that the market has not yet got the measure of the terms of the new Order.

Official tin quotations were as follow:—

Cash—Thursday, £1,485 to £1,490; Friday, £1,455 to £1,465; Monday, £1,490 to £1,495; Tuesday, £1,525 to £1,530; Wednesday, £1,480 to £1,485.

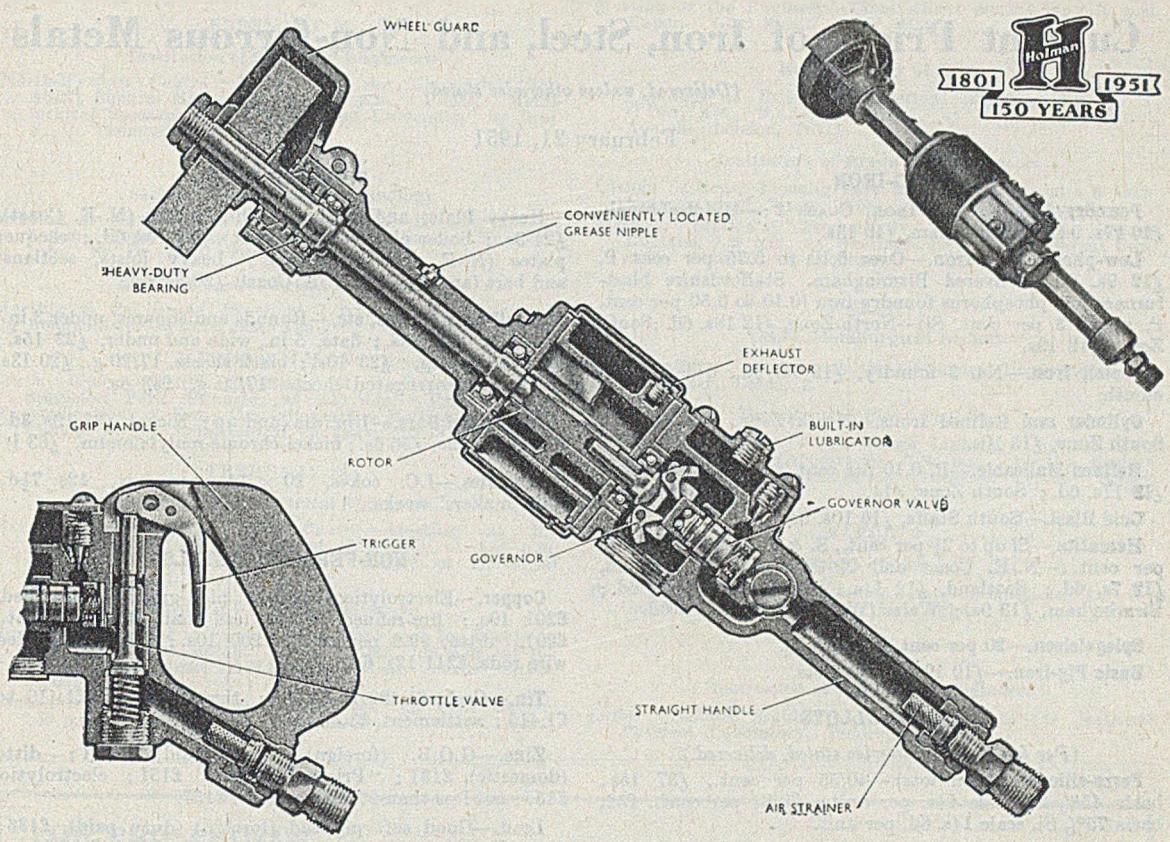
Three Months—Thursday, £1,435 to £1,440; Friday, £1,405 to £1,410; Monday, £1,435 to £1,440; Tuesday, £1,460 to £1,465; Wednesday, £1,410 to £1,415.

Iron and Steel Transfer

Under Section 15 (1) of the Iron and Steel Act, 1949, Parliament has laid down that the amount of British Iron and Steel Stock to be issued in compensation for the vesting of securities by virtue of the Act shall be such "that in the opinion of the Treasury is at the general date of transfer of a value equal to the value of the securities, regard being paid to the market value of Government securities at or about that date." The Treasury last Thursday announced the terms of a British Iron and Steel 3½ per cent. Guaranteed Stock, 1979-1981, which is to be issued to holders of securities of those iron and steel undertakings brought into public ownership in accordance with the Iron and Steel Act. The stock is to be issued and redeemable at par.

The approximate proportion of divisions of the iron and steel industry now in public ownership is shown in the table below.

	Total production. (1949)	Companies to be publicly owned.	Other companies.
	Thousand tons.	Per cent.	Per cent.
PRODUCTION OF:			
Iron ore	13,394.0	97.8	2.2
Pig-iron	9,498.5	97.0	3.0
Carbon steel ingots	14,433.5	99.6	0.4
Alloy steel ingots	690.8	92.6	7.4
HOT-ROLLED PRODUCTS:			
Plate	2,038.7	97.5	2.5
Sheet	1,430.3	92.6	7.4
Tinplate base	750.7	88.3	11.7
Other	6,732.6	90.3	9.7
TOTAL	10,952.3	91.8	8.2
OTHER PRODUCTION:			
Cold-rolled strip	273.3	73.4	26.6
Bright steel bars	307.8	16.7	83.3
Steel castings	236.1	24.1	75.9
Tyres, wheels, and axles	243.1	95.2	4.8
Steel forgings	163.0	48.0	52.0
Steel drop forgings	311.1	11.7	88.3
Hot-finished tubes, pipes, fittings, etc.	989.8	70.1	29.9
Steel wire	783.1	44.0	56.0



NOW TAKE A CLOSER LOOK

Holman Pneumatic Rotogrinds, as this sectional drawing shows, are simple and sturdy in construction, so that they require no attention beyond weekly lubrication with a grease gun. Their slick efficiency on the job makes them popular with workers in foundries, workshops, shipyards, oil installations and civil engineering projects. Their power/weight ratio is high and their vane-type air motor makes for smooth, quiet running. The range extends from precision grinders to heavy-duty types. "Grip" or "Straight" handles are supplied.

DELIVERY EX STOCK

SPECIFICATION

Size	Free Speed R.P.M.	Length ins.	Weight lb.
0/1	16,000	12	4
2	8,500	18½	12
4	5,500-6,500	21½	20¾
Loco Rod Type	6,500	29	23¾

Extension Grinders, Surface Grinders, Shank Grinders and Rotosanders are also available.

MEMO *Up-to-date illustrated catalogues of all Holman pneumatic tools, with full specifications, are now ready. May we send you one?*

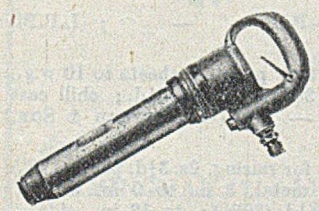
The first name for lasting service

BROS. LTD.

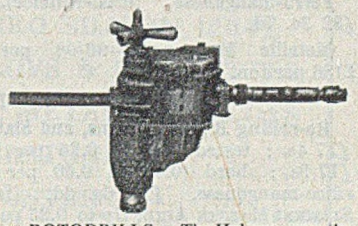
Holman

CAMBORNE . ENGLAND

TELEPHONE: CAMBORNE 2275 (7 LINES)
TELEGRAMS: AIRDRILL, CAMBORNE
SUBSIDIARY COMPANIES, BRANCHES & AGENCIES THROUGHOUT THE WORLD



RIVETERS for all classes of work. New designs with easy but precise control. No vibration, no maintenance, no trouble. Holders-on also available.



ROTODRILLS. The Holman range includes models for almost every job a drill will do—including all sizes of reversing and non-reversing screw-feed drills, hand-held drills and woodborers.

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

(Delivered, unless otherwise stated)

February 21, 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. 0d., 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. 0d.

Hematite.—Si up to 2¼ 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.

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

Ferro-molybdenum.—65/75 per cent., carbon-free, 8s. 9d per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon free, £120; ditto, copper free, £142.

Ferro-tungsten.—80/85 per cent., 36s. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 38s. 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.

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

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

Ferro-manganese (blast-furnace). — 78 per cent., £32 3s. 7d.

Metallic Manganese.—96/98 per cent., carbon-free, £186 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.—I.C. cokes, 20 × 14, per box, 42s. 7½d., f.o.t. makers' works.

NON-FERROUS METALS

Copper.—Electrolytic, £202; high-grade fire-refined, £201 10s.; fire-refined of not less than 99.7 per cent., £201; ditto, 99.2 per cent., £200 10s.; black hot-rolled wire rods, £211 12s. 6d.

Tin.—Cash, £1,480 to £1,485; three months, £1,410 to £1,415; settlement, £1,485.

Zinc.—G.O.B. (foreign) (duty paid), £151; ditto (domestic), £151; "Prime Western," £151; electrolytic, £155; not less than 99.99 per cent., £157.

Lead.—Good soft pig-lead (foreign) (duty paid), £136; ditto (Empire and domestic), £136; "English," £137 10s.

Zinc Sheets, etc.—Sheets, 10g. and thicker, all English destinations, £170 17s. 6d.; rolled zinc (boiler plates), all English destinations, £168 17s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £170.

Other Metals.—Aluminium, ingots, £124; antimony, English, 99 per cent., £360; quicksilver, ex warehouse, £73 10s. to £74; nickel, £406.

Brass.—Solid-drawn tubes, 21¾d. per lb.; rods, drawn, 29½d.; 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), £240; BS. 1400—LG3—1 (86/7/5/2), £255; 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, 39d. per lb.; sheets to 10 w.g., 41⅛d.; wire, 41⅛d.; rods, 38d.; tubes, 43¼d.; chill cast bars: solids, —, cored, —. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 2s. 3½d. per lb. (7%) to 3s. 2½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 2s. 9½d. (7%) to 3s. 8½d. (30%); to 12 in. wide × .056, 2s. 9½d. to 3s. 8¾d.; to 25 in. wide × .056, 2s. 11½d. to 3s. 10¾d. Spoon and fork metal, unsheared, 2s. 6½d. to 3s. 5½d. Wire, 10g., in coils, 3s. 3d. (10%) to 4s. 2¼d. (30%). Special quality turning rod, 10%, 3s. 2d.; 15%, 3s. 6¾d.; 18%, 3s. 11d. All prices are net.

Forthcoming Events

FEBRUARY 26

Institution of Electrical Engineers

North-Western Centre :—Meeting at the Engineers' Club, Albert Square, Manchester, at 6.15 p.m. Paper, "Metallurgical Research at the Manchester University," by Prof. F. C. Thompson.

FEBRUARY 27

Society of Instrument Technology

Meeting at Manson House, Portland Place, London, W.1, at 7 p.m. Paper, "The Measurement of Surface Temperature," by Dr. R. C. Parker.

Sheffield Metallurgical Association

Meeting at the Grand Hotel, at 7 p.m. Paper, "Organic Reagents for Metallurgical Analysis," by J. H. Osborne.

Institute of Metals

South Wales Section :—Meeting at University College, Singleton Park, Swansea, at 6.30 p.m. Paper, "Some Applications of X-ray Crystallographic Methods to Quality Control in the Metallurgical Industry," by J. S. Walton.

FEBRUARY 28

Institution of Electrical Engineers

Mersey and North Wales Centre :—Meeting at the Philharmonic Hall, Hope Street, Liverpool, at 6.45 p.m. Paper, "Lamps and Lighting—A Record of Industrial Research," by L. V. Davies.

Institute of British Foundrymen

Birmingham Branch :—"Grain Refinement and its Effects in Cast Non-ferrous Metals," by A. Cibula, 7.15 p.m., at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3.

London Branch :—"Valve Guide Castings," by Rene Dulche, 7.30 p.m., at the Waldorf Hotel, Aldwych, London, W.C.2.

Manchester Metallurgical Society

Meeting at the Engineers' Club, Albert Square, at 6.30 p.m. Paper, "Clad Steel," by W. Barr.

Royal Society of Arts

"A Century of British Engineering, 1851-1951," by W. T. O'Dea, B.SC., M.I.E.E., 2.30 p.m., at John Adam Street, Adelphi, London, W.C.2.

Institution of Production Engineers

Lincoln Section :—Evening visit to Clayton Dewandre & Company, Limited, Titanic Works, Lincoln, at 6 p.m.

Western Section :—"Productivity," by E. C. Gordon England, 7.30 p.m., at Westinghouse Brake & Signal Company, Limited, Chippenham.

MARCH 1

Leeds Metallurgical Society

"Brains Trust," 7 p.m., at the Chemistry Department, The University, Leeds, 2.

Incorporated Plant Engineers

Peterborough Branch :—"Discharge Lighting," by B.T.H. & Co.'s Research Laboratories, 7.30 p.m., in the Eastern Gas Board's Demonstration Theatre, Church Street, Peterborough.

MARCH 2

Institute of Metals

Birmingham Local Section :—All-day Symposium at the Central Technical College, Birmingham.

MARCH 3

Institution of Production Engineers

Luton Graduate Section :—Afternoon visit to the National Physical Laboratory, Teddington.

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

FULLY qualified practical and technical FOUNDRY MANAGER, with iron, malleable and steel experience, with full duties, seeks engagement. Assembly, machining and commercial experience.—ROBINSON, 52, Lyndhurst Road, Erdington, Birmingham, 24. Tel.: ERD. 0121.

VITREOUS ENAMELLING MANAGER. New appointment desired by advertiser who has first-class knowledge of both technical and practical application of enamels for the domestic field from frit making to the finished ware, also extensive knowledge of the sign trade, including screen work. Capable organiser of mixed labour.—Box 648, FOUNDRY TRADE JOURNAL.

SALES MANAGER job wanted in any of the following industries:—General Engineering; Foundry; Machinery, Domestic and Industrial; Fuel and Hot Water Equipment. Advertiser has first-class record and experience in sales management, market research, organisation, marketing through agents stockists and direct to industry, publicity advertising, exhibitions. Also works management experience. B.Sc.(Eng). Only 38, and plenty of energy.—Box 646, FOUNDRY TRADE JOURNAL.

ASSISTANT FOREMAN, 37 years of age, requires position of responsibility in Tyne-Wear area. Extensive knowledge of technical and practical iron foundry practice.—Box 642, FOUNDRY TRADE JOURNAL.

YOUNG foundryman, experienced iron, steel and non-ferrous, seeks position as ASSISTANT MANAGER or similar. Good education, training, and references. Prefers high-class, mechanised, non-ferrous work. Willing to go anywhere in world.—Box 624, FOUNDRY TRADE JOURNAL.

MOULDER requires position. 28 years' practical experience in iron and non-ferrous metals. Able to supervise and control labour. House required.—Box 650, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

PATTERN MAKERS WANTED. TOP RATES AND BONUS.—Box 644, FOUNDRY TRADE JOURNAL.

ASSISTANT CHEMIST required for Shift Work in Ironworks Laboratory. —Reply, stating qualifications, experience, and full particulars, to MILLOM IRONWORKS, Millom, Cumberland.

SITUATIONS VACANT—*Contd.*

FOUNDRY FOREMAN.—A first-class, reliable, experienced, and energetic man, not under 38 years of age, required for Foundry producing 40 tons per week. Engineering and high class machine tool castings in green, dry sand and loam. Applicant must produce evidence of successfully filling similar position. Pension scheme; good house available.—Applications treated in confidence, stating full particulars of training, positions held, to Box 588, FOUNDRY TRADE JOURNAL.

BRASS, Gun Metal, Phos. Bronze Tub MOULDER wanted, to take charge as working foreman. First-class man only. Excellent opportunity.—J. GREATOREX & SON, 232, Aston Road, Birmingham, 6.

SOUTH AFRICAN IRON AND STEEL INDUSTRIAL CORPORATION, LTD.

VACANCY FOR ASSISTANT SUPERINTENDENT, BLAST FURNACES.

APPLICATIONS are invited for the post of Assistant Superintendent, Blast Furnaces, at the Corporation's Works in South Africa.

Preference will be given to applicants with experience of modern steel works plant and practice.

The maximum salary for the post is £1,400 per annum, plus cost-of-living allowance in accordance with the Corporation's scheme, and which at present amounts to £15 15s. per month for married employees and £7 17s. 6d. for single employees. Commencing salary will be determined commensurate with applicant's qualifications and experience.

The successful applicant will be required to satisfy the Corporation's Medical Officer as to the state of his health, and the appointment will be subject to the Corporation's usual conditions of service.

Apply immediately in writing, quoting "I/285," to London Representative, SOUTH AFRICAN IRON & STEEL INDUSTRIAL CORPORATION, LTD., 535/546, The Adelphi, London, W.C.2.

FOUNDRY MANAGER required for Iron, Aluminium and Non-ferrous Foundry in Lancashire. Applicant must be an experienced practical man, able to organise, control labour, estimate and operate jobbing foundry producing all types of castings up to 6 tons, including loam and machine moulding. Modern building, canteen, pension scheme. Good prospects for right man.—Apply, with full details, past experience, and salary required, to Box 616, FOUNDRY TRADE JOURNAL.

METALLURGICAL CHEMIST or METALLURGIST wanted for Engineering Works in the South of England, to take charge of laboratory and to assist Chief Metallurgist and Foundry Manager. Should be conversant with the analysis and micrography of steel, cast iron, copper base and aluminium alloys, as well as Foundry Sand Control.—Apply, stating age, experience, qualifications and salary required, to CHIEF METALLURGIST, Box 618, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

FOUNDRY WORKER, accustomed to cupola work (keeper, preparing and general work).—Apply Box 626, FOUNDRY TRADE JOURNAL.

FOREMAN for Production Core Shop. Age 30/40. Must be conversant with Osborne Core Blowing Machines and have all round experience in making cores for cylinder heads, crank cases, and other internal combustion engine parts. Modern foundry in North Midlands area.—Apply, giving full details of previous experience and salary required. Box 620, FOUNDRY TRADE JOURNAL.

MANAGER wanted for Steel Foundry on East of Scotland. Present output approximately 100 tons of metal per week by electric furnace process. Average types of castings produced weigh from a few pounds to 20 cwts. Both dry and green sand methods are in operation. Applicant must have experience in floor moulding and semi-mechanised methods. An exceptionally well appointed house is available.—Apply in writing, stating age, details of experience, references, and salary required, to Box 632, FOUNDRY TRADE JOURNAL.

FOREMAN required for Iron Foundry producing Builders' Castings. Knowledge of semi-mechanisation. Staff of 30. Pension scheme. House available. South Yorkshire town.—Box 634, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT, South Lancs. area. "Loam," "dry" and "green" sand. Jobbing Iron Foundry, weekly average 40 tons. 90 employees. Able to produce 15-ton castings to close analysis. To be responsible to the Managing Director for Foundry and Pattern Shop. Preference to M.I.B.F. State salary required. Three-bedroom semi, garden, garage, in residential district. Vacant early April.—Box 638, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER. Excellent opportunity for energetic man (35/45), capable of controlling modern foundry, capacity 15/20 tons per week, light and medium ferrous and non-ferrous castings.—Apply in writing: THE HAMWORTHY ENGINEERING CO., LTD., Poole, Dorset.

PERSONAL ASSISTANT to the Directors of Constructional Engineers and Ironfounders in the Midlands. Commencing salary £600 per annum, with housing accommodation if required.—Box 606, FOUNDRY TRADE JOURNAL.

RATEFIXER / ESTIMATOR required for large mechanised Iron and Steel Foundry producing light and medium-heavy castings. Applicants must have experience of estimating and quoting from drawings or patterns.—Write, giving full particulars of age, experience, previous positions held and salary required, to MESSRS. JOHN FOWLER & CO. (LEEDS), LTD., Sprotborough Works, Doncaster.

SITUATIONS VACANT—*Contd.*

MOULDERS.—Iron Foundry requires skilled jobbing Moulders. Piecework. Good wages can be earned by first-class workers.—H. SAMPSON & SONS, LTD., Bedminster, Bristol, 3.

REQUIRED, for development work in India, METALLURGIST, with suitable technical qualifications, preferably a degree in metallurgy. Experience in production of alloy cast irons essential; knowledge of alloy steels an advantage. Service will involve travel throughout India and Pakistan. Salary in accordance with abilities.—Apply, quoting experience and qualifications, to MANAGER, D. & R. Department, The Mond Nickel Co., Ltd., Sunderland House, Curzon Street, London, W.1, marking envelope "I. Confidential."

FOUNDRY FOREMAN for small Foundry in west end, Glasgow, with experience in cast iron and non-ferrous castings, cupolette and pit fires, pin lift and turnover moulding machines, tub and floor moulding for light jobbing work. Good prospects for man with drive and initiative.—Apply, stating age, experience, with copies of references, where available, to Box 600, FOUNDRY TRADE JOURNAL.

EXPERIENCED PATTERNMAKER for high-class repetition patterns. Permanent position. Housing accommodation available for suitable applicant after 6 months' satisfactory service.—RICHARDS (LEICESTER), LTD., Phœnix Iron Works, Leicester.

FOUNDRY FOREMAN (working). Must be prepared to undertake control of labour and the actual finishing of bath moulds. Single man preferred. Excellent prospects for keen, enthusiastic worker. Good wages, ample food, living accommodation can be obtained. Foundry situated in Southern Ireland.—Apply BILSTON FOUNDRIES, LTD., Highfields, Bilston, Staffs.

2 GOOD FLOOR MOULDERS required for small Iron Jobbing Foundry. Flat accommodation available for suitable applicants.—Box 654, FOUNDRY TRADE JOURNAL.

GREY Iron Foundry has vacancy for FOREMAN with sound knowledge of floor, machine and mechanised production methods, and ability to supervise labour. Applicants preferred with previous employment in a similar capacity, and experience of cupolas, metal and sand control.—Write, stating age, experience and full history of employment, to JONES & ATTWOOD, LTD., Stourbridge, Worcs.

WORK WANTED

WORK wanted for deep moulding boxes 44 in. long by 30 in. wide by 18 in. top by 18 in. depth. Machine moulding. Large pipe fittings or other cylindrical horizontal work. Low phos. iron. Location Clyde area.—Box 532, FOUNDRY TRADE JOURNAL.

LONDON Company, with wide sales connections, would represent Aluminium Foundry (sand and/or die cast and with or without yellow metals production). Excellent opportunity for firm looking ahead of present conditions. Would consider purchase of controlling interest.—Box 656, FOUNDRY TRADE JOURNAL.

FOUNDRIES FOR SALE

IRON AND BRASS FOUNDRY (within a few miles from London) for Sale or to Let on Lease. Fully equipped. Capacity 15 tons per week. The present owner retiring from business.—Apply Box 602, FOUNDRY TRADE JOURNAL.

IRON FOUNDRY, West Riding, for Sale as going concern. Freehold land and buildings; 20 employees. Chiefly engaged on rainwater castings. Plenty of orders and good connections.—Box 622, FOUNDRY TRADE JOURNAL.

FINANCIAL

ENGINEERING INDUSTRY.—Financial group have substantial funds available for the purchase of shares in Private Companies with good profit earning record, or would provide working or development capital on mutually agreeable terms.—Write "Capital," Box 564, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

OFFER YOUR SURPLUS PLANT TO

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

FOUNDRY Cupola; 3 ft. 6 in. or 4 ft. diameter. In good condition. Approx. 31 ft. high.

THE HILL TOP FOUNDRY CO., LTD.
Wednesbury, Staffs.

WANTED. — One self - motorised, 440/3/50, Sand Mixer. 4 ft. 6 in. to 5 ft. pan.—Replies, stating where lying and price required, to Box 652, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

IN STOCK AT SLOUGH FOR IMMEDIATE DELIVERY.

STEEL MOULDING BOXES. 18 in. by 13 in. and 22 in. by 17 in. 30 in. and 33 in. square. 800 pairs to clear at £1 per pair.

New large size Adaptable Hand Moulding Machine. Takes boxes up to 30 in. sq. £65.

Heavy Rumbler, by Jas. Evans. 6 ft. by 3 ft. As new.

TITAN Core Blower. 150 lbs. capacity. £275.

AVERY 3-cwt. Platform Scales; type 282. As new.

NEW SAND DISINTEGRATOR. A.C. motorised. £85.

SIX CUPOLAS & CUPOLETTES in stock. 30 in. dia. Cheap.

BALE-OUT FURNACES, by Morgan & British Furnaces.

A.C. Motors, Keith Blackman Fans, Broomwade Compressors, Shot Blast Spares, etc.

Immediate attention to all enquiries.

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

MACHINERY FOR SALE—*Contd*

FOR SALE.—One Duplex Roll-over Moulding Machine, by the Adaptable Moulding Machine Co., Ltd. Good as new. —Apply CHURCHILL REDMAN, LTD., Parkinson Lane, Halifax, Yorks.

FOR SALE.

NO. 1 and No. 2 Pneulec Royers. New condition.

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

FOR SALE.—British Furnace, semi rotary. 800 lbs. capacity. Gas or oil fired.—Box 640, FOUNDRY TRADE JOURNAL.

PLANT surplus on modernisation: Jackman Shot Blast Cabinet, 2 ft. 8 in. by 2 ft. 8 in. by 2 ft., complete less compressor; Polford Mould Drier; both a.c. 400. Small Royer, d.c. 440. Mumford Plain Jolter, 3 ft. by 2 ft. 6 in. table.—Box 628, FOUNDRY TRADE JOURNAL.

600

AIR COMPRESSORS.

1,000-C.F.M., TILGHMAN, low pressure set, type CE.3B, vert., twin cyl., single stage, water cooled, 12 lb. w.p., 320 r.p.m. Direct coupled 75-h.p. S/R Met.-Vick motor 415/3/50.

490-c.f.m., BROOM & WADE, maker's No. 23022, vert., 3 cyl., single stage, water cooled, 30 lb. w.p., 323 r.p.m. Direct coupled 55-h.p. auto. synch. Crompton motor 400/3/50.

400-c.f.m., ALLEY & McLELLAN, series 34B. size 7, vert., enclosed, 2 stage, 2 crank, double acting, water ccoled, 100 lb. w.p., 975 r.p.m. with vert. F.M. intercooler and aftercooler. Vee rope driven by 95-h.p. S.C. motor by L.D.M. 400/3/50.

250-c.f.m., ALLEY & McLELLAN, Sentinel series 28A, vert., single cyl., water cooled, 100 lb. w.p., 360 r.p.m. Belt driven from 50-h.p. L.D.M. S/R motor 440/3/50, 1,460 r.p.m.

140-c.f.m., FULLERTON, HODGART & BARCLAY, 2 stage, 2 crank, water cooled, 100 lb. w.p., 600 r.p.m., fitted intercooler and with automatic unloader. Arranged vee rope drive from 30-h.p. Alpha Harris S/R motor 400/3/50.

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

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.*

ALBION WORKS

FOUNDRY PLANT AND EQUIPMENT — GENERAL.

MOULDING MACHINES:

HAND SQUEEZE STRAIGHT DRAW MOULDING MACHINE, by BRITISH MOULDING MACHINE CO. Accommodate boxes 15 in. by 14 in. Pattern Table 24 in. by 18 in. Pattern Draw 6 in.

SHOTBLAST AND DUST EXTRACTION PLANT:

TILGHMAN SHOTBLAST ROOM PLANT, having 6-ft. room, type SV2, Tilghman Shotblast Apparatus, Pressure Chamber, Paddle Blade Exhaust Fan, Air Receiver, etc. Price very reasonable.

TILGHMAN DUST EXTRACTION CABINET. 44 in. by 34 in. by 68 in. deep. Motor Driven Dust Extraction Fan, 400/440 volts, 3-phase, 50 cycles.

DUST ARRESTING PLANT, comprising Sheet Steel Cabinet 4 ft. by 3 ft. 6 in. by 5 ft. 6 in. high. Motor Driven Paddle Blade Dust Extraction Fan, 8 in. inlet, driven by 1 h.p. Motor, 400/440 volts. 3-phase. 50 cycles.

RUMBLING BARRELS:

TILGHMAN SHOTBLAST RUMBLING BARREL. Size of barrel 2 ft. 8 in. dia. by 1 ft. 10 in. wide, door opening 1 ft. 2 in. by 1 ft., with Tilghman type NV1 Shotblast Apparatus, Nozzle Holder, etc.

NEW MOTOR DRIVEN HEXAGONAL RUMBLING BARRELS. 36 in. long by 18 in. across flats. 1 ft. 2 in. plate; driven by 3 h.p. Motor, and complete with starter. 400 volts, 3-phase, 50 cycles.

NEW BELT DRIVEN—ditto—size 36 in. long by 30 in. across flats; driven through fast and loose pulleys, with belt striking gear.

BELT DRIVEN GEARED HEXAGONAL RUMBLING BARREL. 18 in. long by 16 in. across flats. Fast and Loose Pulleys, 10½ in. by 3 in.

"FORWARD" FOUNDRY SAND RIDDLE. 5-tons per hour capacity. Complete with Tripod and 22 in. dia. Sieve. Motorised.

GEARED FOUNDRY CRANE LADLES—BRAND NEW:

4-ton, 3-ton, 50-cwt., 2-ton, 30-cwt., 15-cwt., 10-cwt.

ALL THE AFOREMENTIONED ITEMS AVAILABLE FOR IMMEDIATE DELIVERY EX STOCK.

THOS W. WARD LTD.

ALBION WORKS : SHEFFIELD

Phone 26311 'Grams: "Forward."

Remember . Wards might have it!

"SKLENAR" FURNACE. 1-ton capacity. Coke fired. New 1944. Very little used. Price £700.—Box 542, FOUNDRY TRADE JOURNAL.

FOR SALE.

NEW 3-Ton Hand Overhead Travelling Crane. 30 ft. span. Complete with 60-ft. Gantry. Immediate delivery.

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

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.

TILGHMAN Shotblast Room, 18 ft. by 15 ft. by 8 ft. high, with double feed doors with 20 perforated steel floor plates each 1 ft. 9 in. by 4 ft. 7 in. and approx. ⅜ in. thick, with some under floor collecting cones; Shotblasting Hopper with Cyclone, and large Exhaust Fan if required. This room could be cut down to smaller size, or would make two small sized rooms. Slightly incomplete, but offered at a VERY CHEAP PRICE to clear.

TILGHMAN Shotblast Cabinets, 3 ft. cube, having sliding doors, with suspended type Shot Mixing Hopper and motorised Exhaust Fan. £68.

SOMERFIELD Shotblast Cabinet, 3 ft. by 2 ft. by 2 ft. 6 in., with suspended type Shotblast Mixing Hopper. W.p. 30 lbs. p.s.i. £35.

LARGE selection of Belt and Motor-driven Blowing and Exhausting Fans.

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.*

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.—Battery of 5-Core Drying Cabinets, complete with firebox, electric motor, fan, etc. Can be seen working. Offers for quick sale.—Apply to THE BROCKMOOR FOUNDRY CO., LTD., Brierley Hill, Staffs. Telephone: Brierley Hill 7026.

HYDRAULIC MOULDING MACHINES AND PLANT FOR SALE.

(1) T.2 Roll-over. Serial No. 225.G. Under Sand Frame, size 17 5/16 in. by 14 3/16 in. Box sizes, 21 in. by 14 in. Between Table and Pressure Plate, 23 in.

(2) F.E.3. Serial Nos. 221.G. and 222.G. Box size, 34 in. by 22 in. Between Table and Pressure Plate, 15 in.

(3) F.E.2. Serial Nos. 198, 211.G., 220.G. Box sizes, 24 in. by 15 in. and 28 in. by 18 in. Between Table and Pressure Plate, 15 in.

Hydraulic Plant, including: Motor; Starter Pump, interconnecting piping; Loaded Casing Accumulator, working pressure 750 lbs. per sq. in.

Offers and inspection invited. All in very good condition, and made by Foundry Equipment, Ltd.

A. E. BAKER & CO. LIMITED,
Westgate Works, Newport, Mon.

CAPACITY AVAILABLE

SUNDERLAND PATTERN & WOOD WORKING CO., Peacock Street, Sunderland. — Patternmaking; capacity available; plate, light and heavy patterns; keen prices and quick delivery. 'Phone 3979.

IRON Foundry capacity available for production of C.I. Railway Chairs, or plain castings with flat backs up to a maximum of 16 in. by 16 in. by 6 in. deep and up to 1 cwt. in weight. Competitive prices.—Apply JOSEPH WILLIAMSON & CO., LTD., Midland Foundry, Wellingborough, Northants.

CAPACITY available for Light Castings weighing from 1 lb. to 6 cwts., including Castings for Vitreous Enamelling. —WESTERN LIGHT CASTINGS FOUNDRIES, LTD., Fairwood Foundry, Gowerton, near Swansea, manufacturers of malleable iron castings.

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

CAPACITY AVAILABLE

FOUNDRY capacity available. For up to 5 cwts. machine moulded; for up to 2 tons floor moulded. Prompt delivery.—LEWIS' FOUNDRY CO., LTD., Ammanford.

PATTERNMAKING capacity available for all branches of Engineering; for hand or machine moulding. Competitive prices and good delivery.—CHARLES HILL & SONS, LTD., Albion Dockyard, Bristol.

NON-FERROUS FOUNDRY, capacity available, including sand blasting, competition prices quoted.—ALBUTT, SON & JACKSON, Valve Makers and Brass Founders, Greenmont Works, Halifax.

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.

CAPACITY, substantial, available immediately, fully mechanised Foundry; high quality Grey Iron and Malleable Castings; boxes up to 28 in. by 16 in. by 6 in.; Patternmaking facilities if required. —E. J. WALLACE, 50, Wellington Street, Glasgow, C.2.

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.

H. C. HOPPER (Kingston) Ltd.
HAMPDEN ROAD, KINGSTON
KIN 0177/8 9
PATTERNS (Wood & Metal)
CASTINGS (Iron & Non-Ferrous)
GEAR CUTTING
GENERAL MACHINING
All at our
KINGSTON WORKS
Good Deliveries

CAPACITY AVAILABLE—*Contd.*

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.

MISCELLANEOUS

S. BATEMAN for Engineers' Wood Patterns.—Bolton's Court, Blackburn. Tel.: Blakewater 42179.

WE buy used or unserviceable Steel Files at good prices, in lots of 2 cwts. or more.
THOS. W. WARD LTD.
R.S. Department,
Albion Works, Sheffield
Phone 26311 'Grams: "Forward."

WANTED, by Student of National Foundry College, back copies of I.B.F. Proceedings.—Reply, P. R. GUNN, Tor Lodge, Mount Road, Compton, Wolverhampton.

MOISTURE TEST—3 MINUTES! Exact percentage of water in foundry sand determined in three minutes by "SPEEDY" MOISTURE TESTER. Portable; non-electric; simple for use by unskilled labour; inexpensive. Over 4,500 in use in Foundries and many other industries.—Write for fully descriptive Illustrated Brochure to THOS. ASHWORTH & CO., LTD. (Dept. F.T.J.), Burnley, Lancs.

EX W.D. Steel Storage Bins, ⅛ in. gauge, box type; make good stillages, 36 in. by 18 in. by 16 in. and 36 in. by 18 in. by 21 in. 30s.
Keith Blackman 1 h.p. Cyclone Fan, with ducts and hopper. £25.
C. G. NELSON,
118, Anchorway Road, Coventry.

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.

CASTINGS or MACHINING
COMPLETE production available, good quality Grey Iron up to 10 cwt. Alum. up to 150 lbs.; milling, turning, boring, planing, etc.
TRIANCO LTD.,
East Molesey.
Tel. Emberbrook 3320

MISCELLANEOUS—*Contd.*

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

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

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

FOR SALE.—Bound copies "Foundry Trade Journal," as new, for years 1937, 1939, 1940, 1941, 1942, 1943, 1944, 1946. Offers.—Box 580, FOUNDRY TRADE JOURNAL.

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

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

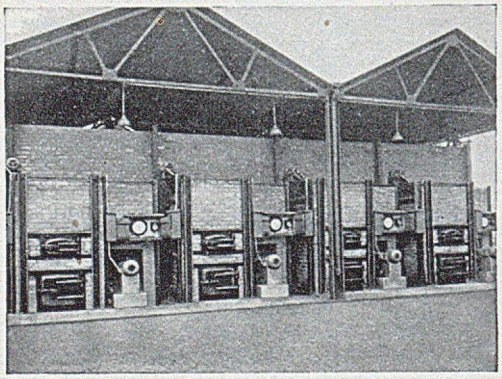
NICKEL SILVER INGOTS, redundant to contract, for Sale. Several tons to specification, approximately copper 50 per cent., nickel 12 per cent., zinc 37 per cent., lead ½ per cent. max., iron ½ per cent. max. Best offer.—Box 636, FOUNDRY TRADE JOURNAL.

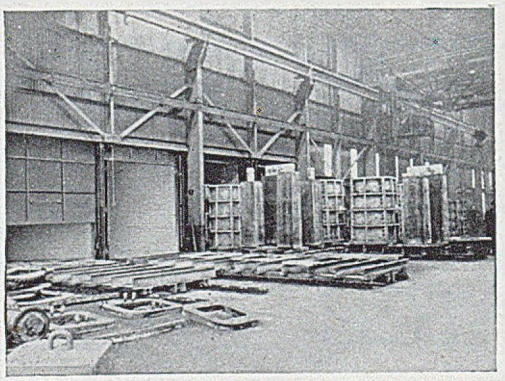
BROMSGROVE Red Foundry Moulding Sand at keen prices. Delivered works by road.—HAWLEY, Lydiate Ash, near Bromsgrove, Worcs.

WANTED your surplus
STAINLESS STEEL
SHEET · OFFCUTS · BAR · STRIP or TUBE
BOUGHT at best prices or
EXCHANGED for what you now need
SCRAP · STAINLESS or NICKEL
We pay best prices and collect.
Purchase offers by return of post or our Buyer will be pleased to call.
TAYLOR STAINLESS METALS LTD.
Slough, Bucks. Phone: Slough 20991
Grams: Taysteel, Slough

WHERE TO BUY
EVERYTHING FOR THE FOUNDRY
RING
BLAckfriars
9510
HARGRAVES BROS.
FACINGS
EQUIPMENT
REQUISITES
FOUNDRY SUPPLIES DEPOT
Quay Street, Manchester, 3

PATTERNMAKERS' Section





By courtesy of Messrs. Head, Wrightson & Co., Ltd., Stockton-on-Tees

Published by the Proprietors, Industrial Newspapers, Limited, 49, Wellington Street, Strand, London, W.C.2, and Printed in Great Britain by Harrison & Sons, Ltd., Printers to His Majesty The King, London, Hayes (Middx) and High Wycombe.

FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 90
No. 1799

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

FEBRUARY 22, 1951

Registered at the G.P.O. as a Newspaper

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

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