FOUNDRY TRADE JOURNAL

EST. 1902

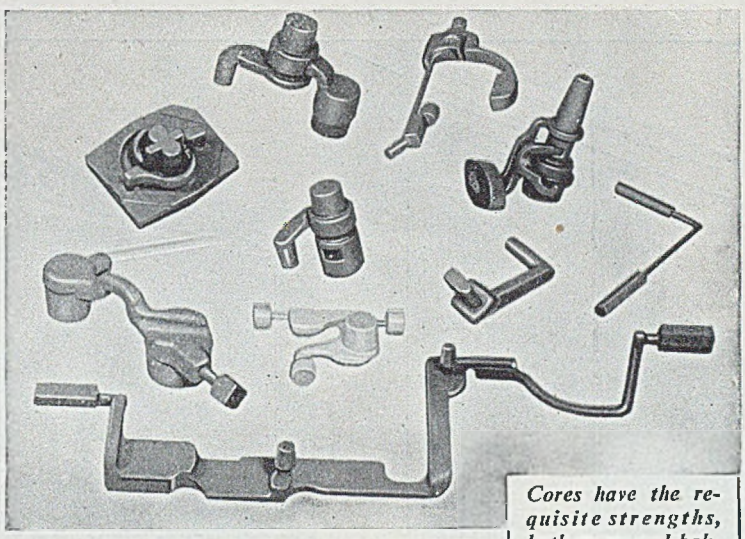
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 95
No. 1936
Registered at the G.P.O. as a Newspaper

OCTOBER 8, 1953
Offices: 49, Wellington Street, Strand, London, W.C.2

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

THE CORE-MIX IS AS GOOD AS ITS BOND



(PHOTO BY COURTESY OF MESSRS. WESTINGHOUSE BRAKE & SIGNAL CO. LTD.)

Cores have the requisite strengths, both green and baked, when the sand is bonded with Glyso, mixed in the Fordath 'New Type' Mixer.

GLYSO Core Bonding Compounds

A RANGE TO MEET EVERY NEED

High green bond, free flowing mix with high baked strength, quick drying without stoving—what are the requirements? The GLYSO range of Core Bonding Compounds provides every characteristic specified in the core-shop. Famed for their substantial contribution to core-making technology, GLYSO binders are widely used in foundries near and far.

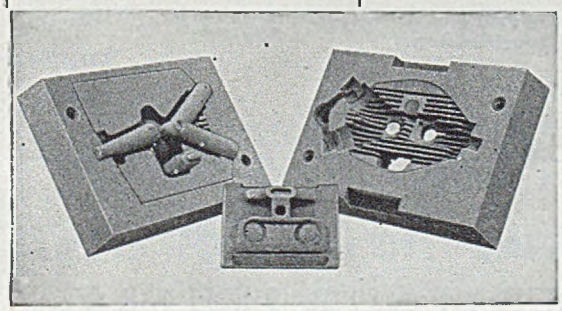
Semi-Solid Compounds give a high green bond covering a wide range of sand characteristics.

Creams combine a lower green bond and free-flowing mix with high baked strength; unsurpassed for core-blowing mixtures.

Dark Compounds provide a lower priced range giving excellent results for general work.

Permol Core Oils are in seven grades, selection being governed by relating dried strength requirements to binder cost. Permol bonded cores have good knock-out after casting.

Intricacy and accuracy with Glyso in the sand mix for this mould and core assembly.



(PHOTO BY COURTESY OF MESSRS. CENTRAL FOUNDRY CO. LTD.)

Glyso XL Core Powder, a pure film-dried cereal, produces high green strength in the mix and is best used with Permol Core Oil.

Glyso — Exol Core Powders, a range of cereal powders impregnated with core oil in accurate quantities for different classes of core work.

Glyso Airbond, quick drying without stoving, or stove-dried in half the usual time.

Glyso Resyns. A range of synthetic resin binders for quicker drying of cores by short-period stoving, or by dielectric heating. Excellent knock-out. Enquire also about Glyso Spray Oils, Fordavol, Fordath Parting Powder, Fordath Moulding Sand Regenerator and Fordath Paint Powders.

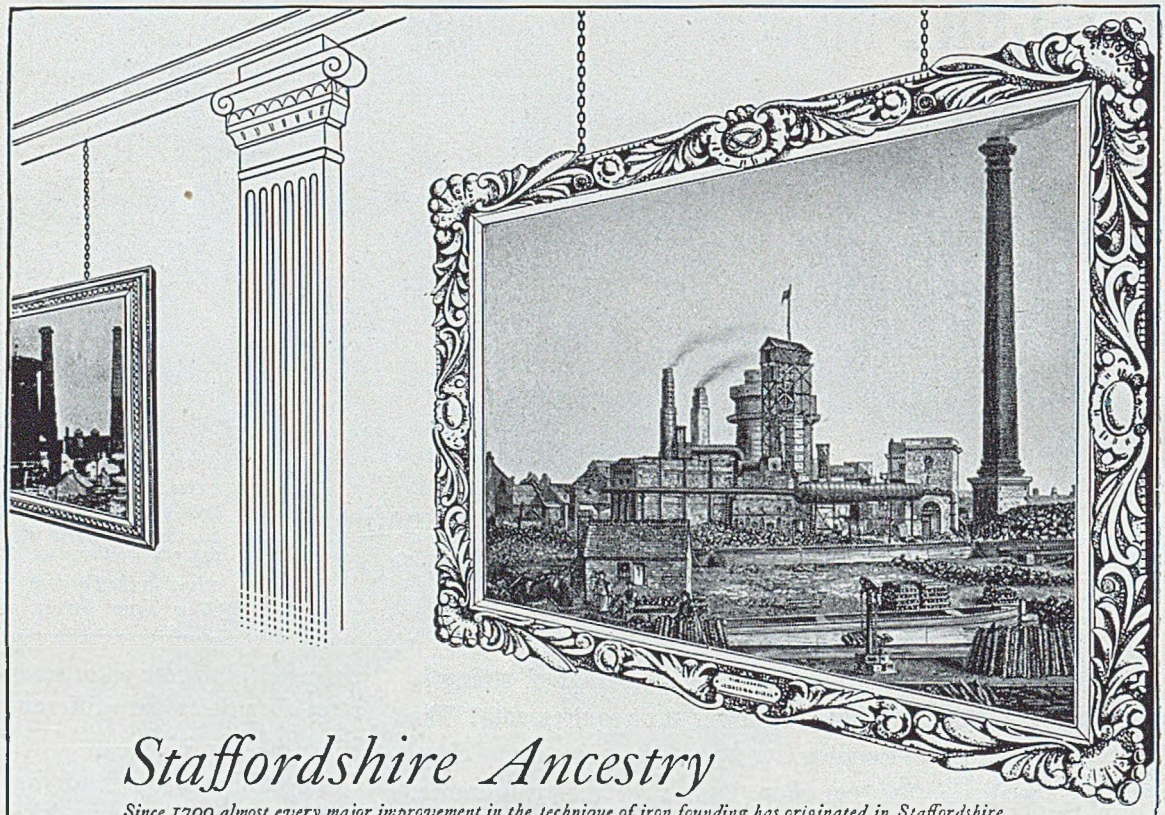
Make certain that the right binder is used for every job in the shop.

GLYSO CORE BINDERS

Full details obtainable from,

THE FORDATH ENGINEERING CO. LTD. HAMBLET WORKS, WEST BROMWICH STAFFS.

PHONE: *West Bromwich 0549, 0540, 1692*
GRAMS: *Metallical, West Bromwich*



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.*

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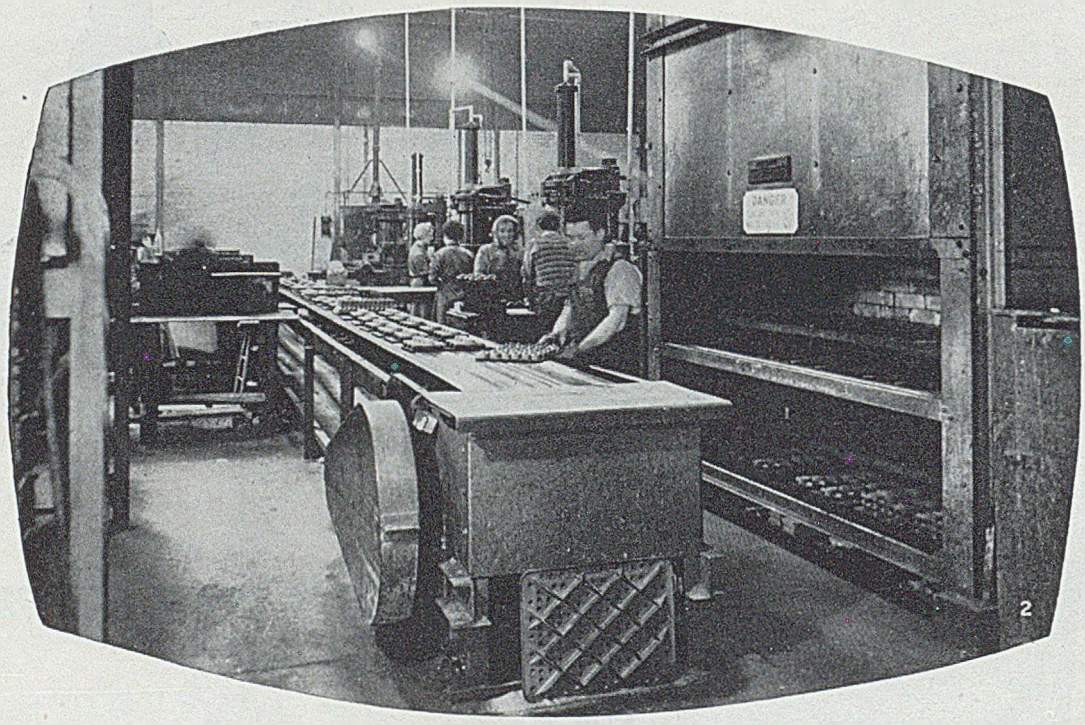
FOR QUALITY CONTROLLED
REFINED PIG IRON

DARLASTON · STAFFORDSHIRE

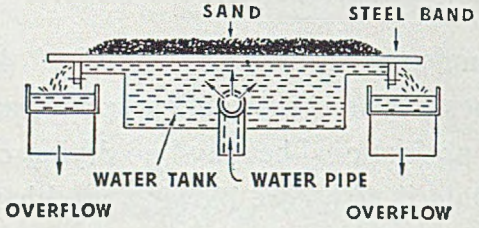
L.G.B.

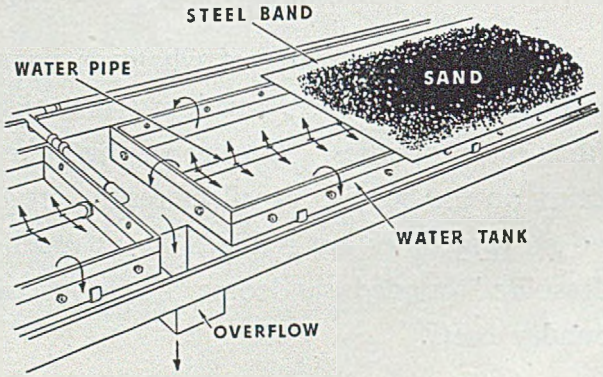
MODERNISE YOUR CORE SHOP . . .



This photograph shows one of our many conveyors conveying cores from the benches to the drying stove.

WITH STEEL BAND CONVEYORS





If you have difficulty with your warm sand adhering to patterns why not cool it on our patented water-cooled steel band conveyor as illustrated by diagrams above and on right.

SSBC

SANDVIK STEEL BAND CONVEYORS LTD

B.F.T. Division

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SINEX HIGH FREQUENCY VIBRATORS AND VIBRATING SCREENS

3 Ton Model Illustrated

Larger and smaller machines available

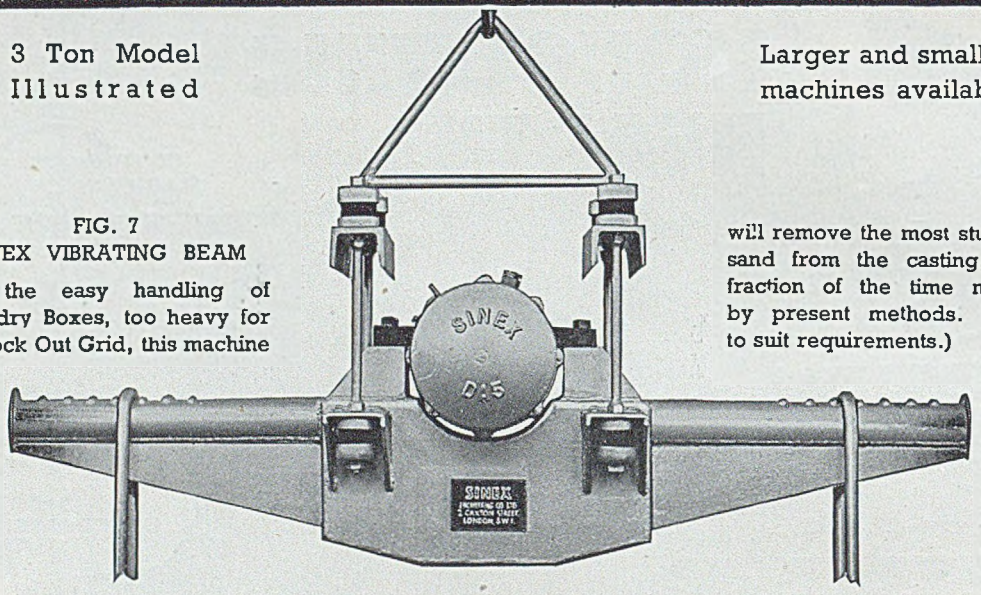


FIG. 7
SINEX VIBRATING BEAM

For the easy handling of Foundry Boxes, too heavy for a Knock Out Grid, this machine will remove the most stubborn sand from the casting, in a fraction of the time needed by present methods. (Links to suit requirements.)

We have an extensive prefabrication department and will be pleased to quote you for alteration or addition to your existing plant, and if Hoppers, Chutes and Roller Conveyors and Ancillary Equipment is required, please contact Sinex Technical Department

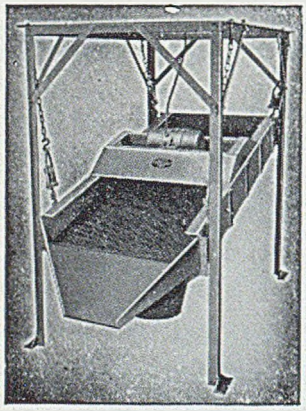


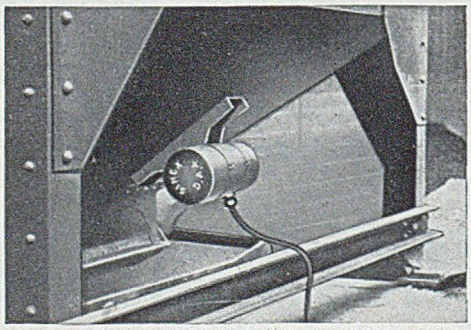
FIG. 10 (on left)

Sinex Vibrating Screen 6ft. × 3ft. Single Deck. Hourly output—15 tons of sand through ⅜in. mesh.

This screen is also manufactured in sizes to suit requirements.

FIG. 8 (illustrated below)

An important function of Sinex High Frequency Vibrators is the application to Sand and Storage Hoppers. To facilitate the rapid discharge of the material, long experience has shown that the fitting of a Sinex Vibrator to a Hopper containing the most stubborn material will avoid "arching" or "funneiling" of the material in the neck of the Hopper and assure a regular flow. Fig. 8 shows a Sand Hopper fitted with Sinex Vibrator. Manufactured in various sizes suitable to the capacity of the Hopper, and wound suitable for any electric supply, single or 3-phase A.C.



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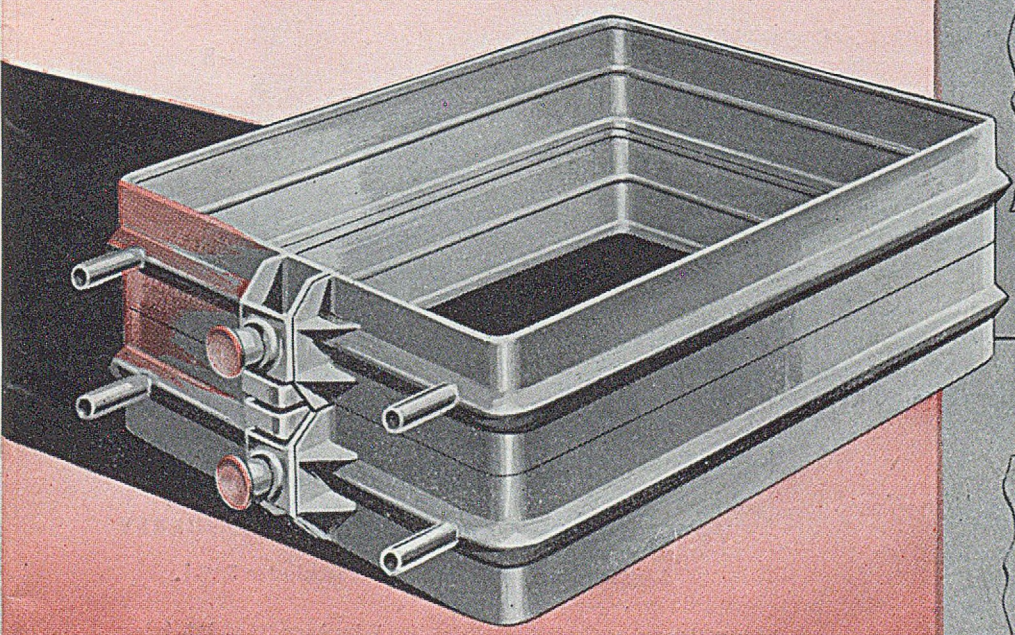
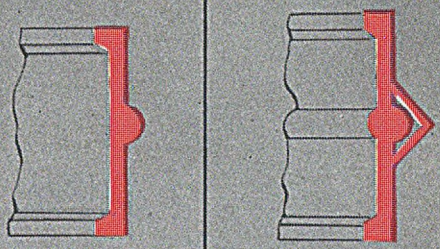
Sterling

standards of precision in box dimensions, accuracy and alignment of lugs and pins, are major contributions to the rapid production of

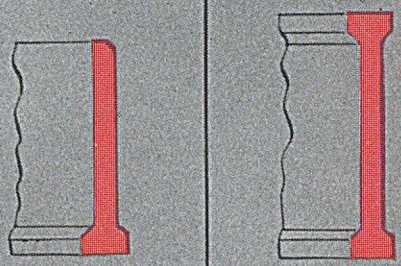
ACCURATE CASTINGS



STERLING FOUNDRY SPECIALTIES LTD . BEDFORD



STANDARD



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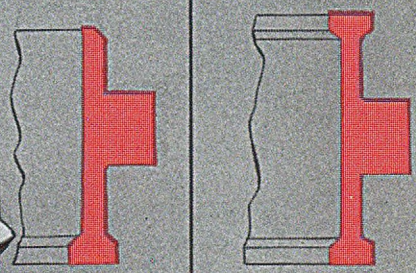
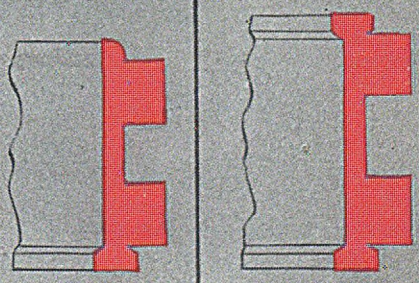


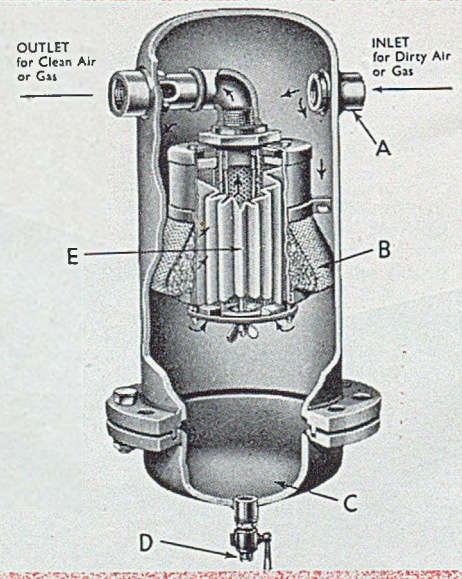
ALL FOUNDRY



CONDITIONS

Are You REALLY Protecting Your Air-using Tools?

Damage to compressed-air-using tools and machinery, through insufficient filtration in the compressed-air lines, costs industry hundreds of thousands of pounds annually. This damage is not caused simply by atmospheric dust introduced through the compressor air-intake into the compressed-air line. The constant compression and expansion of gases cause moisture, scale, and rust to form in the pipeline too; and this alone, if allowed to pass to the air-using tools, can do serious harm. Vokes Pipe Line Filters remove these impurities, and do so with 99·9% efficiency—but, for thorough protection, *filtration must take place not simply at the compressor, but at regular intervals along the delivery line.*



Incoming air at (A) is directed downwards, to a skirt of perforated metal (B) filled with brass wool, which collects oil and water by capillary attraction and, being in contact with the outer filter case, allows the liquid impurities to run to the base (C). Periodically, the liquids are drawn off by a conveniently situated drain tap (D). The air or gas then passes through the filter element (E), which removes all dust or scale particles. *THERE IS VIRTUALLY NO RESTRICTION TO THE AIR-FLOW THROUGH THE FILTER ELEMENT.*

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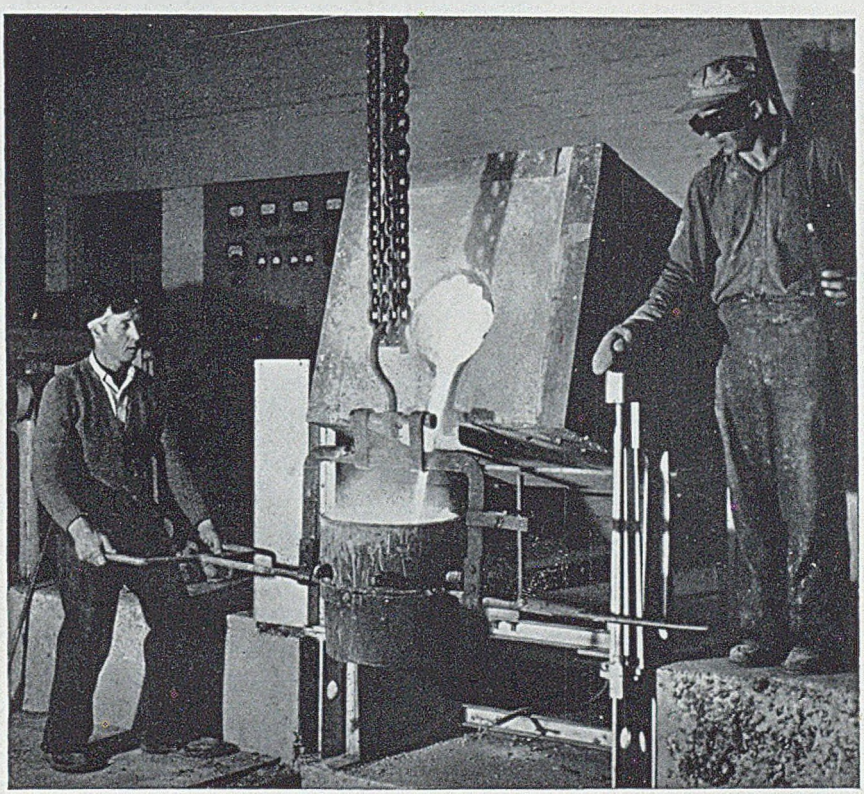
V92

How to increase the life of your furnace linings



Pouring metal from an Allis Chalmers high frequency furnace with Silester bonded lining at the works of Messrs. J. P. McKellar (Alloys) Ltd., Craigton Industrial Estate, Glasgow, S.W.3.

Monsanto's ethyl silicates, Silester A and Silester O, are widely used as the bonding agent in cast refractories for lining arc furnaces and high temperature ovens, in rammed monolithic linings for high frequency furnaces, and in washes for furnace linings.

These Monsanto chemicals make possible the casting of intricate shapes from fillers such as finely graded alumina, zircon, sillimanite and silicon carbide, and are particularly suitable for casting ceramic shapes for retaining electrical elements.

Write now for full information.

SILESTER O *Ethyl silicate*
SILESTER A *Amine modified ethyl silicate*

MONSANTO CHEMICALS LIMITED,
Victoria Station House, Victoria Street, London, S.W.1.

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Ltd., Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Ltd., Bombay. Representatives in the world's principal cities

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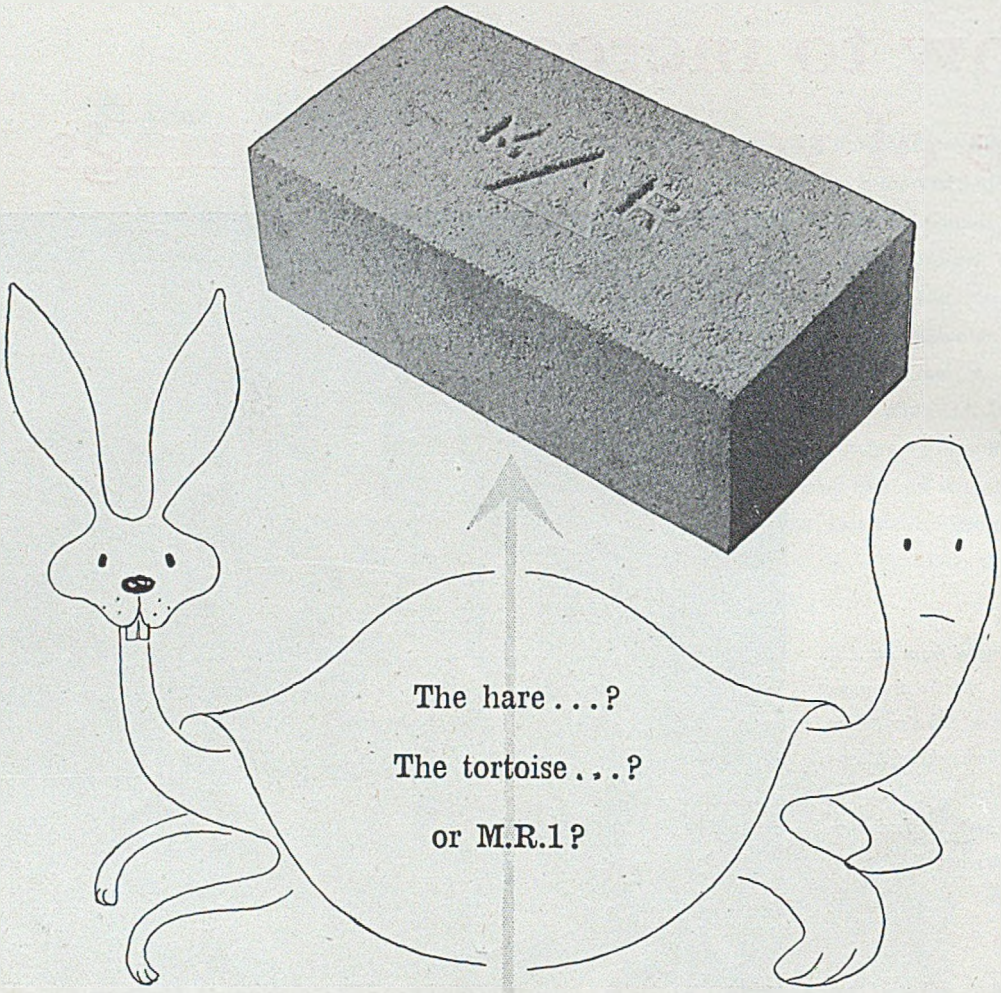


Suppose a furnace could be driven hard *without* shortening the life of the refractories? What if (in terms of output) you could combine the speed of the hare with the staying power of the tortoise? Fine, you say, but there's a limit to what the refractories will stand.

There *is* a limit, of course, even with Morgan M.R.1. But it's a good deal higher in both temperature and length of life than the limit set by ordinary refractories. The M.R.I. is stable up to 1600°C., dense, strong, and highly resistant to spalling.

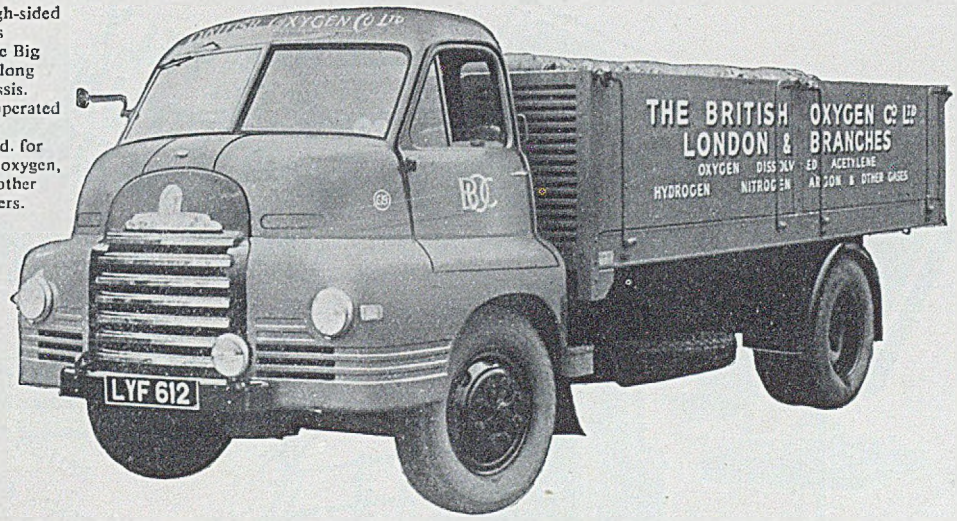
It is a 43% alumina brick with the performance of a very high alumina refractory. Its performance is due to the way it is made: to the specially purified clays, rigid process control and the very high temperature of the final firing. Obviously a more expensive brick to make . . . but one that pays for itself hand over fist in the furnace.

MORGAN Refractories

are worth far more than they cost

THE MORGAN CRUCIBLE COMPANY LIMITED, (Refractories Group), Neston, Wirral, Cheshire • Telephone: Neston 1406 • (N.E.86)

This special high-sided all steel body is mounted on the Big Bedford 7 ton long wheelbase chassis. The vehicle is operated by The British Oxygen Co. Ltd. for the transport of oxygen, acetylene and other gases in cylinders.



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The most successful 7-tonner ever built

BIG BEDFORD—THE DELIVERY POSITION

Greatly increased production is now permitting early delivery of most Big Bedford models. Ask your local Bedford dealer for details, and for a demonstration—or write to Vauxhall Motors Limited, Department 98, Luton, Beds.

The Big Bedford is Britain's best selling 7-tonner. Transport managers and leading hauliers put their faith in it because:—

- Fleet-user experience has shown it to be outstandingly reliable and economical;
- in lorry or tipper form it weighs less than 3 tons unladen;
- its 110 b.h.p. 6 cylinder engine is designed to operate 100,000 miles between overhauls;
- it carries big loads faster and at lower cost;
- and because it is backed by expert service and low-priced genuine parts from Bedford Dealers everywhere.

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156" wheelbase
Chassis £810
plus £156.16.3 P.T.
Dropside Lorry £975
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Tractor Chassis and Cab for 10 ton Bedford-Scammell
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VAUXHALL MOTORS LIMITED · LUTON · BEDFORDSHIRE

Foseco News Letter

Published by FOUNDRY SERVICES LTD., Long Acre, Nechells, B'ham. 7.

SOUNDER CASTINGS WITH SMALLER FEEDING HEADS

Heat producing materials for lining and hot-topping feeding heads to give more efficient feeding in both ferrous and non-ferrous casting are well-known, and FEEDEX Exothermic Feeding Compound is in daily use in large and small foundries throughout the country. This mouldable compound is available in various grades for use with light and heavy non-ferrous metals and with iron and steel.

FEEDEX Sleeves now available

FEEDEX, first supplied in powder form only, can now be obtained also as prefabricated sleeves. They can be had in a range of sizes or made exactly as you require them—in your own core boxes if desired.

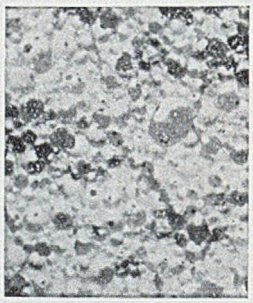
KALMIN Insulating Plaster Sleeves

A more recent addition to our range of feeding materials is KALMIN Insulating Plaster Sleeves which, although not as efficient as FEEDEX is recommended for use with certain non-ferrous alloy castings, particularly in those cases where the feeder head is favourably situated and is filled with really hot metal. It has been proved that the efficiency of such insulating sleeves is considerably improved if a hot-topping plug of FEEDEX is placed on the metal surface as shown in Figure (*b*).

Comparative Efficiency

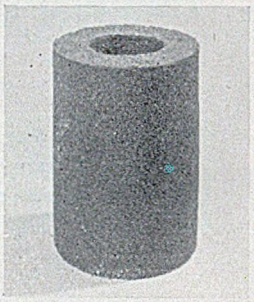
The illustrations show the approximate relative size of head required with (*a*) unlined head, (*b*) head lined with KALMIN Plaster (with FEEDEX hot-topping plug), (*c*) head lined with FEEDEX (with hot-top of FEEDEX), and illustrate clearly the comparative efficiency of the three methods.

The temperature of metal in feeding heads surrounded (*a*) with sand, (*b*) with a KALMIN insulating sleeve, and (*c*) with a FEEDEX heat-producing sleeve, were recorded, and the results are shown in the graph. It shows clearly the superiority of FEEDEX over the plaster material and the superiority of plaster over the green sand.

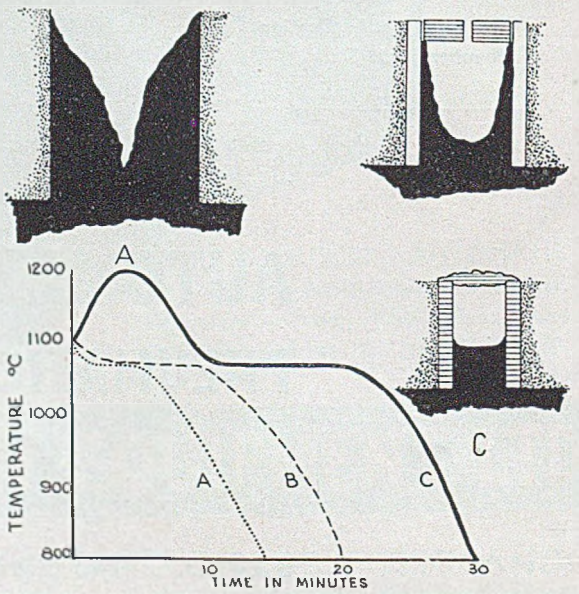


Above—Showing porous high permeability texture of KALMIN sleeve.

Right—KALMIN Insulating plaster sleeve.



Above—FEEDEX heat producing sleeves.



Please send further information on (*a*) FEEDEX (*b*) KALMIN

Attach to your letterheading and post to:

FOUNDRY SERVICES LTD.

Long Acre, Nechells, Birmingham, 7.

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L.G.B.

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Established 1902
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Cast Iron Pipe Association.—Secretary : T. Clark, Crusader House, 14, Pall Mall, London, S.W.1. 'Phone : Whitehall 7941.

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National Association of Malleable Ironfounders.—Secretary : Miss L. Verity, Chamber of Commerce Offices, Tudor House, Bridge Street, Walsall. 'Phone : Walsall 5671.

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NATIONAL IRONFOUNDING EMPLOYERS' FEDERATION

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Leeds and District Ironfounders' Association.—Secretary: F. H. Foster, H. J. Gill & Co. (Leeds), Ltd., 194, Cardigan Road, Leeds, 6. 'Phone: 52020.

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BRITISH CAST IRON RESEARCH ASSOCIATION

Alvechurch, Birmingham. 'Phone and 'Grams: Redditch 71.

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

FOUNDRY TRADE JOURNAL

Established 1902

Vol. 95 Thursday, October 8, 1953 No. 1936

PRINCIPAL 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"

Vitreous Enamellers

After an interval of a few years, the Editor participated in the annual conference of the Institute of Vitreous Enamellers. This was held at Cheltenham Spa and followed much the same lines—and with the same unobtrusive efficiency—as that of the Institute of British Foundrymen. The impression gained from attending a technical session was that the standard of discussion was higher than formerly and that the papers accepted for presentation were of a diverse, yet stimulating, character. The one which most appealed to us was Mr. Gray's paper on the conditions obtaining in this industry in Sweden, Denmark and Finland. He praised the quality of finished ware, especially that based on cast iron. In doing so he insisted that the castings were initially superior to those of this country. As an enameller, what pleased him most was the evenness of the very thin sections used. He was not dogmatic, but did point to the use of sand or a mixture of shot and sand for blasting as a factor favouring good enamelling conditions. These countries are cognisant and appreciative of the dangers to the operators of silicosis, and great attention is paid to dust exhaust, whilst medical supervision is constant and efficient.

When it was suggested that the iron foundries noted for the quality of the surface of their castings, were extravagant in the use of new sand, there was murmur of agreement throughout the audience. Unfortunately, there was no information forthcoming as to whether the Scandinavians were or were not prodigal in the use of new sand. It was stated that they were selling a nice model of a butter melter in large quantities to the Canadian market in competition with ceramic ware. The last occasion on which the Editor participated in one of these conferences, lobby gossip was that enamelled cast iron was rapidly being replaced by enamelled steel sheet and pressings, thereby following American practice. No such impression was received last week. Moreover, an excellent survey of the work of the Institute is given by reading the recently-issued volume (X) of their Proceedings. Here is to be found an outstanding series of papers on the effect of cobalt, nickel, lithium, titanium, and colouring oxides in vitreous enamels; on the use of ball clays, on the enamelling of light alloys and cast iron—all live and interesting subjects.

The leaders of the vitreous-enamelling industry are pretty much the same as earlier, as it should be, for they were the men who placed the Institute on a firm and lasting foundation. The Institute has as its president Dr. Harold Hartley, a man of particularly wide experience of technology, research and business. Others still active are Dr. Hurst, Mr. Gardom, Mr. Grainger, Mr. Hallsworth, Mr. Rogers, and Mr. Todd, but there is a considerable leavening of new members, who emulate the enthusiasm of the pioneers. We still regard the application of vitreous enamel to cast iron as being amongst the most important sales-promotion processes, and founders would be wise to bend their energies to ensure that the highest grade of castings are provided for this purpose, and so stop any encroachment from steel.

Institute of Vitreous Enamellers

Annual Meeting at Cheltenham

The 19th annual general meeting and conference of the Institute of Vitreous Enamellers was held this year in Cheltenham from September 30 to October 3. The proceedings opened on the first day with Council and committee meetings and a reception and dance by invitation of His Worship the Mayor of Cheltenham. On the second day the annual business meeting was held in the morning, commencing with the reading of the minutes of the previous annual general meeting, and followed by the report of the Chairman of Council.

The Chairman, Mr. Stanley Hallsworth, who presided over the meeting, reported that the past year had been one in which the Institute could fairly claim to have progressed in its aims. Twenty-seven new members had joined as against 18 resignations and the net gain at nine new members continued the upward trend of membership which had been maintained each year since the war. The Technical Committee through its various sub-committees had continued to be very active in the investigation of problems affecting the industry and progress towards a satisfactory final report was being made in every case. The Fellowship Committee had put its final recommendations before the Council, and their full implementation only awaited a decision on the means of raising the necessary finance.

The Institute had staged its second Summer School (again at Ashorne Hill, near Leamington Spa) during the weekend of June 19 to 21. The Council in general and the education committee in particular had been disappointed at the fall in attendance at this year's School, particularly in view of the enthusiastic and appreciative comments which had been received following the previous one. This year's programme had been no less effective and it aroused considerable interest among those attending. The Chairman commented that while he appreciated the difficulties involved in sending junior technicians to conferences, many of these did not really arise in connection with a week-end fixture.

Mr. W. S. Grainger, honorary treasurer of the Institute, next presented the financial report and balance sheet. This showed that after transferring £125 to the research and development fund there was a small excess of income over expenditure. The report was unanimously adopted without comment.

The honorary secretary then reported to the meeting that only three nominations had been received for the three vacancies existing on the Institute's Council, and therefore the following members were automatically elected: Mr. J. H. Gray, Mr. J. Nicholls, and Mr. H. Laithwaite.

New President-elect

Dr. J. E. Hurst, past-president, then rose to propose the election of Sir George Briggs as president-elect of the Institute for the ensuing year. This proposition was supported by Mr. John Hooper and was approved with acclamation.

The Chairman then said that he was very happy to be able to announce that the Institute was able to award both the W. S. Grainger Award and the Whittle Silver Medal as a result of papers presented during the previous year. The W. S. Grainger Award went to Mr. H. Laithwaite for his paper on "Some Properties of Vitreous Enamels and Their Practical Significance," which had been presented at a meeting of the Southern section in November, 1952. The Whittle Silver Medal was awarded to Mr. R. Semple for his contribution on the theme of "One-coat White Enamels" which had been set as this year's subject.

Following the annual general meeting, members participated in visits to two works, Thomas De La Rue & Company, Limited, and the Pressed Steel Company, Limited, Oxford. In both cases members were generously entertained to luncheon and tea by the companies.

The programme for October 2 comprised technical sessions held at the Town Hall and devoted to the discussion of five papers. These were: "Recent Developments in the Technology of Porcelain Enamelling on Steel in the United States," by E. M. Hommel; "The Human Factor in the Enamelling Industry," by R. C. M. Callaghan; "Modern Aspects of Sheet Pickling," by Dr. G. de Lattre and Dr. A. de Lattre (presented by J. Hooper); "Tone and Brightness Variations of Titanium-oxide Self-opacified Enamels," by N. S. C. Millar, and "A Survey of the Vitreous-enamelling Industry in Sweden, Finland and Denmark," by J. H. Gray.

In the evening the annual banquet of the Institute was held in the Town Hall, Cheltenham, at which Dr. H. Hartley presided and the principal guests were the Mayor and Mayoress of Cheltenham, Councillor and Mrs. T. L. Thompson, and Mr. J. W. G. Pedder, chairman of the Vitreous Enamellers' Association.

I.B.F. Works Visits Day

The "Works Visits Day" function, which has now become an annual feature of those activities of the Institute of British Foundrymen which are organized on a national basis, was held on Friday of last week, the East Midlands branch of the Institute being the hosts. About 180 members congregated in Nottingham for early morning departures in coach parties to the particular works in the area which they had chosen to visit.

Most of the trips were of a double nature, one foundry being seen in the morning and a second in the afternoon, and luncheon or tea were usually taken at or near the works. The premises inspected were those of Ley's Malleable and Qualcast at Derby; Herbert Morris at Loughborough; Stanton Ironworks at Stanton and (separate party) Melton Mowbray; Bamfords at Uttoxeter; Lloyds (Burton); S. Russell & Sons and G. Perry & Sons at Leicester and the Butterley Company (a brief account of each was published in the JOURNAL, September 24 and October 1 issues).

Social Evening

All the day's arrangements passed off with remarkable smoothness, largely due to excellent staff work by the East Midlands organizing committee, helped by experienced guidance from the head office at Manchester. Members were loud in praise of the worthwhile nature of the function and in discussing useful information they had garnered. In the evening, about 110 reassembled in Nottingham for dinner at the Regent Restaurant. Here, Mr. H. Pinchin, branch president, who was in the Chair, welcomed the national president, Mr. E. Longden, and guest representatives of the works, seated at the top table. These included two past-presidents of the Institute (Mr. P. H. Wilson, O.B.E., of Stanton, and Mr. S. H. Russell), as well as Mr. Clarke, of Qualcast, Mr. V. Bamford, Mr. Newman, of Butterley, and Mr. B. Perry. Mr. R. B. Templeton, also a past-president, who in his year of office inaugurated the "Works Visits Day," was also present. The proceedings were informal and terminated with concert-party entertainment. A hearty vote of thanks was accorded the organizing committee and particularly Mr. S. A. Horton, the branch secretary, at the closure of the function.

Paris Foundry Congress

A Week of Technology and Social Events

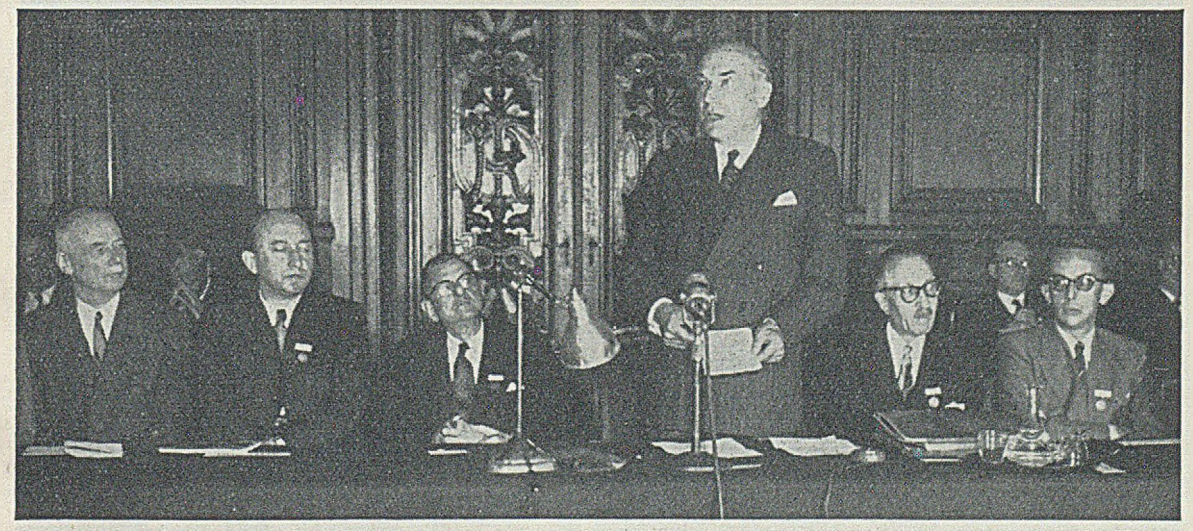
Held under the patronage of the President of the Republic, the presidents of the National Assembly, the Council of Ministers and the Council of the Republic, nine Ministers of State, and under the honorary presidency of Mr. Albert Buisson, principal secretary for Technical Education, this Congress was unofficially opened on September 19 at the headquarters of the hosts, the *Association Technique de Fonderie*, 2, Rue de Bassano. Throughout the day the registration of over a thousand participants was expeditiously carried through. There were facilities for booking hotels, theatres and tours, money-changing bureaux and a post office where philatelists were pleased to find a special cancellation had been sanctioned. The British contingent was headed by the president of the Institute of British Foundrymen, Mr. E. Longden, and with him were the two vice-presidents, Mr. John Bell and Dr. Everest, as well as three past-presidents, Mr. V. C. Faulkner, Mr. D. H. Wood, and Mr. John Sheehan. Other British visitors included Dr. J. E. Pearce, Miss Hanson, Mr. J. Blakiston, Mr. Douglas Catton, Mr. Harold Cookson, Mr. Leo Crump, Mr. W. G. Mochrie, Mr. Ambrose Firth, Mr. Harold Forrest, Mr. George Hyslop, Mr. John Jackson, Mr. Tom Makemson, Mr. Philip Russell, Mr. William Rees, Mr. Treherne Thomas, Mr. C. Wallwork, Mr. H. J. V. Williams, Mr. Frank Rowe, and Mr. John Butler. At 5 o'clock a cocktail party—or, more correctly, an occasion for champagne—was offered by the hosts.

Visit to Dampierre

At 10.30 on Sunday morning, a very large party went by motor coach to the Chateau of Dampierre, thrown open to visitors by courtesy of the Duc de Luynes. This chateau was designed by Mansart, the famous architect, whose special form of roof is still known by his name, but usually in English spelt Mansard. Beyond a short shower of rain, the weather was good and the trip was much enjoyed.

Opening Ceremony

No more dignified place could have been chosen than the large amphitheatre of La Sarbonne for the opening ceremony. The perfect setting was marred only by the lantern screen fouling an interesting mural. On the platform were the eminent personalities of the French foundry industry and the presidents and delegates from most of the technical associations of the world. It was presided over by the Minister of Education and speeches were made by Mr. P. Muguet, the president of the French Association and of the Congress; Mr. L. N. Shannon, the president of the International Committee of Foundry Technical Associations; Mr. Le Thomas, director of the Centre Technique, who replaced his president, Mr. P. Ricard, who unfortunately was indisposed; Mr. Olivier, president of the French Foundry Employers' Federation. The morning was completed with a lecture by Dr. Paul Bastien, who dealt with



Opening Ceremony for the Paris International Foundry Congress. The French Minister for Education, Mr. André Marie, is speaking and on his left are Mr. Muguet, the President of the Congress, and Mr. Goffart, the President of the Belgian Association. On his right are Mr. Shannon, President of the International Committee, and Dr. Schwietzke, of Germany.

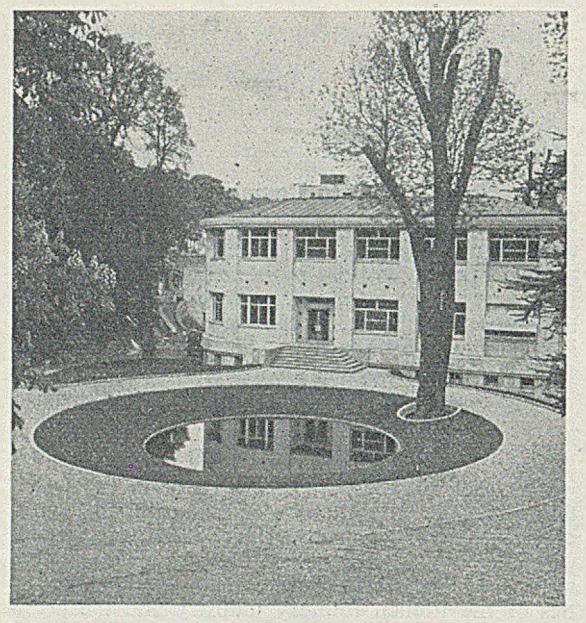


FIG. 1.—*Exterior of the Central Laboratory of the Centre Technique at Sèvres which was inaugurated in June, 1952, and which was visited during the International Foundry Congress held in Paris last month.*

hydrogen in steel and iron. The points he raised are of sufficient significance to set the tongues of foundry metallurgists wagging for moons to come.

As on other days, luncheon was taken at the Moulin de la Galette—an establishment of historic, rather than gastronomic interest.

The afternoon was devoted to the holding of three simultaneous sessions which disposed of twelve lectures covering such diverse subjects as gas in metals; malleable, foundry defects; ingot moulds and cupola practice.

Municipal Reception

No sooner were the technical sessions finished than the members, now joined by the ladies, were taken by coaches to the Hotel de Ville (City Hall). This beautiful renaissance building, constructed towards the end of the 19th century, is not presided over by the Mayor, but by the president of the Paris Municipal Council. He is the first citizen and as such welcomed the guests, and was thanked by Mr. Muguet.

At 8.30 the party reassembled at the Moulin de la Galette for a dinner and cabaret show, which successfully recaptured the days of the " naughty nineties " of Paris.

Educational Matters

For the technicians, the whole of Tuesday was devoted to studying the training of apprentices to be skilled workmen and students for managerial positions. Whilst the educational structures of this country and France are quite different, there is much to be learnt from the French perfected system. Much good use has been made of cinema films, whilst the publication of approved text-books merits high praise.

Works Visits

On the Wednesday morning, there was a goodly list of works to be visited and full advantage was taken of this opportunity. The afternoon was de-

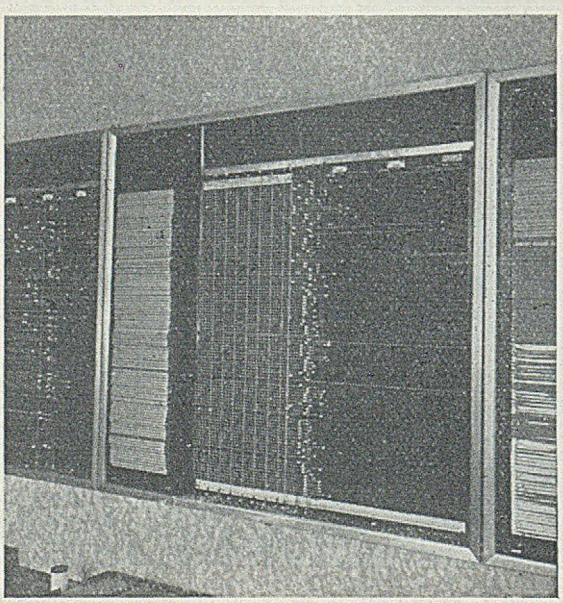


FIG. 2.—*View of the Control Board at the Sèvres Headquarters, where Record is kept of the Inquiries received and their follow-up.*

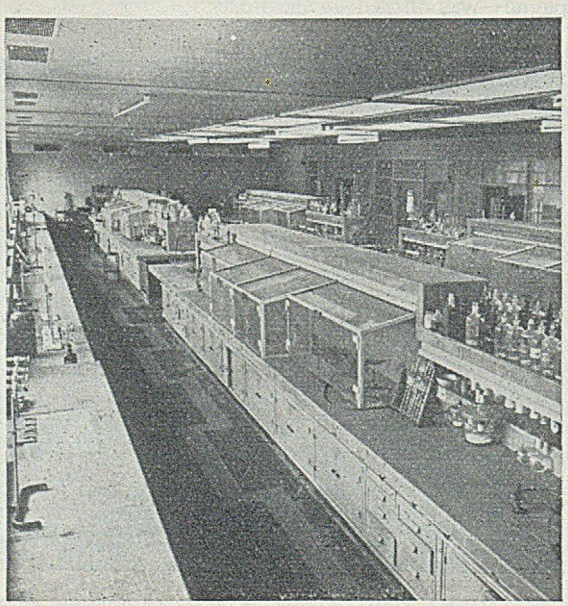


FIG. 3.—*General View of the Large Chemical Laboratory where 16 Workplaces can be accommodated.*

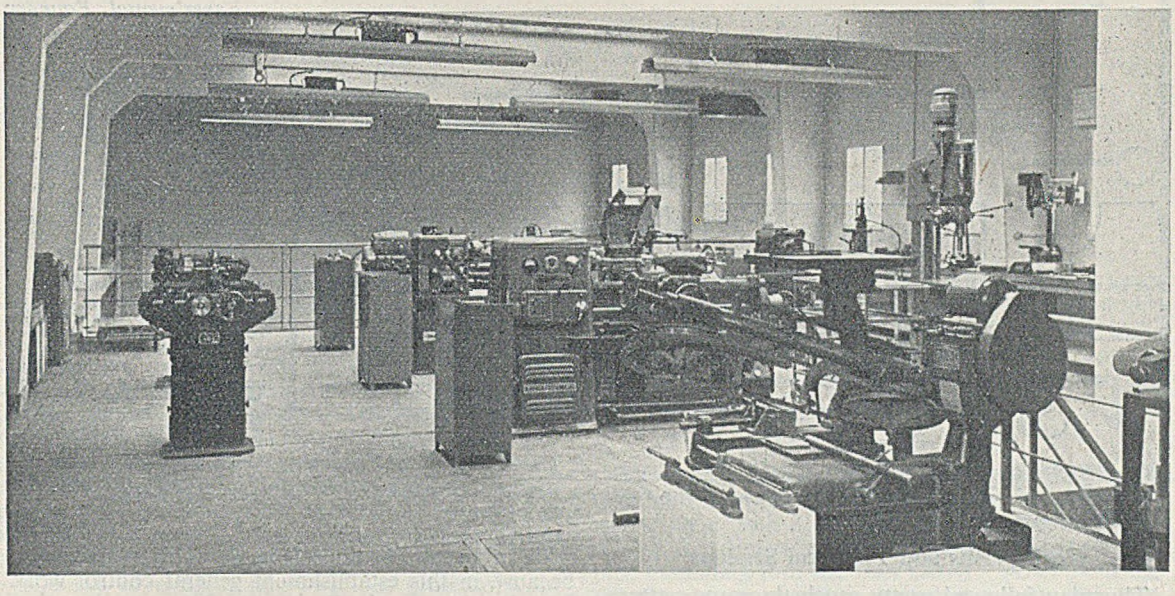


FIG. 4.—*Machine Shop at the Sèvres Headquarters Laboratory for Preparation of Test Samples.*

voted to technical sessions. Again there were three simultaneous sessions to which 14 papers were submitted. The subjects covered included graphite formation; spheroidal-graphite cast iron; refractbry linings; furnaces; runners and risers, and mould-filling properties of metal.

From the technical sessions, the delegates, with their ladies, went to a reception by the Paris Chamber of Commerce. Without underrating our own, the French Chambers of Commerce are of much greater importance on account of their wider activities. They have legal obligations, and are often the creators and administrators of public works, and the one in Paris has charge of the docks at Gennevilliers. Moreover, it operates eight business schools and seven workshop schools as well as controlling jewellery, firearms, and the exchange. It is magnificently housed on the Avenue de Friedland.

From this pleasant gathering, the visitors climbed into their motor coaches to be entranced by the illuminated fountains in the Gardens of the Château de Versailles, some twelve miles away.

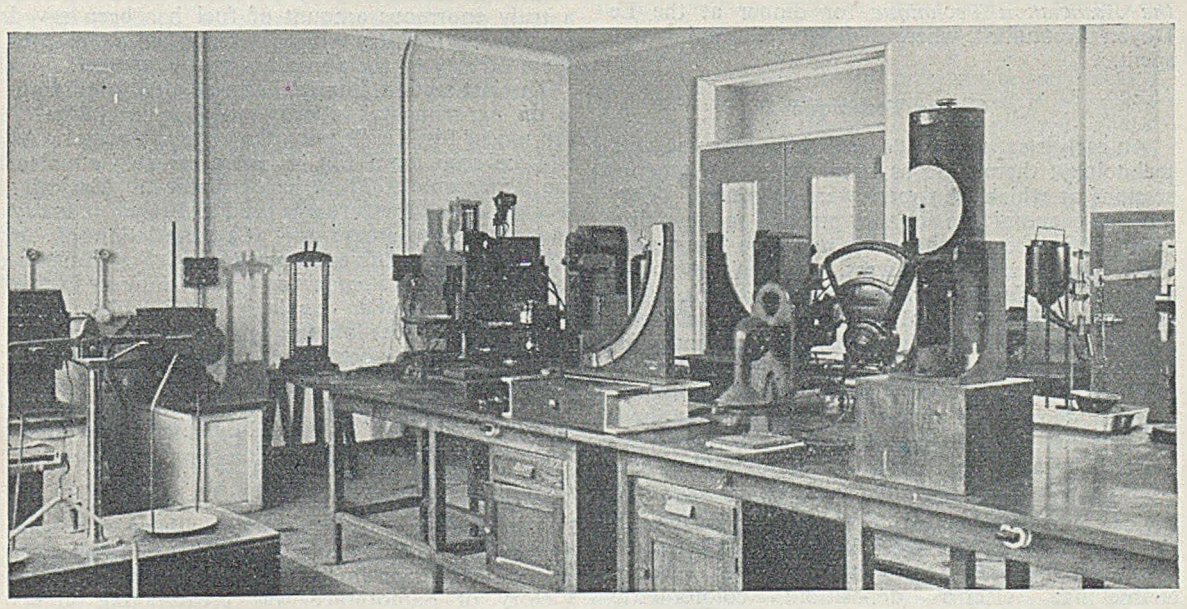


FIG. 5.—*Sand-testing Laboratory, showing the Variety of Instruments available.*

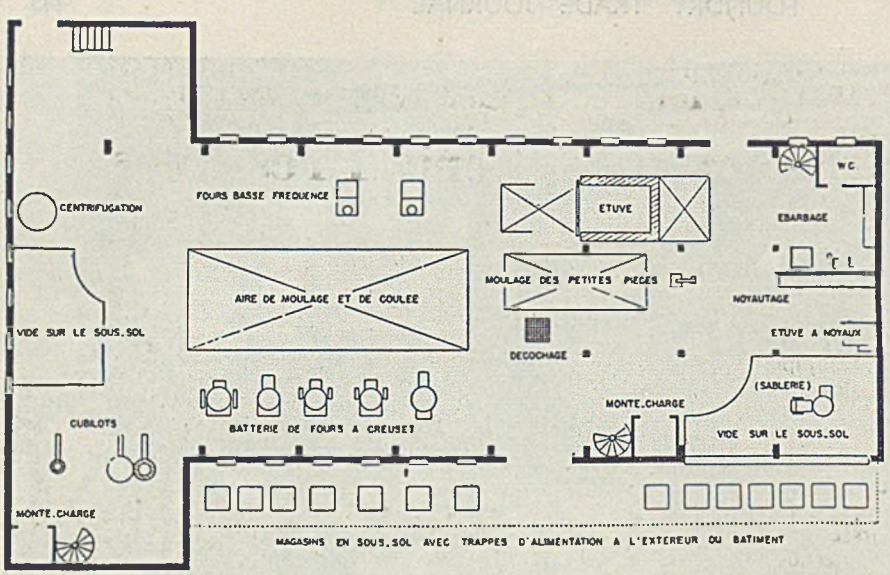


FIG. 6.—*Plan of the Experimental Foundry at Sèvres.*

Key: Centrifugation = centrifugal casting; fours basse frequence = low-frequency furnace; étuve = stove; ébarbage = cleaning; aire de moulage et de coulée = moulding and casting floor; moulage des petites pièces = moulding of small castings; noyautage = core-making; vide sur le sous-sol = opening to basement; décochage = knock-out; étuve a noyaux = core stove; cubilots = cupolas; monte charge = hoist; batterie de fours à creusot = crucible furnaces; sablerie = sand preparation; magasines en sous-sol avec trappes d'alimentation a l'extérieur du batiment = storage in basement with chutes for the reception of goods outside the building

Works Visits and Technical Sessions

Thursday followed pretty much the same pattern as the day before, but the evening was free. The morning was spent visiting foundries, and the afternoon in technical sessions. Thirteen papers were read covering spheroidal-graphite cast iron; copper and light alloys, and testing cast products. During this day there were meetings of the International Committee; and its associated committees on testing cast iron, the creation of technical dictionary, and defects in castings. Mr. Brizon, of Paris, was elected president to replace Mr. L. N. Shannon, and so will be the chief guest at the International Congress to be held next year from September 19 to 26, in Florence. The members of the International Committee, together with their ladies, were the guests of *the Association Technique* for dinner at the Le Doyen Restaurant, where a delightful evening was spent.

Centre Technique

An early start was made on Friday morning with technology; there were as usual three simultaneous sessions at which 14 papers were presented. They covered economics in foundry practice and chemical analysis. After luncheon the members first visited the ceramic museum at Sèvres, and then the laboratories of the *Centre Techniques des Industries de la Fonderie*. This organization really became effective in 1946. Catering for the whole of the foundry industry, it now possesses in Paris a "palace" of a headquarters replete with drawing offices, library, editorial department and so forth. It operates about ten regional laboratories as well as the central research laboratory at Sèvres (see Figs. 1 to 6).

Generally speaking, the laboratory can be divided into four sections. The first is located on the first floor of the main building. This houses the research chemical laboratories, offices, vitreous enamelling; electro deposition; colorometric analysis; determination of carbon and sulphur by combustion and a large routine chemical laboratory with 16 bench positions (Fig. 3). This is necessary because in this establishment general control work is undertaken for the Paris area. The second section—the physics department—is on the ground floor, where there is a nice quiet room where the staff can study undisturbed, as well as accommodation devoted to photometry; machine-shop; vibration free room; dilatometry; metallography; polishing and etching; sand testing, including high temperature work, and fuel testing. The basement of this building contains the stores; canteen; baths; gamma-ray testing; and mechanical testing.

The third department is housed in an older and separate building. This is devoted to the testing and, if satisfactory, the certification of space-heating and domestic-cooking apparatus. This was one of the earliest activities of the Centre and as a result a truly enormous amount of fuel has been saved for French industry wih a very marked increase in the efficiency of the apparatus on the market.

The last section, housed in an adjoining building, is the experimental foundry which is in charge of the son of Mr. Le Thomas, the general director. As will be seen from Fig. 6, there are two cupolas, the larger one of 20-in. inside diameter. Basically it is typical of the furnaces used in French industry and carries twin tuyeres. (A translation of an article on this subject appeared in the JOURNAL recently as the system is not without interest in this country.) A smaller cupola is water-cooled. The equipment includes low-frequency furnaces for melting aluminium; a centrifugal casting machine; oil-fired mould and core-drying stoves; crucible furnaces, fixed and tilting; a Wild Barfield light-alloy holding furnace; a hand-operated moulding machine and a sand-preparing plant based on a Simpson mixer.

Returning to Paris, the evening was spent in the Louvre Museum, where anyone with an appreciation of art could not help but be lost in admiration of a collection of the world's masterpieces. The Victory of Samothrace was breathtaking in its beauty.

(*Continued on page* 454)

Feeding of Steel Castings at Greater-than-atmospheric Pressures*

(*Continued from page* 422)

By Charles W. Briggs and Howard F. Taylor

Pressure Feeding using Design "F"

The "F" design is a parallelopiped 3 by 4 by 6 in., fed with a blind riser, as shown in Fig. 14. Each casting was made in an individual mould, and again the gas-pressure was applied from a pipe extending into the riser cavity. The machining was accomplished similarly to that of the previous castings. A $\frac{1}{8}$-in. section was sawed from the casting in a direction so as to intersect the neck. Radiographs were taken as usual. Sketches of riser cavities and slab radiographs, with brief descriptions of the conditions used are given in Fig. 15.

The use of a blind riser without pressure from any external source gave a large shrink in the casting (33). The formation of a partial vacuum within the casting again resulted in an indentation effect on the upper surface of the mould. Shrinkage was reduced, but not eliminated, by taking advantage of atmospheric pressure from a sand core inserted in the riser (34). Metal bridged across the sand gap between the riser and casting in every case in which pressure-feeding was used. The distance between the riser and casting in this pattern is only one inch, and the casting is larger than the previous one. More heat is concentrated in the sand in the region of the neck, causing a severe hot-spot. The sand directly above the neck is least resistant to the metal under pressure, and gives way. Most of the pressure-fed castings exhibited penetration on their faces, in addition to the metal bridging across the neck.

Only one casting (38A) was nearly sound, as a result of pressure-feeding. In two repeat runs, however, it could not be duplicated (39A and 40A). Two of the pressure-fed castings (36A and 37A) were almost as sound as the casting made using a sand core. In a total of six pressure-fed castings, only one was produced nearly sound.

*This report, which was presented at the fiftieth annual meeting of the Institute of British Foundrymen, was prepared from a research study carried on at Massachusetts Institute of Technology for the Steel Founders' Society of America and is published with the permission of Steel Founders' Society of America. The Authors are technical and research director, Steel Founders' Society of America, and associate professor, Dept. of Metallurgy, Massachusetts Institute of Technology, respectively.

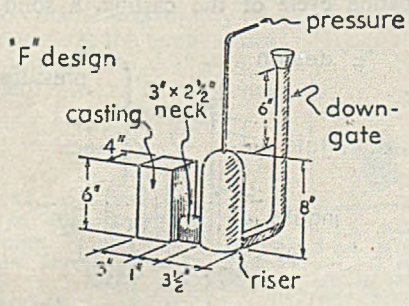


FIG. 14.—*Design "F" Experimental Casting.*

Pressure Feeding using Design "E"

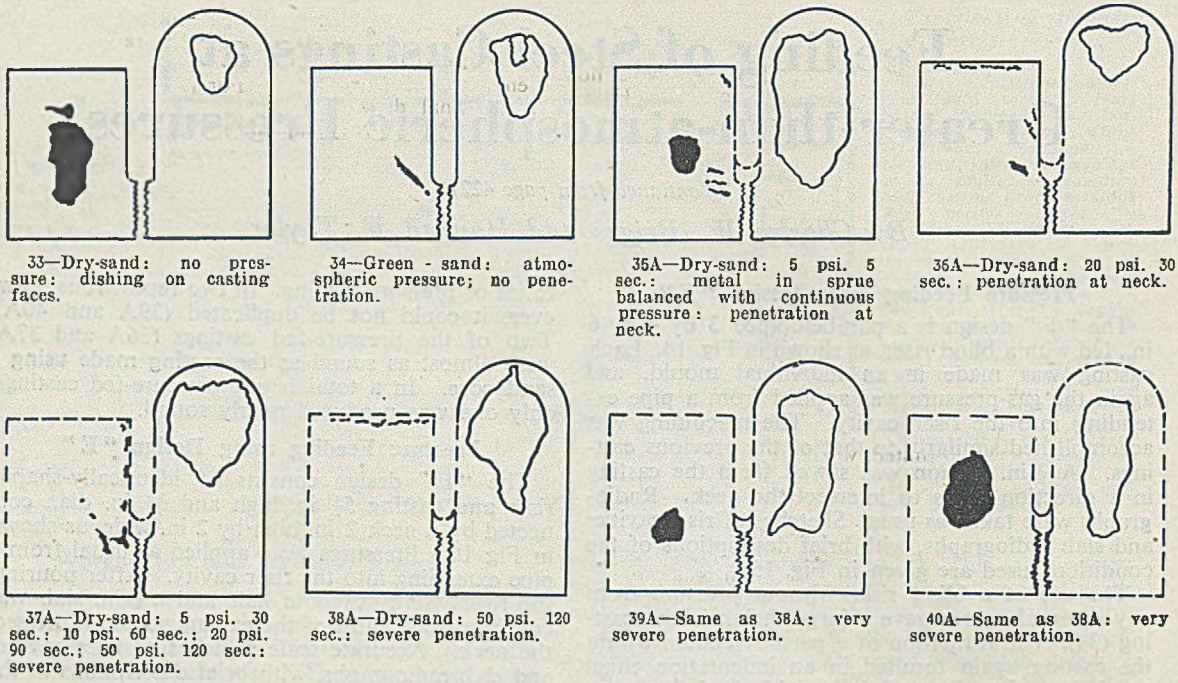
The "E" design consists of identically-shaped riser and casting 5½ in. high and 3½ in. dia., connected by a neck 2 in. high by 2 in. wide, as shown in Fig 16. Pressures were applied as usual from a pipe extending into the riser cavity. After pouring, the risers were sawed in half and a $\frac{1}{8}$-in. slab was cut from the centre of the casting so as to intersect the neck. Accurate scale sketches of riser cavities and slab radiographs, with brief descriptions of the conditions used are given in Fig. 17. Photographs of some of the risers are shown in Fig. 18. Shrinkage occurred in each with little tendency of one to feed the other when neither riser nor casting was kept open to the atmosphere, since the effect of gravity was balanced out. The insertion of a horizontal graphite rod near the top of the riser reduced the shrinkage in the casting considerably. The effect of the graphite rod[2,3] is to lower the solidification temperature of the riser metal and to make it more fluid, as well as to introduce atmospheric pressure. Some shrinkage also occurred when atmospheric pressure was introduced through a vertical sand core in the riser.

The first three trials with pressure-feeding resulted in such severe penetration that no attempt was made to machine either the risers or the castings. Metal bridged across the gap and also severely penetrated the rounded surface of the risers.

Since penetration was so severe even in dry-sand moulds, a special sand mix was made consisting of 35 per cent. silica flour, 65 per cent. No. 60 silica sand, and 5 per cent. bentonite. Penetration was very much reduced, although there was still some in the region of the neck. All of the pressure-fed castings show much more shrinkage than those using either the graphite rod or the sand core. In 46A, the application of pressure forced some metal out of the downgate before the weight was placed on the mould. The resulting cavity has a very uniform inside skin and a flat bottom (Fig. 18). The shrinkage cavities of the other two risers are of the carrot shaped type.

Pressure Feeding using Design "G"

In order to further strengthen the conclusion that high pressures were not markedly beneficial, a carefully planned series of tests was made using the



33—Dry-sand: no pressure: dishing on casting faces.

34—Green - sand: atmospheric pressure; no penetration.

35A—Dry-sand: 5 psi. 5 sec.: metal in sprue balanced with continuous pressure: penetration at neck.

36A—Dry-sand: 20 psi. 30 sec.: penetration at neck.

37A—Dry-sand: 5 psi. 30 sec.: 10 psi. 60 sec.: 20 psi. 90 sec.; 50 psi. 120 sec.: severe penetration.

38A—Dry-sand: 50 psi. 120 sec.: severe penetration.

39A—Same as 38A: very severe penetration.

40A—Same as 38A: very severe penetration.

FIG. 15.—*Sketches of Transverse Radiographs of "F" Design. Dotted lines indicate Areas of Metal Penetration. Solid Black Areas show Shrinkage in the Casting. Outlined Areas show Shrinkage in the Riser.*

arrangement of design "G," Fig. 19. In an effort to reduce the test variables to a minimum, it was thought that a casting should be used which could be very nearly, but not quite, made sound by standard practice. Then, if "greater-than-atmospheric pressures" were beneficial, a sound casting should be produced, since only a slight margin of improvement would be required.

In the first test, the casting was of 4 by 6 in. cross-section, and 8 in. high. For the preliminary tests, a carbon rod was used in the blind riser, and the pressure pipe shown in the sketch was left out. This casting was sound, as shown by the transverse X-ray (Fig. 20, test 64). One inch was then added to the height of the casting, making it 9 in. high, and this was also sound (65). Making the casting 10 in. high resulted in unsoundness (66), and repeated attempts to make it sound by the ordinary method employing only atmospheric pressure, failed. This test was, then, a dependable criterion of riser efficiency. If the particular combination of casting size, riser size, and contact area could result in sound castings 8 in. and 9 in. high, and an unsound casting 10 in. high, then if pressures greater than atmospheric were beneficial, feeding should be improved in the 10 in. casting which could not be made sound otherwise. This was the expedient chosen to rule out any error in choice of dimensions, particularly contact area.

Since pressures greater than atmospheric would have to be operable with green-sand moulds in order to become a practical tool, it was decided to make all final experiments in hard-rammed green-sand using design "G" with gas-pressure applied through the pipe, as shown in Fig. 19. The results of the tests employing nitrogen gas pressure are shown as 67 to 70, Fig. 20.

It will be observed that tests 67, 68 and 69, wherein gas-pressure was applied, did not give improved conditions over test 66 when atmospheric pressure was permitted in the riser. The casting made with 3 lb. per sq. in. gas pressure, only sufficient to lift the metal in the downgate (67), shows some slight improvement over the one made with atmospheric pressure alone (66). Both are unsound, however, and use of a larger sprue system would have prevented the cope defect of the latter.

Test 70 resulted in a casting with only a small amount of shrinkage, but slight metal penetration and bulging of the casting resulted. It is possible that by carefully varying the amount of gas pressure applied and the time it is applied during the solidification cycle of the casting, a solid casting

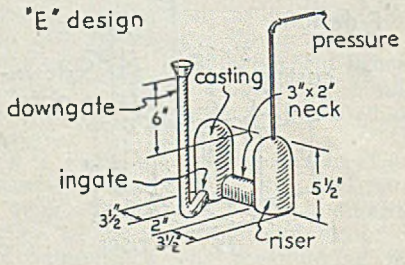


FIG. 16.—*Design "E" Experimental Casting.*

could result without perceptible metal penetration and bulging. However, a large number of trials would have been required with nothing much gained except perhaps to show more forcefully that the process of applying gas pressures was a critical one and varied depending on the casting design and other conditions.

It is apparent, from this final series of tests, that soundness has not been enhanced. Coupled with previous results, it is concluded that "greater-than-atmospheric pressures" are of no practical advantage in the feeding of castings. Control of pressures was undoubtedly more ideal than ever could be obtained by the use of pressure capsules.

Cope Defects

Several of the gravity-fed castings of the "C," "D," "F" and "G" designs showed a depression on the cope surface, which was not present in the pressure-fed castings. This can be explained as follows:—

When the casting is poured, a skin forms at the metal/sand interface. After the ingate has solidified, the system consists of liquid metal solidifying and contracting within the solid skin. The contraction of the metal, upon solidification, causes a partial vacuum to form within the system when no gas pressure is applied. The external force of atmospheric pressure causes the cope surface of the casting to be forced inward. When gas pressure is applied to the molten-metal system, the pressure is greater inside than outside at all times, early and late, and the tendency for such defects is eliminated. In the pressure-fed castings, the gas pressure has held up the cope surface of the casting, and such dishing or caving defects as caused by low-pressure differences are not in evidence on the radiographs. Photographs of the non-pressure risers in Fig. 5 show the dishing effect on the top surface. Similar conditions may also be found in castings.

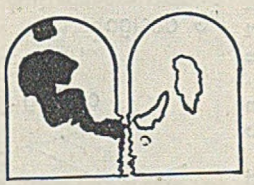
APPLICATION OF PRESSURE USING CAPSULES WITHIN THE RISER

Theoretical Considerations

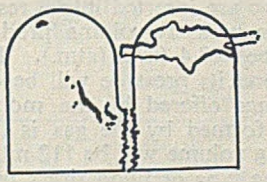
The second method studied of applying pressure to castings was by the insertion into the blind riser of a capsule which created pressure by decomposing at the temperature of molten steel. The first problem was to decide what substance should be used as a gas producer. Some of the substances considered were aluminium nitride, water nitrogen (or air), calcium carbonate, mercury, magnesium, sugar, sodium chloride, zinc, cadmium, and aspirin. In deciding upon these substances, the following questions were considered:— (1) At what temperature will it decompose to form gas; (2) is it soluble in molten steel; (3) are the gaseous products soluble in molten steel, will they react with the steel; and (4) will the reaction take place instantaneously, or will it require a period of time?

From thermodynamic considerations, it was calculated that aluminium nitride is too stable at the temperatures involved. Water, vaporizing at 100 deg. C. (212 deg. F.) might cause an explosive reaction in contact with molten steel. The pressure exerted by nitrogen or some other inert gas would not be enough, since the only expansion would be from a six-fold increase in volume resulting from temperature increase. For ease in handling, it was desirable that the pressure-former be in the solid state. Its decomposition temperature should not be so low that it would decompose instantaneously upon contact with molten steel. Since the gas-forming substance was to be placed within some type of core, it was necessary also that it should not undergo a change at the temperature at which the core would be dried.

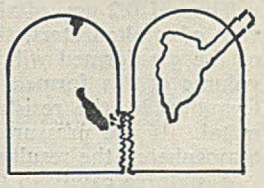
After considering all of these factors, it was decided that zinc would be used as the pressure-former, although some other metals would have produced similar results. Pure zinc has a melting point of 419 deg. C. (786 deg. F.), and a vaporization temperature of 907 deg. C. (1,664 deg. F.)[9]. This is far enough below steelmaking temperature so that the zinc would certainly vaporize upon contact with hot metal. There is no solubility of either liquid zinc or zinc vapour in molten steel[10], nor is there any chemical reaction between the two metals. Before the zinc will vaporize, it must be heated from room temperature through the liquid state to its vaporization point, so that it must



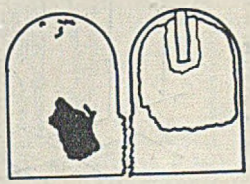
41—Dry-sand: no pressure.



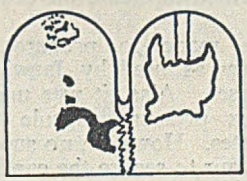
42—Dry-sand; atmospheric pressure, graphite rod used.



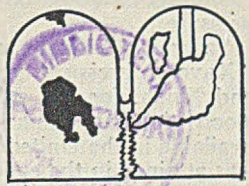
43—Dry-sand: atmospheric pressure, sand core used.



44A—Special dry-sand: 5 psi. 30 sec.: 10 psi. 60 sec.; 20 psi. 90 sec.: 50 psi. 120 sec.; 100 psi. 150 sec.: slight penetration at neck.



45A—Special dry-sand: 5 psi. 30 sec.: 50 psi. 120 sec.: penetration at neck.



46A—Special dry-sand: 5 psi. immediately: metal forced out of sprue: no penetration.

FIG. 17.—*Sketches of Transverse Radiographs of "E" Design. Solid Black Areas show Shrinkage in the Casting. Outlined Areas show Shrinkage in the Riser.*

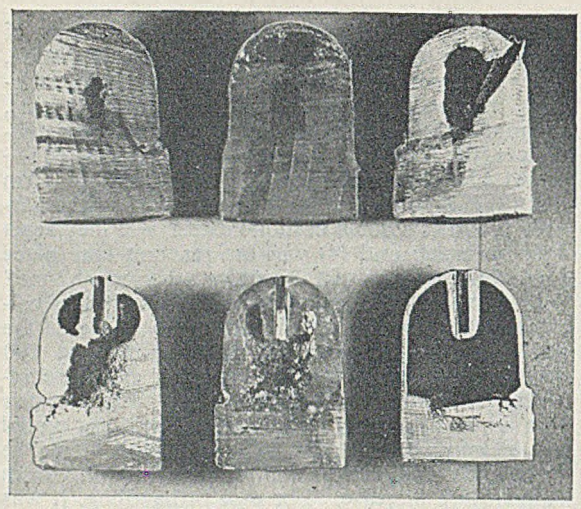


FIG. 18.—*Sectioned Risers of "E" Design.*
Upper Row: 41, 42 and 43. Lower Row: 44A, 45A and 46A.

absorb a large amount of heat from the steel in forming a vapour.

In calculating the approximate amount of zinc to produce a gas pressure, it was assumed that zinc vapour obeys the perfect gas laws. These laws represent the behaviour of gases quite accurately at low pressures and at high temperatures[11]. Since the atomic weight of zinc is 65.38, at one atmosphere pressure and 273 deg. absolute (K), 65.38 gm. of zinc vapour occupy a volume of 22,400 ml.[12].

Since

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \quad P_1 = 1 \text{ atm. } P_2$$

$$\frac{1\ (22{,}400)}{273} = \frac{P_2V_2}{1783} \quad V_1 = 22{,}400 \text{ ml. } V_2$$

or $P_2V_2 = 146{,}500$ (ml.) (atm.) for 65.38 gm. zinc.
$P_2V_2 = 448.4$ (ml.) (atm.) for 0.2 gm. zinc.

Thus, if 0.2 gm. of zinc are inserted into a reservoir of molten steel, the pressure-volume product of the gas formed will be 448.4 (ml.) (atm.). The volume of gas formed and its pressure will be determined by the resistance offered by the molten metal. If the pressure formed by the gas is two atmospheres, the resulting volume will be 112 ml.

A suitable cavity in the type of blind risers used has a volume of 100 to 200 ml., and it was thought that, using between 0.1 and 0.2 gm. of zinc, sufficient vapour would be formed to create the desired pressure.

Several attempts were made to procure the "Kayell" pressure capsules as used by Jazwinski and Finch, for test purposes. Also, it was understood that an Alpha-Lux pressure capsule was available in the United States. However, no success was attained in the endeavour to secure the capsules for comparative testing with the zinc-type pressure capsule.

Pressure-forming Capsules using Pattern "E"

The gas pressures were applied to castings of the "E" design, as previously illustrated in Fig. 16, by inserting a gas-forming capsule in the top of the blind riser. In these tests, the pressure pipe shown in Fig. 16, E design, was removed. After a skin formed at the surface of the metal/sand interface in the riser, the capsule was to decompose creating a gas pressure which would act upon the liquid steel to force it into the casting. Sketches of riser cavities and slab radiographs, with brief descriptions of the conditions used, are given in Fig. 21.

The zinc required some type of protection to prevent its immediate vaporization upon contact with the molten metal, to allow a time interval after pouring so that a skin could form on the riser surface. The first substance used was a coating of refractory core paste[13] containing 92 per cent. silica flour, 4 per cent. bentonite, and 4 per cent. dextrin, to which water was added to form a thick paste. A ½-in. refractory coating was applied to the zinc, the pellet was attached to the end of a steel wire, and the mass was dried for several hours.

The wire was inserted into the mould so that the pellet extended an inch below the top surface of the riser cavity. When the steel was poured into the mould, the pressure created was so great that it broke through the skin at the top of the riser at the point where the wire entered the cavity (see 47, Fig. 21). The pressure forced the metal to rise slightly in the downgate.

In an endeavour to delay the pressure longer, a thicker refractory coating, ¾-in. dia., was tried. This change did delay the action "somewhat," but nevertheless the pressure ruptured a small hole in the skin at the top of the riser (see 48, Fig. 21).

The refractory coating used in the first two trials became somewhat brittle when dried in the furnace, as the escaping water-vapour caused the formation of small cracks in the surface. The refractory covering probably spalled off when it was exposed to molten steel in the riser, thereby allowing the steel to come in contact with the zinc sooner than

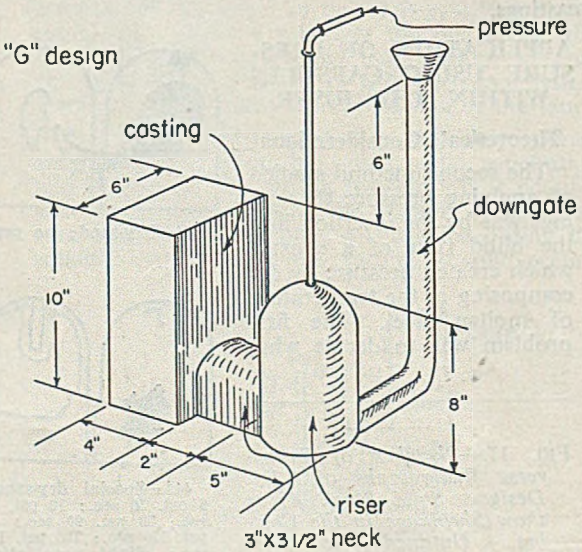
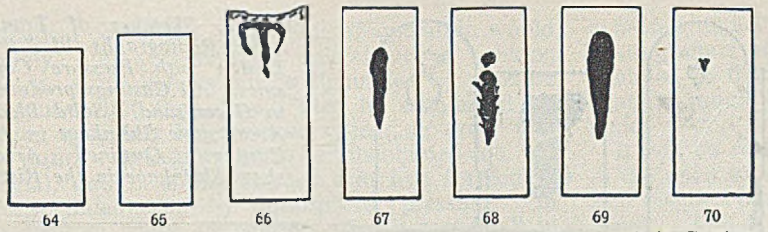


FIG. 19.—*Design "G" Experimental Casting.*



64.—Casting, 8 in. high: atmospheric pressure: sand core: casting sound. 65—Casting, 9 in. high; atmospheric pressure: sand core: sound casting. 66—Casting, 10 in. high: atmospheric pressure: sand core: dishing and shrinkage. 67—Casting, 10 in. high: 3 psi. immediately: no bulging or penetration. 68—Casting, 10 in. high: 3 psi. immediately: 10 psi. 60 sec.: no penetration or bulging. 69—Casting, 10 in. high: 3 psi. immediately: 20 psi. 60 sec.: slight penetration and bulging. 70.—Casting, 10 in. high: 3 psi. immediately: 10 psi. 60 sec. 20 psi. 120 sec.: slight penetration and bulging.

FIG. 20.—*Sketches of Transverse Radiographs of "G" Design. All Castings produced in Green-sand. Solid Black Areas show Shrinkage in the Casting.*

desired. To overcome this, the next zinc pellet was placed at the centre of a cylindrical dry-sand core. the core was cemented together with core paste and dried overnight at 400 deg. F. As before, the core was attached to a steel wire, and inserted in the blind riser.

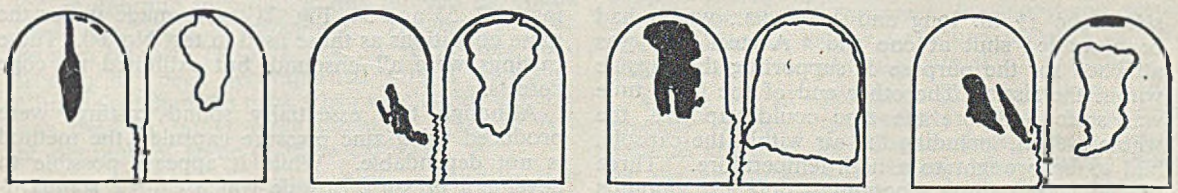
As soon as steel was poured into the mould, gas pressure caused metal to flow out of the downgate and over the side of the mould. The pressure formed was more than had been anticipated, and was caused by a combination of gas from the zinc and from the baked sand core. An unusually large cavity was found in the casting (see 49, Fig. 21). The use of this type of core did, however, delay the pressure until a suitable skin had formed in the riser.

In order to form a thicker skin, a chill was inserted at the top of the riser. The chill consisted of a steel washer with a long nail welded to the centre. The chill was inserted by pushing the nail through the top surface of the sand in the riser. Using this chill and a baked-sand cylindrical core containing no zinc, the delay of pressure allowed a minimum thickness of $\frac{1}{2}$ in. in the riser (see 50, Fig. 21). When 0.10 gm. of zinc was inserted in the same size core, the delay was shorter, the minimum skin thickness in the riser being $\frac{1}{4}$ in.

These tests show that it is difficult to delay the pressure for more than a few seconds after the steel has been poured; in no case was the pressure delayed for more than twenty seconds. When the least resistance to the pressure was afforded by the low strength of the metal skin, the gas-pressure caused rupture of the skin. On the other hand, when a sufficiently strong skin had time to form, the pressure forced metal through the casting and out of the downgate. In none of these cases was penetration into the sand found, as the pressure was not as steady as when it was applied through a pipe. Any metal forced by pressure could flow into the downgate, because no weight was placed upon it. All of the pressure-fed castings show larger amounts of shrinkage than would be obtained by using atmospheric-pressure feeding.

Pressure-forming Capsules using Design "F"

Several capsules were constructed using different materials, in an effort to delay the pressures for longer times. A 0.06-gm. pellet of zinc was placed within a steel tube $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. dia., and the two ends of the tube were closed by squeezing in a vice. The small tube was inserted into a larger

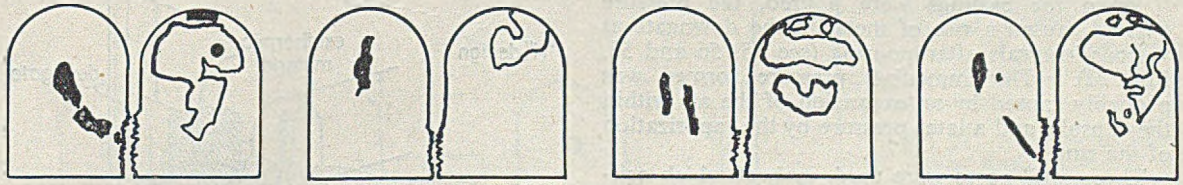


47—Refractory-coated capsule, $\frac{1}{2}$ in. dia.: 0.2 gm. zinc: metal rose in sprue: pressure broke riser skin.

48—Refractory coated capsule, $\frac{3}{4}$ in. dia.; 0.2 gm. zinc: metal rose in sprue: riser skin broken.

49—0.19 gm. zinc in $\frac{3}{4}$ in. dia. by 1 in. long sand core: metal forced out of sprue.

50—No zinc: sand core, $\frac{1}{2}$ in. by $\frac{3}{4}$ in. dia.: no rise of metal in sprue.



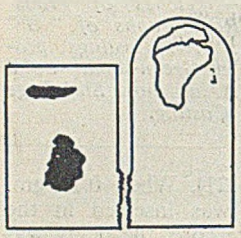
51—0.10 gm. zinc in $\frac{3}{4}$ in. dia. by $\frac{1}{2}$ in. sand core: chill on riser: no loss of metal through sprue.

52—0.07 gm. zinc in $\frac{3}{4}$ in. dia. by 1 in. graphite cylinder: very slight rise of metal in sprue.

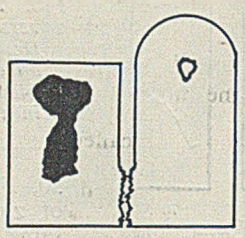
53—0.14 gm. zinc in $\frac{3}{4}$ in. dia. by 1 in. graphite cylinder: very slight rise of metal in sprue.

54—0.21 gm. zinc in $\frac{3}{4}$ in. dia. by 1 in. graphite cylinder.

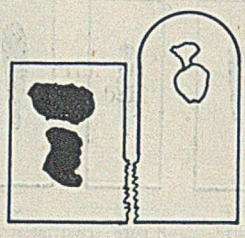
FIG. 21.—*Sketches of Transverse Radiographs of "E" Design with Pressure Capsules. All Castings produced in Green-sand. Solid Black Areas show Shrinkage in the Casting. Outlined Areas show Shrinkage in the Riser.*



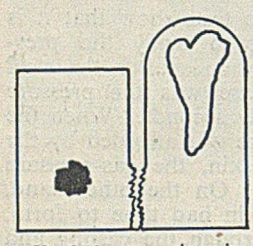
55—0.06 gm. zinc in double steel cylinder: immediate rise of metal in sprue.



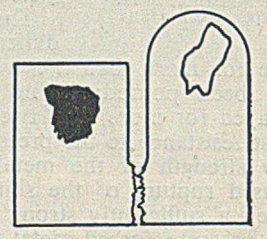
56—0.095 gm. zinc in double steel cylinder: rise of metal in sprue after 15 sec.



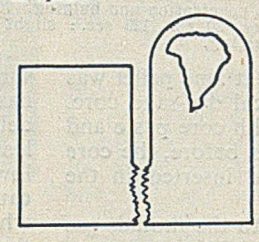
57.—0.14 gm. zinc in double steel cylinder: immediate rise of metal in sprue.



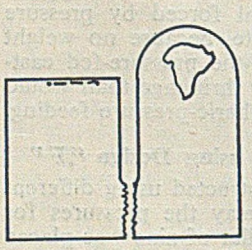
58.—0.16 gm. zinc in insulating brick cylinders: slight rise of metal in sprue.



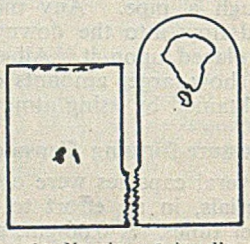
59—0.165 gm. zinc in fire-brick cylinders: immediate rise of metal in sprue.



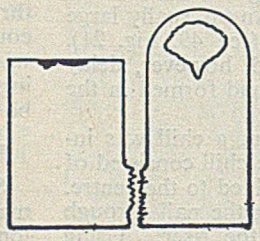
60—0.16 gm. zinc in graphite cylinder, 1 in. dia. by ⅝ in.: immediate rise of metal in sprue.



61—0.14 gm. zinc in 1 in. dia. by ⅝ in. graphite cylinder: slight rise of metal in sprue.



62—No zinc: 1 in. dia. by ⅝ in. graphite cylinder: dishing of casting faces and cope surface.



63—0.15 gm. zinc in 1 in. dia. by ⅝ in. graphite cylinder: no dishing.

FIG. 22.—*Sketches of Transverse Radiographs of "F" Design with Pressure Capsules. All Castings produced in Green-sand. Solid Black Areas show Shrinkage in the Casting. Outlined Areas show Shrinkage in the Riser.*

steel tube 1¼ in. long and ¼ in. dia., which had been welded shut at one end. A steel wire was attached for the purpose of supporting the capsule within the riser. The other end of the large tube was sealed. Before the zinc could vaporize, the whole system, including the air within the capsule, had to be brought to a high temperature. Three of this type capsule containing different amounts of zinc, were inserted in the top of the risers, in addition to chills. The experimental "F" design casting was used in these studies.

When the castings were poured, the pressure exerted caused a rise of metal in the downgate at various intervals after pouring (see 55, 56 and 57, Fig. 22). The immediate pressure formed was probably caused by an expansion of the air within the capsule, and a later pressure by the vaporization of the zinc.

Three sand cores were used, each of which contained about 0.15 gm. of zinc. A hole was drilled to the centre of each core, the zinc was inserted, and the hole refilled using the same core material with a sodium-silicate binder. Each was dried in a furnace, attached to a steel wire, and inserted in its respective riser in conjunction with a chill. In every case, the pressure exerted forced a rise of metal in the downgate, and resulted in shrinkage cavities in the castings (see 58 and 59, Fig. 22).

When a graphite cylinder containing zinc was used as the pressure-former, the casting was produced free from shrinkage (see 60, 61). All of the other trials resulted in widespread shrinkage in the casting.

A graphite capsule containing no zinc was introduced into the riser in order to determine the relative merits of the graphite and of the zinc. The resulting casting contained, in addition to a slight shrink, some top-indentation defects (62). A repeat of test Nos. 60 and 61 gave an apparently sound casting with no cope defects, showing that the zinc was necessary.

Several weeks after test No. 60, three more castings (52, 53 and 54, Fig. 21) were made under the same conditions as those used in test No. 60. These castings were all unsound, but exhibited no cope defects.

Although two essentially sound castings were produced using zinc pressure capsules, the method is not dependable. While it appears possible to develop a pressure capsule which can be standardized for a particular casting design produced under

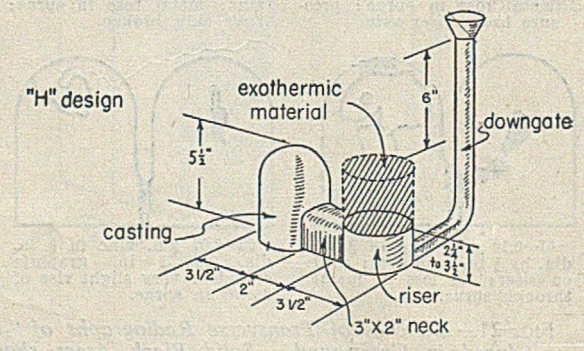


FIG. 23.—*Design "H" Experimental Casting.*

identical conditions, its latitude of operation would surely not accommodate miscellaneous jobbing work. Cope defects can be eliminated by pressure capsules, but these could also be eliminated by using a slightly larger sprue system, in order that a positive pressure could be maintained on the metal, until a strong enough skin had formed to resist indentation by atmospheric pressure. In systems in which the sprue system is too small in diameter and/or height, the pressure against the cope is not maintained long enough, due to premature solidification of downgates or ingates.

Only an occasional test, from the large number of tests made, gave any evidence of a positive beneficial effect of "greater-than-atmospheric pressure" in the feeding of castings. Failure to reproduce these successes dependably led to the conclusion that the results in each case were fortuitous.

A number of rather-large production castings were made using "zinc/graphite pressure capsules," with variable results. In each case of success or failure, it was not possible to determine whether or not the same result might have been as dependably obtained using standard blind-riser practice.

EFFECT OF TEMPERATURE INDEPENDENT OF PRESSURE

In order to isolate the effects of pressure and of temperature, and to gain an idea of which entity was the more potent, a series of castings were made as shown in design "H," Fig. 23. By reducing riser height to as little as ¼ in. above the neck, and using an exothermic material, sounder castings were made than could be made dependably with gas pressure. Because of the closeness of the casting to the riser and the extreme heat developed by the exothermic material, it was difficult to obtain ideal directional solidification. However, as can be seen by tests 71 to 73, Fig. 24, reasonably good feeding has been accomplished with a riser only ¼ in. higher than the neck when exothermic material was used in rather large quantity. Fig. 25 is a photograph of some of these castings.

Time has not permitted more exhaustive tests to be made along these lines, but it is confidently expected that a sound casting would result if the heating effect of the exothermic material could be confined to the riser and not project sideways to heat the mould walls around the casting above the neck.

It will be recalled that the use of excessive heat in the open top riser (Fig. 11) of a one-inch thick slab resulted in limited improvement over ordinary means. This is easily understandable, because the extreme thinness of this particular type of casting makes it impossible for the high heat to penetrate downward into the casting to overbalance inadequate temperature gradients.

Sketch 74 is made from the radiograph of the 3½ by 3½ by 12-in. slab produced with exothermic material in the riser. Here, the extreme heat in the greatly shortened riser has effected nearly complete soundness at an extremely favourable yield ratio. It was not possible to accomplish any such order of feeding using gas-pressure. This indicates the desirability of thinking in terms of thermal control rather than pressure control.

CONCLUSIONS

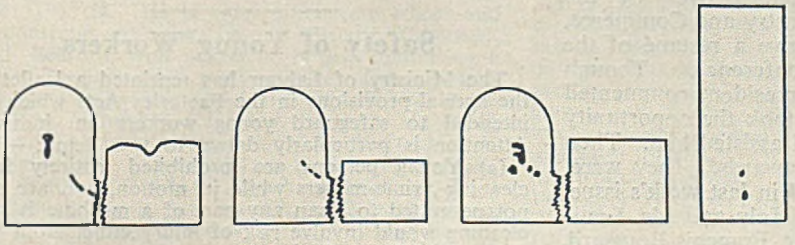
Specifically the conclusions from this investigation upon the utilization of "greater-than-atmospheric pressures" in the feeding of steel castings are as follow:—

1. No dependable improvement in feeding efficiency, as evidenced by casting quality or increased yield, was found as a result of using gas pressures in excess of atmospheric in side/blind or top/blind risers.

2. It is apparent from isolated cases of successful application of pressure-feeding that low gas pressures of 3 to 50 lb. per sq. in. are more beneficial than higher gas pressures.

3. Low positive gas pressure on casting riser systems prevent cope defects. This could be otherwise accomplished, however, by increasing sprue size in order to ensure a positive pressure against the cope surface until adequate skin has formed.

4. The rate of application of gas pressure is extremely critical, particularly when green-sand moulds are used, in order to obviate the tendency of the gas pressure to enlarge the casting, cause penetration of metal into the sand of the mould, or to force metal back out of the downgate. The tests indicate quite conclusively that regulation of the amount and time of application of gas pressure is too critical to accommo-



71—Riser, 1½ in. higher than neck: exothermic material packed into rest of blind riser.

72—Riser, ¾ in. higher than neck: exothermic material packed into rest of blind riser.

73—Same as 71.

74—"C" design: top riser, 3 in. dia. by 1½ in.; exothermic material on riser: casting sound: yield 92 per cent.

FIG. 24.—*Sketches of Transverse Radiographs of "H" Design and "C" Design with Exothermic Material in the Risers. Gas Pressures were not employed. All Castings produced in Green-sand. Solid Black Areas show Shrinkage in the Casting.*

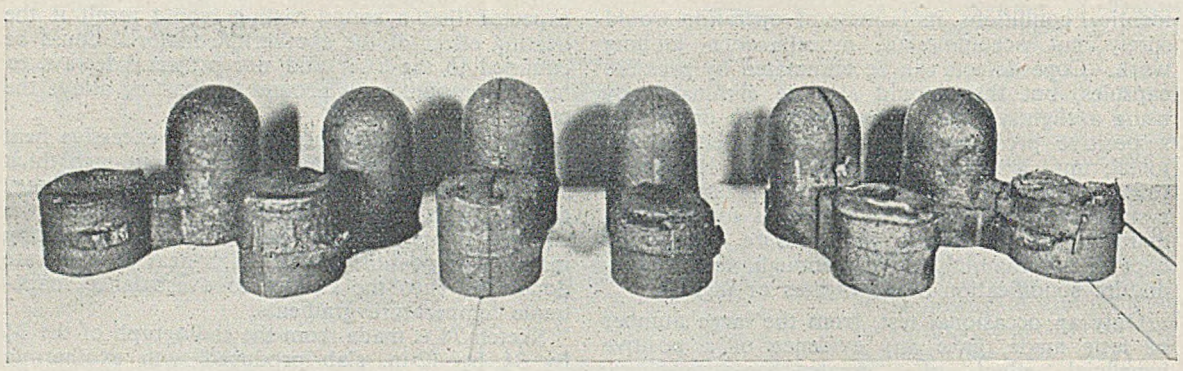


FIG. 25.—*Use of Exothermic Material on Blind Risers.*

date use of a "pressure-capsule" to any practical advantage.

5. Flat-bottomed cavities with uniform walls in risers are an unnatural form of shrinkage. They clearly indicate metal disadvantageously displaced, as in (4) above, by too sudden or too great application of gas pressure, and are most certainly not a dependable criterion of riser efficiency.

6. Control of temperature gradients remains as the paramount consideration in making sound castings, and is of equal consequence with or without use of high gas pressures.

7. "Pressure capsules" made of zinc pellets in graphite cylinders produced sound castings in isolated instances, but their performance was not dependable. This type of pressure capsule is considered as effective as any other type pressure capsule that may be constructed. Also, the control of gas pressures by the application of external gas pressures (nitrogen) to the riser were more ideal than ever could be obtained by the use of pressure capsules, therefore further work to perfect such capsules would be unnecessary.

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Paris Foundry Congrezs

(*Continued from page* 446)

Last Day

The last morning was devoted to the holding of three sessions, comprising altogether 13 papers. One was devoted to safety and hygiene; others to elastic properties; non-destructive testing; chemical analysis and various subjects.

The afternoon was taken up with a "solemn" closing session. It was presided over by the deputy of the Minister for Industry and Commerce, who invited Mr. Muguet to give a résumé of the work accomplished by the conference. Though obviously far from well, the president commented on every paper presented and took the opportunity of thanking all those who had assisted him. Then came the presentation of the awards. They were, in addition to those mentioned in last week's issue, bronze medals to Mr. Gabriel Joly and Mr. Louis Grand and silver medals to Mr. François Boussard, Mr. Pierre Rigaut and Mr. Pierre Nicolas.

The closing banquet was held at the Palais D'Orsay hotel, under the presidency of Mr. Achille Brizon, deputizing for Mr. Muguet, who was indisposed. Mr. Shannon briefly thanked the hosts for the many courtesies accorded to the guests. After a speech by a Minister of State, the evening ended with a ball organized by the Old Students' Association of the Paris Foundry High School, the profits from which go to the benefit of a fund which lends money to boys during their studies, to be paid back when they start work.

Early on Sunday morning, the bulk of the British party, which numbered 62, left for home, under the chaperonage of Mr. Makemson, who throughout was, as usual, helpful to all the members.

Safety of Young Workers

The Ministry of Labour has reprinted a leaflet on the special provisions in the Factories Acts which are intended to safeguard young workers in industry. Attention is particularly drawn to two items:—

(*a*) Young persons are prohibited entirely from cleaning prime-movers while in motion, and are also not permitted to clean any part of a machine is such cleaning would involve risk of injury either from that or an adjacent machine.

(*b*) A young person is prohibited from lifting, carrying or moving any load so heavy as to be likely to cause injury to him. The Council of Ironfoundry Associations can supply copies of the leaflet, price 4d. each, to member firms.

New I.B.F. Sub-committees

At a meeting of the Institute of British Foundrymen Technical Council's advisory panel a total of 19 suggestions for new technical sub-committee work which had been received from branches and individual members were considered. As a result, the advisory panel decided to recommend three investigations which cover a considerable number of the 19 suggestions received. The Technical Council has accepted the panel's proposals with minor amendments and the following sub-committees were accordingly appointed:—

T.S. 47—*Foundry Coke Grading and Testing.* "To review the present position of the quality of foundry melting coke and to prepare recommendations concerning coke specification and practical tests, including mechanical tests."

T.S. 48—Non-ferrous *Surface Finish.* "To investigate factors affecting the surface finish of sand-cast non-ferrous castings."

T.S. 49—*Feeding of Castings.* "To investigate methods of improving the feeding of castings with special reference to increased yield per unit weight of material melted."

As the prime aim of the work of the technical sub-committees is to study problems which are currently presenting difficulties in the foundry, it has been particularly useful to the Technical Council in the efforts which are being made to advance this purpose to have the cross-section of foundry problems represented by the 19 suggestions received. The suggestions received but not yet acted upon will be further considered as soon as it is possible to initiate any additional sub-committee work, though a number of these remaining proposals, interesting and desirable studies though they are, may have to be ruled out solely on the ground that they are impracticable within the resources available to the Council.

Purchasing Officers' Association

At the annual general meeting of the Purchasing Officers' Association, held during the twenty-second National Conference at Brighton, the retiring national chairman, Mr. F. J. White (Chance Bros., Limited), reported a year of progress and expansion. Membership had increased from 2,900 in 1952 to a present total of 3,300, and was constantly rising, despite the tighter regulations now governing election. New branches and groups had been formed in four centres, and now numbered 41; and the Association's branches in Australia and South Africa had made notable progress. Owing to the expansion of the Association's activities it had become necessary to take over additional office accommodation and to increase the size of the staff. The number of registered students had increased by 75 per cent. during the year.

At the meeting Mr. H. H. C. Wood was elected president for 1953-54. He is chief purchasing officer and stock controller of the Igranic Electric Company, Limited, Bedford, with whom he is just completing a continuous period of 25 years' service. Other officers elected were:—As vice-presidents: Mr. E. W. Beaumont (S. M. Wilmot & Company, Limited), Mr. P. C. Corrance (Blackburn (Dumbarton), Limited), Mr. A. Elliott (Churchill Machine Tool Company, Limited), Mr. A. Rochester (R. & W. Hawthorn, Leslie & Company, Limited), Mr. F. J. White (Chance Bros., Limited), and Mr. D. Wragg (Thomas Firth & John Brown, Limited); chairman, Mr. J. Ferguson (United Ebonite & Lorival, Limited); vice-chairman, Mr. R. J. Mitchell (Morgan Crucible Company, Limited); and hon. treasurer, Mr. C. F. Huebner (British Oxygen Company, Limited).

Notes from the Branches

Bristol and West of England

The opening meeting of the session for the Bristol and West of England branch of the Institute of British Foundrymen took place at the Grand Hotel, Bristol, on September 26. The new Branch president, Mr. L. Buckley was in the chair, and an illustrated talk on "Resins for Foundry Use" was given by Mr. D. N. Buttrey.

Referring more especially to shell moulding, Mr. Buttrey dealt fully and frankly with the developments in this field, and indicated some of the difficulties encountered to date, *e.g.*, the poor surface finish obtained with brass castings, the variable results obtained with some aluminium alloys, and the reported tendency of low-carbon steels to pick up carbon at the surface. Speaking of the advances made in recent months, Mr. Buttrey stated that possibly the most interesting was that of the great development of shell cores, whereby much saving of sand was effected.

The interest aroused was evident from the many and varied questions put forward. In replying, Mr. Buttrey made the following points:—

1. With resin-bonded cores, the normal dressing of cores could often be omitted.
2. Carbon "pick up" in steel castings has been reported when shell moulding, but the evidence was inconclusive, so far, as to whether the "pick up" was affected by section thickness.
3. While U.F. resins are recommended for non-ferrous alloys, satisfactory results have been obtained with thin-section cast iron poured at comparatively low temperature.
4. The packing of shell moulds in steel shot could be considered satisfactory, provided that there was no undue reduction of mould permeability.
5. Sands of high clay content were not suitable for use with P.F. resins.

A vote of thanks to Mr. Buttrey was proposed by Mr. H. Balme (immediate past-president) and seconded by Mr. D. F. B. Tedds.

Mr. A. E. Lane, the winner of the branch "Short Paper Competition" for the 1952/1953 session then read his paper on "Problems encountered in the Production of High-duty Irons," and was presented with his prize by Mr. Balme. In the evening, members and friends enjoyed a "high tea" and social evening, arranged by Mr. I. J. Birch and Mr. J. R. Hayward.

Seeking Trade with Canada

The managing director of Ransomes & Rapier, Limited, Ipswich, and Cochrane & Company (Annan), Limited, Mr. Richard Rapier Stokes, M.P. for Ipswich, has commenced a business tour of Canada. One of Mr. Stokes's particular interests lies in increasing exports of capital engineering goods from Britain to Canada. During his tour of the Dominion he will be visiting Canadian distributors of various engineering products, notably mechanical shovels, drag-shovels, draglines, mobile cranes, and boilers. He will be in Canada for four weeks, and his itinerary will include Toronto, Winnipeg, and Saint John, N.B. Mr. Stokes has been Labour M.P. for Ipswich since 1938. He was Minister of Works from 1950 to 1951, Lord Privy Seal from April to October, 1951, the Minister of Materials from July to October, 1951.

THE LATEST "FACT VEYOR" (No. 16) to be received from J. Collis & Sons, Limited, Regent Square, Gray's Inn Road, London, W.C.1, lists the safe-working loads for two-leg sling chains, $\frac{5}{16}$ to $1\frac{1}{2}$ in. nominal diameter.

Metal Penetration

In a Paper, given to the Iron and Steel Institute on the influence of ramming and of sintering on the penetration of molten metals into compacted silica-sand mixes by Dr. T. P. Hoar, Dr. D. V. Atterton, and Mr. D. H. Houseman, the Authors have summarized their conclusions in the following statement:—

(1) Penetrating pressure considerably increases as the degree of ramming increases, for both fine- and coarse-grained sand compacts.

(2) A close correlation exists between surface density of sand compacts and penetrating pressure; that between "green" air-permeability number and penetrating pressure is slightly less good.

(3) Sintering at 1,600 deg. C. reduces the penetrating pressure values below those calculated from low-temperature results; the effect is greater for soft- than for hard-rammed compacts and greater for fine- than for coarse-sand mixes in hard-rammed compacts, but it is greater for coarse than for fine mixes in soft-rammed compacts.

(4) The penetrating pressure for iron falls considerably as temperature increases from 1,560 to 1,640 deg. C., for both soft- and hard-rammed compacts.

(5) Microscopic examination of compacts penetrated by tin and by iron shows that sintering produces rounding of the pores; these become somewhat fewer in number but greater in individual area, especially in soft-rammed compacts.

(6) Practical foundry moulds may be sampled (and repaired), and the samples tested for penetrating pressure on a simple apparatus suitable for routine testing.

(7) Penetrating pressure values closely similar to those found in the laboratory may be expected in practical castings made in the foundry.

(8) In carefully-hand-made foundry moulds, a rather low average degree of ramming, with wide variations of degree of ramming over the surface, is to be expected, especially on faces parallel to the direction of ramming.

This work formed part of a programme being carried out in the Department of Metallurgy, University of Cambridge, on fundamental aspects of steel founding. It is supported financially by the British Steel Castings Research Association, and the Authors' thanks are accorded to the Association, to its moulding-materials panel, and to the director of research, Mr. J. F. B. Jackson, for help and interest. The Authors are also much indebted to K. & L. (Steelfounders & Engineers), Limited, for supplying certain materials and for affording foundry facilities.

Neglected Markets

British exporters would find a promising and growing market for their goods in the comparatively-neglected North-West area of the United States, states an article in the current issue of the *Board of Trade Journal*. Over 10 million people reside in the area, which includes Minnesota, most of Wisconsin, North and South Dakota, Montana and parts of Nebraska, Wyoming and Iowa.

The business hub of the area is the distributing centre known as the Twin Cities—St. Paul and Minneapolis, in Minnesota. Together they are now rated as the seventh largest wholesale distributing centre in the U.S. and increasingly favourable results for British goods are being obtained there each month, declares the article, which is written by H.M. Consul at St. Paul. "Many U.K. businessmen miss visiting this promising area during their trips to the U.S. Most representatives who do visit the area leave with sizeable orders which generally develop into good regular business," he reports.

New Equipment

Oxygen-generating Plant

Details have recently been announced of the oxygen-generating plant now being produced by the Butterley Company Limited under licence from the U.S. concern, Air Products Incorporated. The plant enables users to produce their own supplies on site of high-purity oxygen for industrial uses. It is claimed that the equipment meets the industrial need for a constant supply of oxygen at a cost per cubic foot that shows considerable saving over the normal sources. The Butterley concern are making available a range of 14 standard models of the generator, which produce moisture-free oxygen which is 99.5 per cent. pure and which is normally compressed to 2,000 lb. per sq. in. at rates of 300 to 12,000 cub. ft. per hr.

Incorporation of a liquid oxygen pump, patented by Air Products, it is stated, eliminates the need for a bulky gasholder, oxygen compressor and drier, with a consequent saving in costs and simplicity of maintenance.

Versatile Fluoroscope

An industrial fluoroscope, with special features to ensure that the part under observation receives 100-per-cent. inspection, has been designed for the mass inspection of light-alloy castings. The instrument, known as the 'Scopemaster' is a product of the General Electric Company, Milwaukee, Wisconsin, U.S.A. A special feature is the mechanism provided for moving the product in the X-ray beam on a turntable of novel design. By means of this, a single external control permits the parts under inspection to be moved in any lengthwise or crosswise direction while in the X-ray beam. In the case of castings, this facilitates inspection of fillets and corners. The distance between the viewing screen and the product may also be adjusted by the operator during the inspection.

The unit thus provides full inspection of critical castings, and costly machining time can be conserved by inspecting castings before they are machined, to detect sub-surface flaws. The fluoroscope operates from a 110-v., 60 cycle a.c. electrical source. It has a 9 by 19 in. front opening through which products are inserted for viewing. Internal cavities 0.040 in. in size, or approximately 6 per cent of the metal thickness in an aluminium-alloy casting, can be detected.

Public-school Leavers in Industry

Careers masters representing 17 of the 170 public schools associated with the Public Schools Appointments Bureau were told by Mr. H. Lyon, director of the Bureau, recently, that many future leaders of industry would be found among the "frustrate" groups of boys who, after receiving a public school education, were eventually left searching for a career on completion of their national service. It was the Bureau's aim to find places for these young men, and the object of the five-day convention which the careers masters were attending was, he said, to show them some of the opportunities which industry could offer. The masters, meeting at Leicester, were the guests of the Brush Electric group in conjunction with the Rootes group and the British United Shoe Machinery Company, Limited. It was emphasized that while the Bureau did not wish to deter public school boys from other professions, it did want to ensure that the boys saw the chances which industry gave them for serving their generation.

Cast-iron Gutter Manufacture

*Federated Foundries' New Process**

It is now well known in the industry that Federated Foundries, Limited, have developed and patented an entirely new process of making cast-iron gutters. A team of technicians has for several years concentrated on this problem and many different methods were considered, investigated, and abandoned, until finally the difficulties were surmounted and a solution evolved. Users of cast-iron gutters soon realized that supplies of these gutters were being made available after a long period of short-supply, and the time has come when the method adopted can be made known. The company are fully alive to the obvious use of the same process for the production of many other types of castings, and considerable progress in this direction is being made.

Traditional Process

The method in common use for the production of cast-iron gutters is costly in manpower, space and time. Each man is allotted an area on the moulding floor in which he has sand, metal moulding boxes and patterns. For every mould made, the man, largely without mechanical aids, has to prepare sand, lift boxes and patterns and ram sand to the pattern shape, and all boxes have to be laid out on the floor before casting. After a mould has been cast, each box has to be emptied of sand, casting removed, and boxes cleaned and stored away for the next day's operations, as a mould can only

* Patented in the United Kingdom and abroad by Federated Foundries, Limited, 75, Hawthorn Street, Glasgow.

FIG. 1.—*Traditional Method of Manufacture for Cast-iron Gutters. Individual Boxes are laid out on the Floor for Hand Casting by the Pouring Gang.*

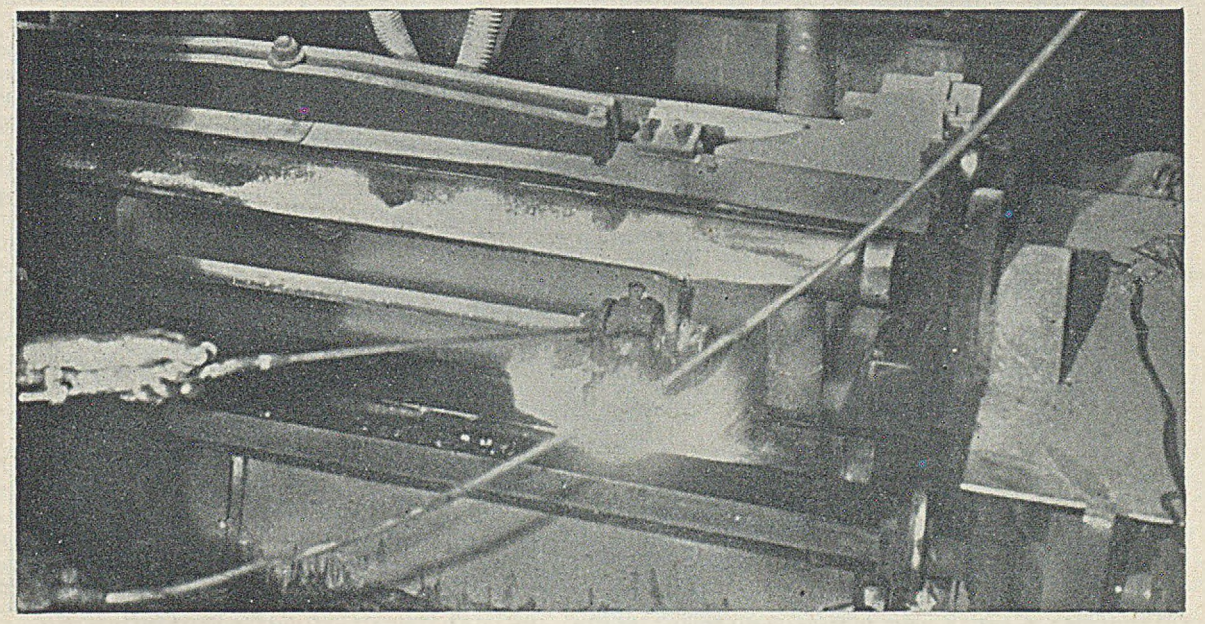

FIG. 2.—*Application of Carbon Insulation to the Open Die by means of a Hand Torch*

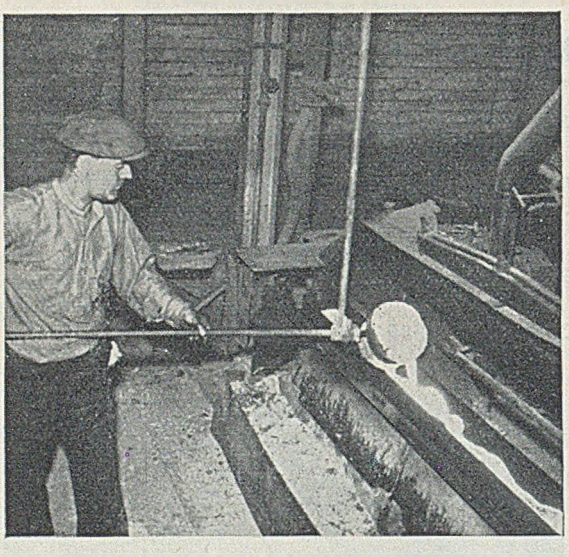

FIG. 3.—*Pouring Metal into the Open Die from a Hand Ladle suspended on an Overhead Runway.*

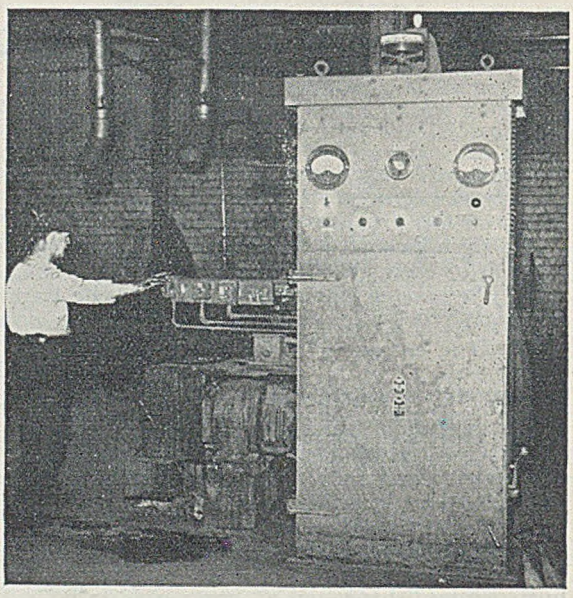

FIG. 4.—*End View of the Casting Machine. Operation is by Automatic Cycle initiated by Push-button Control after Charging the Die with Molten Metal.*

be used once for each casting. Fig. 1 shows the existing method.

New Method

In the new F.F. process, male and female metal dies are used into which molten metal is poured and then pressed into the desired shape, the dies being electrically operated and automatically controlled. The manual effort of sand preparation and sand ramming, box and pattern lifting, and the carrying of molten metal is thus entirely eliminated.

By the compact layout of dies in line, fed by a continuous metal supply, floor space is used economically and production for the labour involved is greatly increased. The product itself is superior in quality and surface finish to the sand casting.

In the first stages of the process, the die is open and by means of a torch an insulating carbon coating is applied to the die itself. Fig. 2 shows this

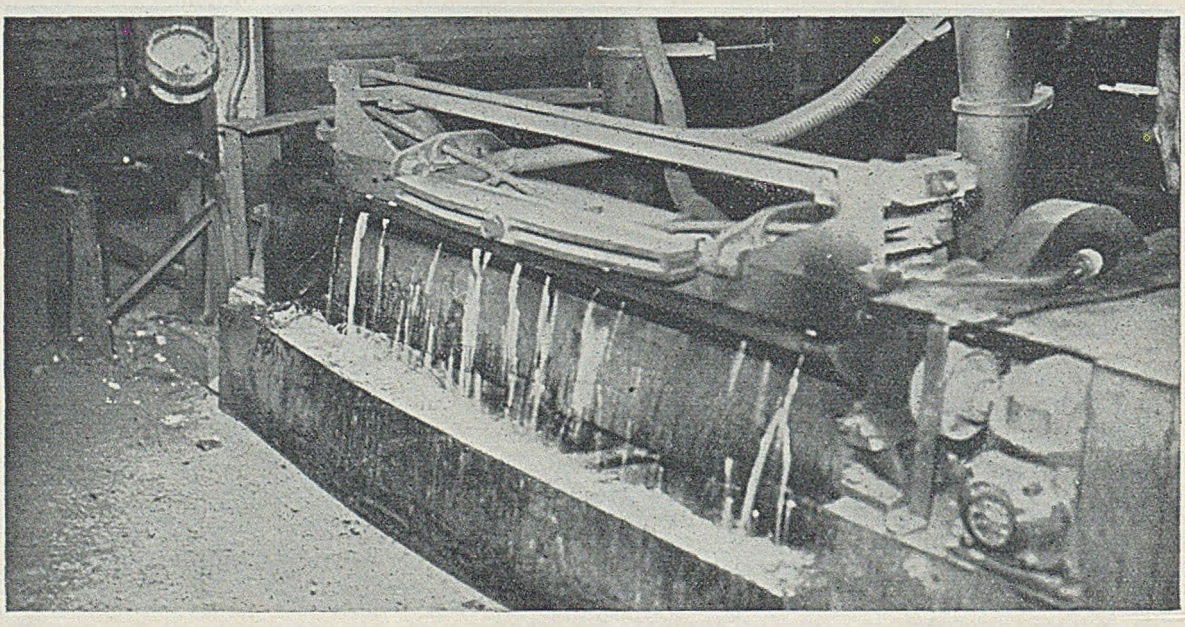

FIG. 5.—"*Pressing*" *Operation brought about by the closing of the Top Die. For the illustration, Excess Metal was charged so as to exaggerate the Overflow.*

FIG. 6.—*Casting, still Red Hot, being removed from the Die.*

operation. Ducting above the machine supplies air for controlling the temperature of the die. A continuous supply of metal is available from the cupola, and this is transferred, in a drum ladle, suspended on an overhead runway, to each machine. The drum ladle in turn transfers metal into the operator's hand ladle, which is also suspended on an overhead runway.

Pouring into the die is shown in Fig. 3. The suspended hand ladle is moved into position, tilted slowly, and the metal is allowed to flow along the channel of the die. The hand ladle contains about the right amount of metal and there is therefore very little waste. An automatic control then takes charge. As soon as pouring is completed, the operator (as shown in Fig. 4) presses a button which sets in motion a controlled sequence of movements through the electrical control panel. This automatically operates the male die on a closely-controlled time cycle. The panel also carries a series of lights which convey to the operator the correct timing for pouring, and for the removal of the casting after pressing, the intervening operations being performed automatically.

"Pressing" Operation

For the "pressing" operation, the top or male die is automatically moved down, and any excess metal is squeezed out and displaced into a trough underneath the bottom die. When the die is fully down, it remains closed for a definitely controlled time to enable the casting to solidify before the top die reverses to open. (To convey this pressing operation in Fig. 5, the displacement of metal as shown was purposely exaggerated.)

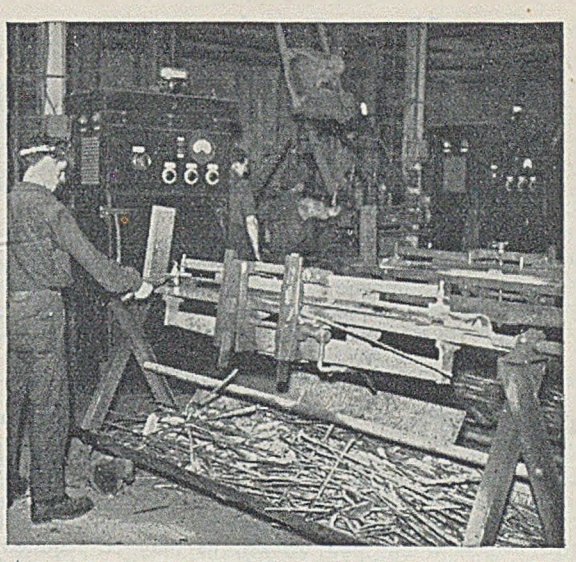

FIG. 7.—*Trimming off the "Flash." This Operation is followed by Edge Grinding, Inspection and Despatch.*

Continuing the sequence, the die is automatically opened. The casting remains in the bottom die and the time lag before its removal is indicated to the operator by a green light from the control panel. Fig. 6 shows the casting being removed, and in Fig. 7 the casting has been transferred to a fixture alongside each machine on which the operator removes the "flash" from the edges. The "flash" collected in the tray below is returned to the cupola for remelting.

Because there are no ingates or projections left on castings, as with the traditional method, very little further treatment is necessary, but nevertheless all castings are ground to ensure clean edges. Every gutter before passing to the warehouse for despatch is rigidly inspected as a final check that first-class quality is maintained.

Conclusion

It is evident that a step forward of considerable importance in ironfoundry circles has already been taken by this firm. Furthermore, from the knowledge gained in the research stages, further developments are envisaged, offering proof of the competitiveness and virility of this branch of the foundry industry. The illustrations were taken at the firm's Glasgow works, but their factory at Croydon is also operating the process.

I.B.F. Golfing Society

As it has now been decided by the English Golf Union to hold the competition for the Brabazon Trophy at Woodhall Spa just prior to the English Ladies' Championship, the ninth annual meeting of the Institute of British Foundrymen Golfing Society will be held at Woodhall Spa on Saturday and Sunday, October 2 and 3, 1954, and not as previously intimated.

New Catalogues

Adjustable Steel Shelving.—A leaflet, RS101, from Rowe Brothers Limited, of 10 Dover Street, London, W.1, describes and illustrates a range of adjustable steel shelving units. The principle underlying their manufacture is the provision of perforated angle uprights, which will receive shelves, sides, table tops, fronts or backs to provide all manner of storage facilities.

Recuperators.—Metallurgical Engineers Limited, Granite House, Cannon Street, London, E.C.4, have just issued a catalogue covering the potentialities of the Schack design of apparatus for preheating gas and air, In it are shown quite a few interesting applications of which the last to have attention is the hot-blast cupola and for this special literature is available from the firm.

Slip Flasks.—A four-page leaflet, received from W. J. Hooker Limited, 4 Midland Crescent, London, N.W.3, describes and illustrates a British-designed and manufactured slip flask. It is of the tapered type, but has the added feature of being extensible. Enlargement is effected by inserting light-weight components to add to height, length and breadth as may be required. Some features of this new production are the subject of an application for Patent rights.

Moulders' Tools.—Catalogue No. 50, issued by the Monk Tool Company of Geneva, Illinois, U.S.A. represents a type of trade literature which does not readily lend itself to "showmanship." In illustrating a very wide range of moulders' tools, at least overcrowding has been avoided, and the 70-odd items shown are clean and well printed on good paper. The range seems to cover much the same type as used in this country. This firm is of English origin having been started by Charles Monk in 1885.

Chaplets and Hinge Tubes.—An American firm, Smith and Richardson Manufacturing Company, Geneva, Illinois, in their catalogue No. 348 detail a wide variety of chaplets not all of which are common in this country. The section on hinge tubes is of distinct interest; these items are used to core holes through ribs and lugs which extend into the mould perpendicular to the parting line. It is stated they offer a means of casting holes for pins, bolts and the like which are within 0·010 in. of the specified diameter and ¼ in. of the desired location and save much drilling. The pattern is so prepared that it carries a recess into which the hinge tube fits. When the pattern is stripped from the mould, the hinge tube remains in position to cast in the desired hole. The catalogue lists about 150 varieties and diameters and a further 25 or more for oval holes. Several other novel "gadgets" listed in the catalogue show evidence of close customer co-operation. The catalogue is of good standard using clear illustrations, and carrying an attractive cover.

Ingot Makers' Social Function

The British Bronze and Brass Ingot Manufacturers' Association has organized a dinner/dance/cabaret at Grosvenor House Hotel, Park Lane, London, to take place on November 7, commencing at 6 p.m. A number of official guests will be present. A general invitation to participate in this function has also been issued to members of the Association of Bronze and Brass Founders. Tickets are three guineas each and applications, with remittances, should be sent to the secretaries, Heathcote & Coleman, 69, Harborne Road, Edgbaston, Birmingham, 15.

Midlands Industry Report

At a meeting of the Midland Regional Board for Industry recently, Mr. Barry Kay, Regional Controller of the Board of Trade and Ministry of Supply, said he believed many manufacturers were still unaware of the potential export business waiting for those who would get down to the job of personal selling.

After commenting that the improvement in trading had continued, Mr. Kay said that the main contribution to the increase in production had come from the consumer-goods trade, with output primarily intended for the home market. He added that buoyancy in the home market must not be allowed to induce a false sense of security. Markets which together accounted for more than half the world's trade offered considerable scope for bigger shipments from this country; these were Canada, U.S.A., Organisation for European Economic Co-operation countries, some Middle East countries and some dollar Latin-American countries. Irak, Kuwait, Syria and Lebanon were enjoying an income from oil and they offered especially good opportunities for construction and development projects. On the Continent, there had been a substantial freeing of trade by the O.E.E.C. countries, but in these markets, since 1950, the United Kingdom had lost ground to Germany.

Figures placed before the Board showed that among workers reported officially as redundant during August, nearly 200 came from the motor and cycle chain trade, where large stocks were said to have accumulated. Short-time working, which involved 8,128 workers, had occurred in the motor-vehicle and accessories trades, cycle, steel-rolling and electrical-switchgear industries. Of the wholly unemployed, 6,115 had been out of work for more than eight weeks.

Aluminium Development Association

The Aluminium Development Association announces the following changes in the membership of its Council and executive committee.

Council.—Mr. H. E. Jackson has resigned following his retirement from the Board of Imperial Chemical Industries, Limited (Metals Division). His place has been taken by Dr. Maurice Cook. Mr. G. A. Woodruff resigned on retiring from J. Stone & Company, Limited. He represented L.M.F.A. Development, Limited, on the Council, and his place has been taken by Mr. J. F. Paige, of William Mills, Limited. Mr. C. W. Cumber, representing Richard Thomas & Baldwins, Limited, has resigned on taking up an overseas appointment with his company; his successor has yet to be appointed.

Executive Committee.—Following the appointment of Dr. Maurice Cook to the Council, he has been succeeded on the executive committee of the Association by Dr. N. P. Inglis. Mr. F. G. Woollard has resigned, following his retirement from the Birmid Group, and his place has been taken by Mr. Harold Goodwin, of Birmetals, Limited. Mr. F. R. C. Smith has also resigned, since in his new position in the Aluminium, Limited, group it was impracticable to continue representing Aluminium Laboratories, Limited, on this committee. Mr. J. H. Mayes, of Northern Aluminium Company, Limited, has been appointed in his place.

MR. R. A. RIDDLES, C.B.E., M.I.M.E., a member of the Railway Executive for mechanical and electrical engineering, recently laid the foundation stone of the Apprentices' Training School at Crewe.

Effects of Mould Resistance on Internal Stress in Sand Castings*

Discussion of the Paper by R. N. Parkins, B.Sc., Ph.D., A.I.M. and A. Cowan, B.Sc., Ph.D.

Opinions expressed at the meeting related the subject to the larger problem of internal stress generally in castings manufacture, but some doubts were expressed as to whether other additional factors should have been taken into account. The Authors reiterated that the main effects were those of differing temperature and sand condition was of minor importance. Application of the work to larger castings and those of more complicated design was advocated and this work was said to be in hand.

THE CHAIRMAN, Dr. A. B. Everest, opening the discussion of this Paper at the Blackpool Conference of the Institute of British Foundrymen, said it was probably fair to state that the work was part of what might be called a major project of the Institute's Technical Council. It was now several years since he had presided over a committee which worked on the release of internal stress in castings by stress-relief annealing, and arising from that work requests had come from several sources as to the causes of internal stress in castings. A Committee, T.S. 32, had been studying the problem for about three years but the subject had proved an enormous one, owing to the many different factors involved—not only the properties of the cast iron during cooling but the properties of the sand. He recalled that at a previous meeting the question of frictional effects had been raised, and the study which had just been reported to them was a considered attempt to try and put that in its proper place with regard to the other factors.

It would be interesting to know whether consideration had been given to the tendency of different sands to sinter or frit on to the cast iron as being a contributory cause of friction and consequently of internal stress. Although the study was complete in itself it was also part of the very much bigger study into the causes of internal stress.

DR. PARKINS, who read the Paper at the meeting, on behalf of his co-Author, said in reply they had not really considered the question of fritting. They believed the problem of friction was intimately connected with sand being burnt on to the casting, although they had no direct evidence of it other than that they found the castings had a lot of sand burnt on to them when they were stripped. There were certain experimental difficulties connected with the method, and the manufacture of the close-packed sand was not easy; results came through very slowly, but they were continuing with the work and were making notes of points which should be gone into farther in due course.

Effects in the Vertical Plane

MR. J. BLAKISTON, congratulating the Authors on investigating a very important subject, said that many founders realized the problems brought about by the internal stresses which arose when manufacturing intricate castings.

Several points had occurred to him: first, he noticed that the mould was cast in the horizontal position and wondered if any consideration had been given to simultaneously casting a mould of like construction and shape in a vertical position, in order to see what effect gravity had on the shrinkage; secondly, had any consideration been given to the expansion of the sand mould, which took place as the casting was contracting? The composition of a sand would have a very important effect on that, because if a high silica content sand were used, two expansion stages during the period of the heat transfer from the mould to the sand would be encountered.

A third point was the lubrication effect an element might have, for instance, the gases produced by a coal-dust addition to the sand. They would produce a definite lubrication against the friction between the metal and the mould, and that again might affect the results. It was undoubtedly a fact that as the study of the subject progressed, there were so many variable factors which were likely to enter into it that it was impossible to know where it was going to lead, or if any definite conclusion could be arrived at.

DR. A. COWAN, in reply, said that up to the present they had given no thought to the possible effect of pouring in the vertical position, but he could not see that gravity would have a marked significance. The main factor which caused the stress in this case was the sand—the strength of the sand and nothing else. With reference to lubrication by coal-dust gases, the core-sand did have such an effect, due to the burning-out of the linseed oil, and a high stress was obtained so long as a considerable amount of that sand was not burnt out. Again, the primary factor seemed to be the strength of the sand rather than anything else.

With regard to expansion of the sand being heated as the casting cooled, he was afraid the apparatus used was not sensitive enough to measure such a phenomenon. It was thought the Northallerton sand, the Southport sand (principally a silica sand), and floor-sand F.13 (which could be compared directly with S.14 or N.13), would give very similar results. The amount of sand heated to a critical temperature so as to record an expansion would be small, unless one had a large-size casting. In that case it was found that sand for only about ½-in. from the mould face was heated to anything like 800 deg. C.

* Paper printed in the JOURNAL July 23, 1953.

Internal Stress in Castings—Discussion

DR. R. N. PARKINS, also in reply, said that the remainder of the work which had been described and was shortly to be placed before the Institute of Metals, dealt with all three effects at the same time. The situation became rather complicated when one had sand effects, thermal effects and transformations taking place at the same time.

The question of the expansion of the sand being heated as the casting cooled was dealt with indirectly in the Paper, in that it was shown that in the majority of cases it was likely that the difference in temperature was the predominant factor in the formation of internal stresses and that sand effects, by and large, were of very much less importance. Even allowing for the fact that there would be some expansion of the sand, its effect was likely to be smaller than other effects which give rise to internal stresses.

Effect of Different Sands

MR. MIDDLETON (B.S.C.R.A.) said that from the results described, especially for the cast-iron flanged bar, it would appear that it was the low-temperature properties of the sand rather than the hot-strength which largely determined its resistance to the contraction of the test casting. This was to be expected in cases of this sort where the casting was small, and only a small depth of sand was heated to a high temperature. Under such conditions, it was the bulk of the sand at a low temperature that controlled the amount of hindrance offered to the contracting casting.

Had the amount of deformation under compressive load been determined for the sand mixers ? For example, it was possible to have two sands having similar ultimate compressive strengths but different deformations under load, and then one would expect the sand having the higher deformation to resist the contraction of the casting less. That might account for the results given in the Appendix, the close-packed sands having a higher deformation under compression, and thereby allowing the casting to contract to a greater degree.

With regard to the core sand, he was not in agreement with the Authors' opinion that oil-sands burned away rapidly, forming a layer of low-strength sand, which in turn allowed the casting to contract freely immediately after pouring. He had carried out extensive research on the effect that moulding materials had upon the incidence of hot-tearing in steel castings, and as a result of this work,* it had been established, for steel castings of dimensions equivalent to that of the authors, that oil-sands resisted the contraction of the casting to a greater extent than clay-bonded sands, thereby causing a greater degree of tearing.

By increasing the size of the casting, the effects due to the different types of moulding materials could well be reversed. For example, oil-bonded core-sands might be shown to collapse more easily and might therefore resist the contraction of the casting less than clay-bonded sands. Frictional effects had been observed in Mr. Middleton's work and in the work by Hall in America.

DR. COWAN said they had found with the core-sand used that about $\frac{1}{2}$ in. all around the flanges was burnt away, and when the mould was stripped the sand just crumbled as a black mass. That would be expected from the sand strength-values given in Fig. 3, as soon as the sand was heated to something like 600 deg. C. and had also been borne out by a comparison of results with cast iron, brass, and "Y" alloy.

The previous speaker had remarked that the deformation values were principally due to the room-temperature strengths of the sand, whereas in the Paper he and his co-Author had stated them to be due rather to the cumulative effect of the high-temperature strength of the sand and the room-temperature strength. It was impossible to say definitely whether the room-temperature or the high-temperature strength was causing the deformation, but it seemed to be a mixture of the two. They had been trying to measure the deformation of sands at the same time as the compressive strength, but many difficulties had been encountered and they had been forced to abandon it.

DR. PARKINS emphasized the remarks made by the Chairman, namely, that the Institute's Sub-committee T.S. 32 had the question in mind, and bigger castings were now being made in order to study it further. The present Paper was but a minute part of the work of that sub-committee.

Appendix Most Valuable

MR. DEARDEN observed that the Paper described the results of measurements of contraction when hindered in different degrees by the design of the casting and the strength of the mould. It showed that contraction could differ from that indicated on a patternmaker's rule, but this was no clear proof that hindered contraction could cause internal stresses which persisted in castings even after release from the mould. This could only be done by measuring the residual stress, if any, after release from the mould and this the Authors had apparently not done. The straight bars described in the Paper would not be expected to have any residual stress after release from the mould, but this could not be said about the unequal-section grid casting described in the Appendix.

He thought the work described in the Appendix was more appropriate to the title of the Paper. It demonstrated how the restraining effect of different sands on a plain bar could exceed that of the flanges on a flanged bar, and could influence the residual stress in a grid casting of unequal section. He presumed the stresses in Table VII were measured after release of the castings from the moulds. It appeared that the application of the close-packed sand to the thicker member of the grid casting reduced the subsequent residual stress in that member, but it was usually considered preferable to use sands of higher permeability as the section of the castings increased. In this case, the close-packed sand had an A.F.S. permeability of 102, which seems a very high value for a sand of that description. He considered that an extension

* See Paper 53-70 A.F.S. 1953, Convention in Chicago.

of the work described in the Appendix would be well worth while.

DR. PARKINS, in reply, said it was perfectly correct that the stresses disappeared from the plain casting, but for the greater part of the work a casting of the rectangular framework type had been used which actually had an internal stress left in it. The present work was concerned with the cases where stresses were removed when the casting was stripped, but that was the simplest way of studying sand effects and keeping them apart from thermal effects.

As to permeability, close-packed sands had a very low value, and in any case he did not consider their use a practical proposition because the sand was an extremely difficult and tedious job to prepare. In fact, from a practical point of view the question of internal stresses or of trying to remove them was largely one of design rather than anything else.

Friction Effect of Burnt-on Sand

MR. COLIN GRESTY expressed his keen interest in the Paper, particularly in what had been said on the question of frictional effect. He agreed with what the Authors had said with regard to burnt-on sand being one of the hindrances to free contraction. He was chiefly interested in large castings rather than small ones (on which the Authors' work was based) and had in mind internal stresses which sometimes caused a large casting to crack. The possible incidence of the frictional effect was a new conception.

In a big mould, a very dangerous point was where one got a "flash" of metal due to an imperfectly-made joint, which sometimes occurred in such work. During cooling down, a "flash" sometimes cracked and cracks so formed had a nasty habit of running into the main body of the casting. He wondered whether such "flash" could possibly increase the intensity of the frictional effect. He hoped the Authors would continue their work on the subject and perhaps have the opportunity of studying larger castings.

THE CHAIRMAN remarked that that work was being pushed on.

DR. PARKINS said the most likely explanation of the effect of the flash was that if there was a stress in the casting it would obviously be higher in the region of a very thin section than elsewhere, and a crack was more likely to start in a thin section than a thick section. The reason probably lay there, rather than in the frictional effect, although that might well play a part.

MR. GRESTY said they had looked upon it, so far, as mainly a thermal effect, plus the fact that there was a very thin layer of metal in the flash, which could crack very easily.

DR. WHITE said the principle of grading sand was quite a general one.

THE CHAIRMAN, concluding the session, proposed a hearty vote of thanks to the Authors, which was carried with acclamation.

ADDENDUM*

A report of further work on the "Mechanism of Residual-stress formation in Sand Castings" by the same Authors has been placed before the Institute of Metals, from which their synopsis and conclusions are reproduced:—

Synopsis.—Experiments on cast iron, brass, and Y-alloy show that residual stresses in sand castings may result from: (*a*) temperature differences set up during cooling, (*b*) phase transformations in the alloy, and (*c*) resistance to contraction offered by the sand. The magnitude of the contribution by each of these varies according to the type of casting produced, but a qualitative interpretation of the present results indicates that minimizing temperature differences in the casting usually promotes low stresses. This is because the contributions of phase transformations and sand resistance to the total residual stresses depend largely upon the presence of temperature differences in the casting.

Conclusion.—It is apparent that the relative contributions of temperature differences, sand strength, and phase transformations to the residual stresses in metal castings vary to a considerable extent. Thus, in the case of the non-ferrous alloy frameworks, the stresses may be attributed almost entirely to the temperature differences established. In grey-iron castings, however, the contributions of the phase transformation and of the sand may be of the same order as that due to temperature differences, although it is clear that transformation and sand restraint are likely to have an appreciable effect only if temperature differences exist within the casting. The frequent suggestion, then, that the mechanical properties of the mould have little influence upon the magnitude of the final stress is not always true, and indeed it has been shown in the Authors' earlier work that these stresses in rectangular frameworks can be controlled to some extent by the use of a facing sand, on either the centre or outer members, having a grain-size distribution such that close packing of the grains results. It is evident, however, that the practical means of reducing residual stresses in castings to low values must lie in an attempt to give careful consideration to the shape of a casting in order to reduce temperature differences established during cooling.

* Contributed by the Editor.

T.U.C. General Council

Mr. Harry Douglass, general secretary of the Iron and Steel Trades Confederation, succeeds Sir Lincoln Evans, the former general secretary of the confederation, who resigned this position and his seat on the General Council of the Trades Union Congress consequent upon his appointment as vice-chairman of the Iron and Steel Board. Mr. J. Owen, former general secretary of the National Union of Blast-furnacemen, Ore Miners, Coke Workers, and Kindred Trades, who was succeeded in this position by Mr. Joseph O'Hagan after his appointment to the Iron and Steel Board, is also succeeded by Mr. O'Hagan on the General Council. The third appointment to the General Council, that of Mr. L. T. Wright, follows upon the appointment of Sir Andrew Naesmith, formerly general secretary of the Amalgamated Weavers' Association, to the Iron and Steel Board. When the new General Council of the T.U.C. met after the congress, it elected Mr. Jack Tanner, president of the Amalgamated Engineering Union, as chairman for the coming year.

Imports and Exports of Iron and Steel in August

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in August. Figures for the same month in 1952 are given for the purpose of comparison, and totals for the eight months of 1952 and 1953 are also included. (All figures in tons.)

Total Exports of Iron and Steel and Destination

Destination.	Month ended August 31.		Eight months ended August 31.	
	1952.	1953.	1952.	1953.
Channel Islands	350	369	4,721	4,209
Gibraltar	115	126	1,345	1,267
Malta and Gozo	149	1,064	1,616	3,022
Cyprus	613	272	4,118	7,716
Sierra Leone	416	1,158	3,557	7,136
Gold Coast	3,287	2,867	23,502	28,919
Nigeria	1,556	4,710	29,563	41,773
Union of South Africa	10,854	4,036	95,279	84,313
Northern Rhodesia	1,661	1,186	19,174	16,141
Southern Rhodesia	4,984	5,110	37,991	46,372
Tanganyika	1,709	2,245	14,237	13,595
Kenya	2,476	6,188	27,816	53,757
Uganda	318	955	4,194	7,643
Mauritius	288	420	3,037	5,828
Bahrein, Qatar, and Trucial Oman	744	3,601	11,051	20,670
Kuwait	777	2,180	10,203	19,341
India	5,288	6,215	49,892	55,702
Pakistan	4,596	3,106	50,291	24,089
Malaya	6,511	4,271	52,588	49,067
Ceylon	1,222	2,341	15,551	16,649
North Borneo	95	538	2,420	3,938
Hongkong	2,603	1,625	15,484	21,860
Australia	25,729	7,907	207,935	112,429
New Zealand	11,270	8,333	97,306	83,207
Canada	10,778	16,224	123,763	134,807
Jamaica	1,767	668	18,068	12,077
Trinidad	2,925	3,293	31,340	29,626
British Guiana	340	549	4,124	4,383
Anglo-Egyptian Sudan	2,359	1,241	13,139	19,639
Other Commonwealth	1,869	5,257	21,581	49,361
Irish Republic	5,556	4,731	42,134	39,004
Soviet Union	—	8	1,037	12
Finland	2,722	1,564	30,816	20,617
Sweden	6,670	6,697	76,960	55,732
Norway	4,405	5,321	41,946	47,719
Iceland	131	246	2,138	2,717
Denmark	2,599	7,507	53,224	64,315
Poland	8	146	81	641
Western Germany	141	145	993	6,144
Netherlands	8,381	7,755	68,026	94,832
Belgium	577	3,183	5,557	17,030
France	210	193	1,676	9,374
Switzerland	556	1,032	6,225	8,033
Portugal	740	752	6,116	12,275
Spain	1,094	932	6,214	4,292
Italy	436	8,272	7,640	40,220
Austria	30	139	383	1,095
Yugoslavia	256	683	3,464	3,715
Greece	48	5,876	2,139	13,355
Turkey	140	969	5,393	8,048
Netherlands Antilles	4,292	522	11,408	7,674
Belgian Congo	101	339	1,992	1,964
Angola	88	1,033	2,332	6,122
Portuguese E. Africa	116	162	3,169	2,293
Canary Islands	19	4	530	429
Syria	253	61	1,713	1,534
Lebanon	161	311	7,983	4,237
Israel	805	911	10,535	5,572
Egypt	1,834	1,379	22,585	18,777
Saudi Arabia	72	1,228	4,560	4,012
Iraq	3,902	8,960	34,357	54,315
Iran	258	301	6,765	2,843
Burma	523	1,584	8,050	15,866
Thailand	1,074	354	6,797	7,745
Indonesia	893	1,134	10,359	11,996
China	—	48	191	531
Philippine Republic	789	138	3,639	1,985
U.S.A.	6,522	12,874	34,708	72,728
Cuba	25	228	1,415	2,544
Colombia	79	651	2,903	7,458
Venezuela	4,210	1,983	27,746	33,602
Ecuador	483	48	2,872	1,757
Peru	744	524	5,947	7,154
Chile	128	287	2,308	2,005
Brazil	2,240	115	17,268	2,010
Uruguay	286	264	3,439	1,985
Argentina	2,979	390	26,843	9,518
Other foreign	2,048	2,230	15,258	17,501
TOTAL	177,273	192,269	1,642,610	1,734,763

Total Imports of Iron and Steel and Origin

From	Month ended August 31.		Eight months ended August 31.	
	1952.	1953.	1952.	1953.
India	1	5	229	167
Canada	20,382	1,247	97,412	61,365
Other Commonwealth countries and the Irish Republic	912	39,086	3,726	131,407
Sweden	2,663	2,820	19,000	16,895
Norway	4,826	4,138	43,482	39,417
Western Germany	12,087	2,207	71,857	32,523
Netherlands	22,900	5,365	102,980	79,818
Belgium	23,133	7,772	208,042	154,910
Luxembourg	13,010	5,421	112,316	81,939
France	46,445	12,759	200,721	189,242
Italy	165	7,446	8,161	28,324
Austria	22,130	52,413	118,590	328,897
Japan	26,366	114	152,097	56,395
U.S.A.	47,199	6,671	426,692	107,786
Other foreign countries	867	4,223	6,427	38,366
TOTAL	243,086	151,687	1,571,738	1,347,451
Iron and steel scrap and waste, fit only for the recovery of metal	76,053	76,155	449,412	633,285

Exports of Iron and Steel, by Product

Product.	Month ended August 31.		Eight months ended August 31.	
	1952.	1953.	1952.	1953.
Pig-iron	58	181	2,408	3,516
Ferro-tungsten	10	22	71	56
Other ferro-alloys	146	207	2,332	1,808
Ingots, blooms, billets, and slabs	42	128	233	713
Iron bars and rods	163	53	2,338	1,243
Wire rods	10	1,648	806	10,807
Bright steel bars	756	823	9,131	10,809
Alloy steel bars and rods	1,305	811	10,610	10,812
Other steel bars and rods	7,277	5,750	73,647	64,130
Angles, shapes, and sections	6,782	7,290	88,808	77,298
Iron and other castings and forgings	785	742	8,064	11,295
Girders, beams, joists, and pillars (rolled)	3,290	764	24,877	12,834
Hoop and strip	2,605	11,904	31,631	51,411
Iron plates and sheets	81	10	359	208
Tinplate	25,487	19,065	195,025	172,095
Tinned sheets	168	168	1,276	1,115
Terneplates and decorated tinplates	77	59	486	718
Other steel plate (⅛ in. thick and over)	18,160	13,902	157,033	158,052
Galvanized sheets	2,901	10,677	40,330	74,722
Black sheets	10,807	16,797	88,407	128,410
Other coated plates and sheets	804	468	6,982	6,206
Cast-iron pipes up to 6 in. dia.	6,911	5,019	59,693	54,160
Do., over 6 in. dia.	5,650	5,480	45,469	44,884
Wrought-iron tubes	27,474	31,249	281,335	294,346
Railway material	20,041	18,607	140,329	170,175
Wire	2,814	4,174	34,322	36,995
Cable and rope	2,113	1,993	20,314	21,003
Wire nails, etc.	1,000	2,198	10,611	13,374
Other nails, tacks, etc.	341	246	4,115	3,104
Rivets and washers	340	218	4,169	3,089
Wood screws	267	159	2,937	1,366
Bolts, nuts, and metal screws	1,340	1,321	15,727	13,554
Baths	404	323	9,752	2,715
Anchors	587	801	6,561	6,607
Chains, etc.	877	594	7,120	6,052
Springs	387	323	4,109	3,406
Holloware	7,633	7,461	59,140	69,732
Doors and windows	1,533	1,262	14,579	12,559
TOTAL, including other manufactures not listed above	177,273	192,269	1,642,610	1,734,763

News in Brief

NEWEY ALUMINIUM FOUNDRY, LIMITED, have now moved into their new and larger premises at Hainge Road, Tividale, Tipton, Staffordshire.

THE DIRECTORS of E. Chalmers & Company, Limited, non-ferrous metal manufacturers, of Edinburgh, are issuing 116,000 2s. ordinary shares in connection with the purchase of shares in what will become a subsidiary company.

A BROADCASTING SYSTEM—the first of its kind to be installed in any British port—which will allow the whole of the Manchester dock estate to be alerted at the touch of a switch, is now functioning at the Port of Manchester.

MR. THOMAS HENRY EDGE, of Wolverhampton, metal merchant, of Alexander Metal Company Limited, formerly for over 30 yrs. with the Wolverhampton Metal Company, Limited, who died on February 7 last, left £24,431 (£24,219 net).

A MARKETING of the ordinary one-class capital of Edward G. Herbert, Limited, machine-tool makers, etc., of Manchester, is being arranged on the Manchester Stock Exchange. The company has an issued ordinary capital of 255,130 5s. shares.

OPERATIONS have recently commenced at the new hammer forge which Steel, Peech & Tozer have built at the Ickles works. This forge is designed to give increased production and to apply the latest techniques to the manufacture of railway axles.

AT A LUNCHEON last week in the canteen of Horseley Bridge & Thomas Piggott, Limited, constructional engineers, etc., of Tipton (Staffs), 31 pensioners were entertained as guests of the directors; their combined service with the company totalled 1,200 yrs.

INCREASES IN ELECTRICITY CHARGES to domestic and small commercial consumers were announced last week by the Midlands Electricity Board, which covers Worcestershire, Salop, Herefordshire, Staffordshire and parts of Warwickshire and Gloucestershire.

THE WORKS at Clayton, Bradford, of Jowett Cars, Limited, which have been used for servicing and spares and have been occupied by the company for about four years, are to be closed and the department will be transferred to the main factory at Idle, Bradford.

TWO SHIPBUILDING ORDERS placed with Bartram & Sons, Limited, Sunderland, have been cancelled. The orders, placed two years ago, included a 16,500-ton tanker for Greek owners and a 10,900-ton motor cargo ship for Haldin & Company, Limited, London.

THE MINISTER OF SUPPLY has, after consultation with the Iron and Steel Board, made an Order which increases the basic prices for tinplate and terneplate by 1s. 8d. per box and 6d. per box, respectively, and for the appropriate extras by corresponding amounts.

INTERNATIONAL COMBUSTION, LIMITED, Riley Stoker Company, Limited, Rhymney Engineering Company, Limited, and Neckar Water Softener Company, Limited, are sharing a stand (41 and 54), at the Fuel Efficiency Exhibition, to be held in Manchester in November.

THE BRITISH WELDING RESEARCH ASSOCIATION announces that Dr. A. A. Wells has now been appointed chief research engineer and head of the engineering research station at Abington, near Cambridge, and that Mr. R. P. Newman will be chief administrative officer of the station.

THE DIVIDEND of the British United Shoe Machinery Company, Limited, Leicester, is being raised from 3¼ per cent. to 4 per cent., tax free, on account of the year ending December 31 next. For 1952 there was a 5¼ per cent. final dividend to make 9 per cent. net on the £4,140,000 ordinary capital.

MR. TOM JOHNSTON, chairman of the North of Scotland Hydro-Electric Board, officially reopened East Bank's Foundry at Wick on September 30, and praised the initiative and enterprise of Mr. John M. Rollo, who was responsible for restarting the foundry, which had been closed for 18 months.

A GROUP NET PROFIT of £54,694 for the year to June 30, against £47,867 in the previous year, is reported by Richard Crittall & Company, Limited, heating and ventilating engineers, of London, W.1. The company is recommending a dividend on ordinary shares of 12½ per cent., against 10 per cent.

THE GEORGE E. DAVIS MEMORIAL LECTURE will be given by Mr. Norman Swindin, A.M.I.MECH.E., M.I.CHEM.E., at a joint meeting with the Chemical Engineering Group and the Manchester Section of the Society of Chemical Industry in the Reynolds Hall, College of Technology, Sackville Street, Manchester, on October 10, at 3 p.m.

ONE OF THE SHOWPIECES of an exhibition arranged by the Coventry machine-tool firm of Alfred Herbert, Limited, is a combination turret lathe. The exhibition, which is attracting visitors from all parts of the country, is designed to help engineers keep in touch with the modern development of cutting by means of carbide tools.

BRITISH STANDARD 2027:1953 applies to rolled copper plate in the annealed condition in thicknesses over ⅜ in. and over 12 in. in width. It specifies quality of material, tolerances and mechanical properties and includes details of mechanical testing. Copies may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, W.1 (price 2s. 6d.).

MEN EMPLOYED at the North Shields works of Armstrong Whitworth & Company (Pneumatic Tools), Limited, have objected to the company's proposal to introduce an American system of "clocking in." The firm proposes that each man should "clock in" and "clock off" for each individual job, which it states is the recognized system in America.

PREFERENCE would not be given to British equipment for the construction of the £144,000,000 project to build a hydro-electric dam, aluminium plants and a port in the Gold Coast although the scheme might be partly financed by a loan from the British Government. Mr. K. A. Gbedemah, the Gold Coast Minister of Commerce and Industry, said in London last week.

THE BRISTOL BRABAZON AIRLINER has, it is understood, been sold for scrap by the Ministry of Supply to Coley Metals, Limited, the holding company of R. J. Coley & Son (Hounslow), Limited. No price has been disclosed for the purchase which was negotiated with the Bristol Aeroplane Company, Limited, acting as agents for the Ministry in putting out the tenders for the aircraft.

GRANVILLE IRONWORKS, of Ruston Street, Birmingham, are moving to Tipton and the Birmingham Estates Department is to begin the task of adapting the former factory premises to take a number of small commercial and industrial concerns. Such changes will give Birmingham its first Coporation owned flatted factories, which are expected to be opened early next Spring.

News in Brief

AMONG the guests who witnessed the opening of the new bridge at Victoria Dock, Aberdeen, by the Queen Mother, on September 23, were 60 workers from Teesside who had assisted in the construction of the bridge at the Thornaby works of Head, Wrightson & Company, Limited. The bridge, which spans the 70-ft. entrance of the Victoria Dock, is made of aluminium alloy, and is of the movable bascule type.

ERECTION of a new factory for Veasey & Sharples, Limited, specialists in reconditioning machine-tools, at a cost of some £50,000, is to be started within the year at Coventry. The completion of the building, which covers 20,000 sq. ft., is expected within two and a half years and will enable the firm to do all its work on these premises, whereas at present much of the work has to be done on owners' sites.

ADDRESSING the annual luncheon meeting of the Manchester branch of the National Union of Manufacturers last week, Sir Cuthbert Clegg, who is a member of the British Productivity Council, urged all advocates of free enterprise to demonstrate by results its advantage over State control. In view of a great deal of changed thought on nationalization, he thought that here was an opportunity and a challenge.

RALEIGH INDUSTRIES, LIMITED, have prepared 63 different types of catalogues for use in what it believes is the biggest overseas sales campaign ever undertaken by a British cycle firm. The catalogues differing in language, size and illustrations are being sent to dealers in more than 100 overseas territories. They have been printed in French, German, Siamese, Flemish, Spanish, Turkish, Portuguese, Chinese, and Burmese.

DURING OCTOBER, six ships, totalling some 65,000 tons gross, will be handed over by Tyne shipbuilders. The month will be one of the best for deliveries for several years. Deliveries for the first 10 months of the year will then total 24 vessels of about 201,000 tons gross, compared with about 182,000 tons for the whole of 1952. The final delivery total for 1953 might challenge the 231,000 tons of 1949, the best since the war.

THE LATEST USES and production methods in powder metallurgy will be studied by a team of experts which arrived by air in New York on September 30. The team, whose mission has been organized under the Technical Assistance scheme of the Organization for European Economic Co-operation, comprises 28 participants from seven European countries—Belgium, Denmark, France, Germany, Italy, the Netherlands, and the United Kingdom.

TO CELEBRATE the jubilee of the Rugby Engineering Society, an exhibition was opened at Rugby College of Technology on September 24, to show advances in engineering during the last 50 years. The Science Museum, South Kensington, local works and public authorities co-operated in an excellent exhibition. Rugby's part in the development of the jet engine was emphasized, and electronics formed a prominent section of the show.

REDUCTION of industrial smoke, fog, and sootfall in the Potteries was essential to cleaner, healthier lives in the area, said Alderman A. E. Bennett, Lord Mayor of Stoke-on-Trent, at a luncheon following a visit to the Blythe Bridge factory of the Simplex Electric Company, Limited, recently. The visit, he went on, gave him the opportunity to correct the impression that the industrial life of the Potteries was only confined to making pottery and mining coal.

THE GLANMOR FOUNDRY COMPANY, LIMITED, and Thomas & Clement, Limited, of Llanelly, announce the formation of an association with the Matteson Engineering Service of Salem and Youngstown, Ohio, U.S.A. The Matteson Engineering Service specializes in galvanizing, hot-dip tinning, pickling, cleaning, shearing, slitting and many other processes. Mr. Dennis Thomas, chairman of the British company, has left for America for further consultations with the Matteson organization.

SPEAKING at the annual luncheon at Walsall on October 1 of the Walsall branch of the National Union of Manufacturers, Mr. C. S. Garland, senior vice-president of the Union, said that the Town and Country Planning Act with its horde of bureaucrats had done more to hamper industry than any other measure. He could not see that the Act had done one iota towards solving the essential problem of this country—how to earn our own living. He hoped to see the end of the Act.

FOR MANUFACTURERS to have an agent in each country in Latin America was recommended by Sir Ernest Canning when he addressed members of the West Midlands branch of the Institute of Export on September 28. The appointment of more than one agent should be considered in large countries such as Brazil. Sir Ernest, who recently visited Latin America, said that two criticisms he found made of Britain were that she changed her Embassy staffs too often and did not answer enquiries with the full details requested.

AFTER CHARGING £4,909 in respect of special research expenditure the accounts of William Doxford & Sons, Limited, Sunderland, for the year to June 30, 1953, show a net profit of £777,339, as compared with £601,744, an increase of £175,595. The directors have resolved to recommend a new share issue of 50,000 ordinary shares of £1 each to be allotted fully paid on the basis of one new share for every 14 ordinary shares held on the close of business on October 15. Dividend on the ordinary shares is held at 20 per cent., making 25 per cent. as previously.

THE ORDINARY SHARES of H. B. Barnard & Sons, Limited, of Glyn Street, Vauxhall, London, S.E.11, and at Dudley Port, Staffordshire, Manchester, and Grangemouth, Scotland, have been purchased by P. Winn (Barking), Limited, Investment Company. The Industrial & Commercial Finance Corporation, Limited, of 7, Drapers Gardens, London, E.C.2, have purchased all the preference shares in H. B. Barnard & Sons, Limited. All existing executive directors, Mr. H. B. Barnard, Mr. P. P. Levy, Mr. P. H. Green and Mr. H. R. Whitfield, will continue with the company. Additional directors will be Mr. R. C. S. Godelman, Mr. W. Manning, Mr. J. C. Pidduck (chairman) and Mr. J. M. Tilling.

THE BRITISH STANDARDS INSTITUTION has recently published B.S.2030—Dimensions of X-ray Films for Crystallography. The special needs of crystallographers cannot be satisfactorily met by the sizes of X-ray film specified in B.S.1443—Sizes of X-ray film and intensifying screen—and this new standard has, therefore, been prepared to deal with the sizes of X-ray film used in the various instruments peculiar to the crystallographer, *e.g.*, diffraction-powder cameras as specified in B.S.1693. It is hoped that this standard will give guidance relating to the future design of crystallographic equipment and apparatus. Copies may be obtained from the British Standards Institution, 2, Park Street, London, W.1 (price 2s.).

Personal

MR. B. F. HOMER and MR. N. C. BLYTHE have been appointed directors of Midland Electric Manufacturing Company.

MR. JOHN BLAKISTON, M.I.MECH.E., is leaving for the Far East on October 21. He is to visit Malaya and Bengal and will return early in the new year.

MR. J. M. DOUGLAS, previously general manager, has been appointed managing director of the Argus Foundry, Limited, with effect from September 30, 1953.

MISS MARY LEIGH has been appointed general secretary of the Women's Advisory Council on Solid Fuel. She replaces Mrs. Fraser-Stephen, M.A., who has resigned. Since 1944, Miss Leigh has been technical officer to the Council.

MR. HENRY NIMMO, C.B.E., M.I.C.E., M.I.E.E., M.I.MECH.E., and MR. WILLIAM LINN, M.I.C.E., have been elected respectively president and chairman of the General Council of the Engineers Guild for 1953-54.

AFTER 50 YEARS with Sentinel (Shrewsbury), Limited, MR. JOHN SMITH has retired and on October 1 was presented by his colleagues with a television set. He joined Alley & McLellan in Glasgow and went to Shrewsbury when the firm moved there 35 yrs. ago. Since 1946, he has been a director and for the past 20 yrs. chief buyer for the company.

MR. L. RUMLEY, sales director of Conveyancer Fork Trucks, Limited, of Warrington, has left England for a visit to the company's Canadian Associate, Electro-Hydraulics (Canada), Limited, of Toronto. During his stay he will survey the market in Canada for British materials-handling equipment, and he expects to return to this country towards the end of the month.

A GOLD WRISTLET WATCH AND WALLET were presented last Thursday to Mr. John Naylor, manager of the Devonshire shed of Prince-Smith & Stells (Keighley), Limited, worsted machinery makers, Keighley, on his retirement after 51 years' service with the firm. Mr. A. Midgley, foreman of the department, presented the gifts, which were subscribed to by both past and present members of the firm.

MR. NRIPESH CHANDRA BAGCHI, M.SC., A.INST.P., assistant director in charge of the X-ray laboratory of the Government of India's test house, at Alipore, Calcutta, has arrived in the United Kingdom, for training (made available under the Colombo Plan Technical Co-operation scheme) in modern industrial radiographic practice and the use of industrial X-ray plant.

MR. W. V. BINSTEAD, who has been with Northern Aluminium Company, Limited, for 16 years, 12 of which have been spent as welding and joining engineer in the sales development division, Banbury, has resigned to take up a similar appointment with the Saturn Oxygen Group of companies, operating from Downshire House, Roehampton Lane, London, S.W.15. His new appointment covers the whole sphere of light-alloy joining.

MR. B. G. L. JACKMAN, president of the Birmingham section committee of the Institution of Production Engineers, took the chair at a luncheon which followed the inauguration of a Worcester sub-section of the Institution, Mr. W. C. Puckey, national president attended, and stressed that the Institution aimed at serving the community by building up business and production for the benefit of all. The principal officers of the new sub-section are Mr. Richard Higgs, managing director of Richard Lloyd & Company, Tenbury Wells, chairman, and Mr. R. Wheeler, of Bourne Heath, near Bromsgrove.

Obituary

MR. CARTLIDGE, managing director of Gainsborough Enamelled Ware Company, Limited, Stourbridge, died recently.

MR. FELIX HARMER, who has died at the age of 55, joined Alfred Herbert, Limited, machine-tool makers of Coventry, as an apprentice in 1915. He specialized in die-casting machines and motor-body dies, and travelled widely for the firm.

MR. HARRY PHILLIPS, chairman and founder of Knowles Foundry, Limited, and a partner in the pattern making firm of Butcher & Phillips, John Harper Street, Wolverhampton, died on September 25 at the age of 75. Mr. Phillips was actively concerned in both firms up to the time of his death.

MR. WILLIAM MOSS, who had been a director of H. Frost & Company, Limited, manufacturers of pressings, castings, and machine tools, of Walsall, for the last 33 yrs. and its chairman since 1930, and a director of Taylor, Law & Company, Limited, kitchenware manufacturers, of Birmingham, has died at the age of 88. He was Mayor of Sutton Coldfield from 1942 to 1947.

THE DEATH is announced of MR. WILLIAM H. SAXTON, resident civil engineer of Dorman, Long's new Lackenby steel plant. Mr. Saxton, who was trained at Sheffield, where he took his degree as Bachelor of Engineering, had been on the engineering and constructional staff of Dorman, Long & Company, Limited, for over 20 yrs. He was a past chairman of the Northern Counties Branch of the Institution of Structural Engineers.

THE DEATH is recorded of MR. PERCY FOX-ALLIN, at the age of 82. Though primarily on the staff of the *Iron & Coal Trades Review*, he often acted as editorial representative for this JOURNAL. Just about 30 years ago, he made a survey of the facilities for teaching foundry metallurgy in this country, which appeared as a series of articles. Though primarily an expert on coal mining, he had been a foundry apprentice under the late Mr. F. J. Cook at Belliss & Morcom Limited. Fox-Allin was a great sportsman, a renowned amateur boxer, rugby footballer and swimmer. His hobbies were hunting, shooting, fishing and photography. He was naturally shy, and his overcoming of this gave an initial appearance of brusqueness, but this rapidly dispersed and real friendships were quickly formed. His eclectic mind would quickly grasp the essentials of all that was new in mining, metallurgy engineering and foundry practice for he belonged to an age when there was less specialization. By the older generation of these professions he will be long mourned.

Foundry to Move for Houses?

So that proposed housing plans can be carried out, Sedgley (Dudley) Urban District Council may require a firm to move, it was stated at a public inquiry at Sedgley last week. The owners of the land used by the firm (the Jockey Foundry & Engineering Co., Ltd.), objected to a compulsory purchase order by the Council to acquire two plots of land, on one of which the foundry were tenants, and on both of which they held an option to purchase. The company had occupied its site on a temporary basis since 1946.

The firm, it was stated, wanted to use part of the site for new offices, and a showroom, with two detached houses and a flat. At the rear several buildings would be taken down and a new foundry built. The Ministry's decision will be made known later.

Raw Material Markets

Iron and Steel

Business at the foundries varies appreciably. The light engineering trades and suppliers of domestic equipment have for some time been very quiet and in consequence their requirements of castings from the light foundries have been on a reduced scale. Formerly, these foundries received good support from the export market, but trade has dwindled to a fraction of previous requirements. Some slight improvement in home demands is noticed, and while this may be due to the need for replenishing depleted stocks of castings, it is hoped that it is the forerunner of an autumn revival in the trade. Many of the jobbing foundries are also affected, and both these and the light foundries are still striving to secure sufficient work to enable them to improve on present outputs, and so avoid short-time working. A fair tonnage of castings is being produced by the textile foundries, but they also are in need of work.

The high-phosphorus pig-iron which is utilized by the light, jobbing, and textile foundries is restricted in demand, although some improved buying has been forthcoming recently. Users of heavier castings, including makers of machine tools and power-plant equipment, steelworks, collieries, and the motor and allied trades, are indenting for good tonnages. This is enabling the engineering and specialized foundries to maintain good outputs, and the pig-irons which they use, mainly the low- and medium-phosphorus irons and hematite, are fully absorbed. Increased business would require larger supplies of these grades, which would be difficult to obtain from present outputs. Producers of hematite are compelled to ration available supplies to their customers and larger tonnages of the low- and medium-phosphorus irons could be disposed of.

The supply of steel semis to the re-rollers is equal to present demands. The re-rollers are not heavily engaged. Home orders for small bars, sections, and strip are on a fair level, but export business is needed to keep plants fully occupied, and this is practically negligible.

The reduction in the export price of steel plates has again revived speculations concerning the possibility of a revision of the whole structure of British steel prices. Production costs generally have been reduced, and there may be a margin for some price concessions to the home consumer. It may be inferred that the steel-plate position is a little easier, though it would be a mistake to conclude that this type of steel is in plentiful supply. Other finished steel products are more readily obtainable.

Non-ferrous Metals

There was little evidence in last week's trading on the Metal Exchange of any downward trend in the values of non-ferrous metals, but we must remember that all four now stand substantially below the prices which they at one time commanded. Zinc and lead have, of course, sustained a considerable fall this year, and although there is temporarily a shortage of high-grade zinc in this country, consumers are able to provision their works reasonably well. Lead is in fairly good demand and the difficulty over prompt metal seems to be coming right, for the backwardation is now a good deal less than it was earlier in the year or, indeed, only a few weeks ago.

Scrap is probably in the most difficult supply situation, for copper and brass are both scarce and prices have advanced materially. There appears to have been a marked improvement in the extruded brass rod trade, for the call for swarf and rod scrap is most insistent, dealers reporting that they could secure orders for twice as much metal if only they could get hold of it. As to copper, the scarcity of prompt refined material may well be compelling users to try to secure first-class scrap such as commutator bars, etc., to take its place.

Business on the Metal Exchange last week was fairly brisk, but rather patchy. Tin recovered some of the ground lost earlier and closed £3 15s. up for cash and £5 better for three months, but the backwardation remains; at the end of the week it stood at £10. Lead was, on the whole, steady, but the days of £95 and £96 for this metal seem to have gone now that the American price is no better than 13 cents. Zinc recovered from its lowest point under the spur of a good demand for high-grade metal and closed 25s. better for October and 15s. up for January. The backwardation increased to £2 10s. from £2 a week earlier. In spite of a cut of 25 to 50 points in the export price in the United States, which on Friday was quoted at 28.50 cents to 28.75 cents, the London market remained steady. Apart from some selling of three months, which widened the backwardation by 30s., there was no change in values on the week.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* October 1, £232 10s. to £237 10s.; October 2, £232 10s. to £237 10s.; October 5, £232 10s. to £237 10s.; October 6, £234 to 238; October 7, £235 to £237 10s.

Three Months: October 1, £222 to £222 10s.; October 2, £221 to £221 10s.; October 5, £222 10s. to £223; October 6, £224 to £225; October 7, £223 10s. to £224 10s.

TIN, Standard—*Cash:* October 1, £611 to £612 10s.; October 2, £605 to £607; October 5, £610 to £612; October 6, £614 to £615; October 7, £608 to £610.

Three Months: October 1, £602 to £603; October 2, £597 10s. to £600; October 5, £601 to £602 10s.; October 6, £603 to £604; October 7, £597 to £598.

ZINC—*October:* October 1, £70 15s. to £71; October 2, £71 10s. to £72; October 5, £72 5s. to £72 10s.; October 6, £73 to £73 10s.; October 7, £74 to £74 5s.

January: October 1, £68 15s. to £69; October 2, £69 to £69 10s.; October 5, £69 10s. to £69 15s.; October 6, £70 to £71; October 7, £71 10s. to £71 15s.

LEAD—*October:* October 1, £92 10s. to £92 12s. 6d.; October 2, £91 15s. to £92; October 5, £90 15s. to £91; October 6, £91 5s. to £91 10s.; October 7, £91 to £91 2s. 6d.

January: October 1, £89 to £89 5s.; October 2, £89 to £89 5s.; October 5, £88 to £88 5s.; October 6, £88 10s. to £89; October 7, £88 10s. to £88 15s.

Private Trading in Magnesium

Lord Woolton, Chancellor of the Duchy of Lancaster and Minister of Materials, has decided, after consultation with the industry, that private trading in magnesium shall be restored on January 1, 1954. As from that date the Ministry of Materials will cease to trade in magnesium and the Magnesium Distribution Order, 1951, will be revoked. Private importation will be permitted and applications for import licences should be addressed to the Import Licensing Branch, Board of Trade.

Public trading in magnesium was reintroduced in 1951 because of the serious shortage which had developed throughout the world as a result of rearmament. Supplies are now such, it is officially stated, that the requirements of the United Kingdom can be met through normal trade channels.

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

(Delivered unless otherwise stated)

October 7, 1953

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £13 18s. 0d.; Birmingham, £13 11s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £16 14s. 6d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £17 0s. 3d.

Scotch Iron.—No. 3 foundry, £16 11s. 0d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £18 3s. 0d.; South Zone, £18 5s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £19 3s. 0d.; South Zone, £19 5s. 6d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £16 12s. 0d.; Scotland (Scotch iron), £16 18s. 6d.; Sheffield, £17 13s. 0d.; Birmingham, £17 19s. 6d.; Wales (Welsh iron), £16 18s. 6d.

Basic Pig-iron.—£14 6s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered).

Ferro-silicon (6-ton lots).—40/55 per cent., £53 10s. 0d., basis 45 per cent. Si, scale 21s. 6d. per unit; 70/84 per cent., £82 10s. 0d., basis 75 per cent. Si, scale 23s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. 0d. to 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £165 0s. 0d. to £181 0s. 0d. per ton; 38/40 per cent., £229 0s. 0d. to £235 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 20s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 23s. 3d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s. 0d., basis 60 per cent. Cr, scale 28s. 3d. per unit; 6/8 per cent. C, £80 17s. 0d., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. 2d. per lb. Cr; max. 1 per cent. C, 2s. 2½d. per lb. Cr; max. 0.15 per cent. C, 2s. 3½d. per lb. Cr; max. 0.10 per cent. C, 2s. 3¾d. per lb. Cr; max. 0.06 per cent. C, 2s. 4d. per lb. Cr.

Cobalt.—98/99 per cent., 20s. 0d. per lb.

Metallic Chromium.—98/99 per cent., 6s. 3d. to 6s. 9d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 40s. 0d. to 70s. 0d. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 12s. 6d.; tested, 0.08 to 0.25 per cent. C (100-ton lots), £26 2s. 6d.; hard (0.42 to 0.60 per cent. C), £28 0s. 0d.; silico-manganese, £33 16s. 0d.; free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s. 0d.; case-hardening, £33 0s. 0d.; silico-manganese, £34 17s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic soft up to 0.25 per cent. C, £29 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 0s. 0d.

Sheet and Tinplate Bars.—£25 11s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast). £30 6s. 6d.; boiler plates (N.-E. Coast), £31 14s. 0d.; floor plates (N.-E. Coast), £31 15s. 6d.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £28 9s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £32 4s. 6d.; flats, 5 in. wide and under, £32 4s. 6d.; hoop and strip, £32 19s. 6d.; black sheets, 17/20 g., £41 6s. 0d.; galvanized corrugated sheets, 24 g., £49 19s. 6d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £51 14s. 3d.; nickel-chrome, £73 3s. 6d.; nickel-chrome-molybdenum, £80 18s. 3d.

Tinplates.—57s. 9d. per basis box.

NON-FERROUS METALS

Copper.—Cash, £235 0s. 0d. to £237 10s. 0d.; three months, £223 10s. 0d. to £224 10s. 0d.; settlement, £237 10s. 0d.

Tin.—Cash, £608 0s. 0d. to £610 0s. 0d.; three months, £597 0s. 0d. to £598 0s. 0d.; settlement, £609 0s. 0d.

Zinc.—October, £74 0s. 0d. to £74 5s. 0d.; January, £71 10s. 0d. to £71 15s. 0d.

Refined Pig-lead.—October, £91 0s. 0d. to £91 2s. 6d.; January, £88 10s. 0d. to £88 15s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £101 0s. 0d.; rolled zinc (boiler plates), all English destinations, £98 5s. 0d.; zinc oxide (Red Seal), d/d buyers premises, £87 0s. 0d.

Other Metals.—Aluminium, ingots, £150 0s. 0d.; magnesium, ingots, 2s. 10½d. per lb.; antimony, English, 99 per cent., £225 0s. 0d.; quicksilver, ex warehouse, £64 15s. 0d.; nickel, £483 0s. 0d.

Brass.—Solid-drawn tubes, 22½d. per lb.; rods, drawn, 32d.; sheets to 10 w.g., 239s. 0d. per cwt.; wire, 29⅜d.; rolled metal, 235s. 9d. per cwt.

Copper Tubes, etc.—Solid-drawn tubes, 27½d. per lb.; wire, 267s. 0d. per cwt. basis; 20 s.w.g., 296s. 0d. per cwt.

Gunmetal.—Ingots to BS. 1400—LG2—1 (85/5/5/5), £170 0s. 0d. to £180 0s. 0d.; BS. 1400—LG3—1 (86/7/5/2), £180 0s. 0d. to £195 0s. 0d.; BS 1400—G1—1 (88/10/2), £252 0s. 0d. to £285 0s. 0d.; Admiralty GM (88/10/2), virgin quality, £252 0s. 0d. to £300 0s. 0d. per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £265 0s. 0d. to £295 0s. 0d.; L.P.Bl, £215 0s. 0d. to £240 0s. 0d. per ton.

Phosphor Bronze.—Strip, 351s. 9d. per cwt.; sheets to 10 w.g., 373s. 6d. per cwt.; wire, 44⅛d. per lb.; rods, 38⅜d.; tubes, 37d.; chill cast bars: solids 40d., cored 41d. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × .056, 3s. 0¼d. per lb.; round wire, 10g., in coils (10 per cent.), 3s. 5¼d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 4¼d. All prices are net.

Forthcoming Events

OCTOBER 12

Incorporated Plant Engineers

Dundee branch:—"Factory Instrumentation," 7.30 p.m., at Mathers Hotel.

Institution of Works Managers

Manchester branch:—"Man Management," by S. Waugh, 6.45 p.m., at the Grand Hotel.

Purchasing Officers' Association

London branch:—"The Commercial Relationship between Great Britain and the Commonwealth of Australia," by the Australian Government Senior Trade Commissioner, 6.45 p.m., at the Royal Society of Arts, John Adam Street, London, W.C.2.

OCTOBER 13

Incorporated Plant Engineers

Manchester branch:—"The plant maintenance team's visit to the U.S.A.," by Colin Troup, 7.15 p.m., at the Engineers' Club, Albert Square.

Institute of British Foundrymen

Slough section:—"Shell Moulding," by J. Fallows, 7.30 p.m., in the lecture theatre of High Duty Alloys, Limited, Slough.

Institution of Works Managers

Birmingham branch:—"Training for management—the line of succession," by C. D. Law, 7 p.m., at the Grand Hotel.

Merseyside branch:—"Mechanical Handling," by L. Landon Goodman, 6.30 p.m., at the Adelphi Hotel, Liverpool.

OCTOBER 14

Incorporated Plant Engineers

East Midlands branch:—"The Works Engineer and the Factories Act," by H.M. District Inspector of Taxes, 7 p.m., in the demonstration theatre, East Midlands Gas Board showrooms, Parliament Street, Nottingham.

Institute of British Foundrymen

South African branch:—Visit to the South African Broadcasting Corporation by members and wives.

West Riding of Yorkshire branch:—"Brains Trust," 7.30 p.m., at the Technical College, Bradford.

Purchasing Officers' Association

Wessex branch:—Open discussion Meeting, 7 p.m., at the Westinghouse Brake & Signal Company, Limited, Chippenham.

OCTOBER 15

Institute of British Foundrymen

East Midlands branch, Northampton and District:—Film, "Plan for a Foundry," 7.30 p.m., by the Ford Motor Company. Meeting to be held at Wellingborough.

OCTOBER 16

Institution of Mechanical Engineers

General meeting, Presidential address by A. Roebuck, 5.30 p.m., Storey's Gate, St. James's Park, S.W.1.

Manchester Association of Engineers

"The formation and prevention of atmospheric contamination in factories," by W. A. Attwood, 6.45 p.m., at the Engineers' Club, Albert Square, Manchester, 2.

North-east Metallurgical Society

"The production and properties of titanium," by N. P. Inglis, 7.15 p.m., at the Constantine Technical College, Middlesbrough.

Another Large Steel Casting

A steel casting, believed to be the largest ever made in Scotland, was transported last Friday from Wm. Beardmore's foundry at Parkhead, Glasgow, to Queen's Dock on the first step of its journey to the United States. The casting weighs 132 tons, and will form part of a gigantic new type of press being used in the American defence programme. The largest casting previously made by Beardmore's weighed in the region of 80 tons when finished. Special arrangements have to be made for castings of this order, and four melting furnaces had to be synchronized. Since the metal was melted in a separate part of the firm's premises, and three 60-ton ladles and one 40-ton ladle of molten metal had to be transported across Shettleston Road, the transport and casting procedure was carefully rehearsed.

NOTICE

Replies to Box Numbers to be addressed to "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS WANTED

FOUNDRY MANAGER / FOREMAN, desires position, 30 years' ferrous experience, would consider position as Foundry Production Troubles Investigator. Write—Box 3808, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, age 36, A.M.I.B.F., desires change. Practical man with technical training. Experienced in heavy, medium and light engineering foundries, mechanised and jobbing. Sand, metal control, greensand, drysand and loam moulding.—Box 3807, FOUNDRY TRADE JOURNAL.

METALLURGIST/FOUNDRY MANAGER requires position. Experienced all aspects of iron foundry work, production of grey, refined and alloy cast irons, and steel. Minimum salary £850. Small foundry, Yorks./Lancs. area preferred.—Box 3810, FOUNDRY TRADE JOURNAL.

GENTLEMAN, with good connections in Engineering Trades and long experience of Technical Sales and administration in Foundry trade is open to entertain offers affording scope for exercise of ability, knowledge and experience. Excellent credentials.—Box 3811, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, aged 38, M.I.B.F., City and Guilds, experienced, ferrous and non-ferrous, loose pattern and mechanised, used to complete control, buying, selling, and production. excellent references.—Box 3787, FOUNDRY TRADE JOURNAL.

PRACTICAL REPRESENTATIVE, M.I.B.F., 30 years' experience in all branches as Works Manager and Technical Representative, requires position. Well known to Foundry Managements, particularly North England and Scotland. Fully capable of demonstrating where necessary. —Box 3785, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, 45, wishes change, present position full control jobbing and semi mechanised foundries. Experienced all branches iron and non-ferrous, heavy jobbing, repetition, and mechanised plants, estimating, costing and sales,—Box 3783, FOUNDRY TRADE JOURNAL

FOUNDRY EXECUTIVE. Grey iron—high duty, and alloyed. Also non-ferrous. Capable administrator, used to large and small castings. Loose pattern and mechanised production, also loam and strickle work. 6 years' sales experience. Seeks change, view to permanency. Age 46. M.I.B.F.—ROBINSON, 52, Lyndhurst Road, Erdington, Birmingham, 24.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order* 1952.

DRAUGHTSMAN required, preferably with experience of Gravity Dies, Pressure Dies or Plastic Moulds.—Apply JOHN DALE, LTD., London Colney, Herts.

SITUATIONS VACANT—*contd.*

NORTH YORKSHIRE STEEL FOUNDRY requires experienced SAND CONTROLLER, to start and run his own sand control organisation.—Box 3797, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, must be expert in chill cast yellow metal rods and cored bars, for sole charge of Foundry. Apply with full details to—"CHAIRMAN" METALS & ALLOYS LTD., Minworth, Birmingham.

METALLURGICAL CHEMIST, 22-25 years of age required, with some experience of ferrous and non-ferrous analyses. Near Bradford, Halifax and Huddersfield.—J. BLAKEBOROUGH & SONS LTD., Brighouse, Yorkshire.

METALLURGICAL CHEMIST required. Preferably with Foundry experience.—Apply, stating age, experience, and salary required, to THE PERSONNEL MANAGER, Fairbairn Lawson Combe Barbour, Ltd., Wellington Foundry, Leeds, 1.

SUPERINTENDENT required for Mechanised Foundry in West Midlands engaged on light castings production. Applicants should have experience in all sections of the above class of work, from Cupola to Dressing Shop, and be able to control labour and plan production. Age about 30-35.—Full particulars of training and experience to Box 3799, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Foundry attached to large Engineering Works, Glasgow district, handling general engineering and pressure castings. The duties would be complete charge of Cast Iron and Brass Foundries and also Pattern Shop. Successful applicant must have proved himself competent in position of similar responsibility. Four figure salary, superannuation scheme, and excellent prospects.—Box 3795, FOUNDRY TRADE JOURNAL.

WELL-KNOWN Group of Midland Ironfounders require first-class TECHNICAL AND SALES REPRESENTATIVE, for the South Wales area.

Also a REPRESENTATIVE for the North-East Coast.

Only applications of proved experience in the sales of all types of Grey Iron Castings will be considered. The position is a permanent one and is subject to the Company's Contributory Pension Scheme.—Box 3796, FOUNDRY TRADE JOURNAL.

A LONDON Foundry, producing high duty iron castings, requires a young man as PERSONAL ASSISTANT to the Works Director. Applicants should be between 25-33 years of age, and possess a good general and technical education and practical experience. This is a new appointment and offers excellent prospects for a suitably qualified man who has initiative and can assist in production and administrative problems.—Box 3775, FOUNDRY TRADE JOURNAL.

MEN with good experience of selling Foundry Products required to act as LOCAL SALES REPRESENTATIVES by progressive foundry manufacturing Grey Iron and High Duty Iron Castings. A good salary will be paid to the right man. Replies, which will be treated in confidence, should give full details, including age, experience, employers, and areas in which the applicant has operated. —Box 3780, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

NORTH YORKSHIRE STEEL FOUNDRY requires METHODS ROOM ENGINEER, to start and run new methods room organisation.—Box 3797, FOUNDRY TRADE JOURNAL.

FOUNDRY METALLURGIST required as assistant for new Shell-Moulding Foundry, to be set up in the Midlands, State full particulars of previous experience, age and salary requirments.—Box 3813, FOUNDRY TRADE JOURNAL.

FIRST-CLASS Enamelling Manager required by Vitreous Enamellers in Australia. Must have experience in running large production shop (cookers, hollowware and flat work) and high technical knowledge. Membership I.V.E. an advantage. Salary to be negotiated. First-class passages applicant and family.—Box 3806, FOUNDRY TRADE JOURNAL.

JUNIOR FOREMAN required by large Foundry on North-East Coast. Experience in mechanised and semi-mechanised greensand work essential. Applications giving salary required, age, experience, etc., to,—COCHRANES (MIDDLESBRO') FOUNDRY LIMITED, Ormsby Iron Works, Middlesbrough.

FOREMAN required by North-East Coast Iron Foundry. Experience in the manufacture of Cast Iron Pipe Specials in loam, greensand and drysand is required. Apply giving full details of previous experience and salary required to—COCHRANES (MIDDLESBRO') FOUNDRY LIMITED, Ormesby Iron Works, Middlesbrough.

SUDAN GOVERNMENT

THE Sudan Railways require a FOUNDRY FOREMAN, aged 28-45, for service in the Sudan for the supervision of the Railways Jobbing Foundry engaged on the production of cast iron and non-ferrous metals and the control of the mixing of such metals.

Applicants must have served an apprenticeship and had good subsequent experience in a good general foundry. A new foundry has been approved and it is intended to install power machine moulding. Candidates with knowledge of machine and shell moulding also other modern practices and able to introduce such systems would have preference.

Appointment will be on Short Term Contract (with bonus) determinable at any time by six months' notice on either side provided that on or after 1st April, 1955 the period of notice shall be three months and not six. Salary scale ranges from £E.800 to £E.1,350 (annual increases of £E.50). A cost of living allowance which is reviewed quarterly is also payable. There is at present no income tax in the Sudan. Outfit allowance of £E.50 is payable on appointment. Annual leave after the first tour.

Further details and application form will be sent on receipt of a postcard only addressed to The Sudan Agent in London, Sudan House, Cleveland Row, St. James's, London, S.W.1, quoting "Foundry Foreman 1921" and name and address in block letters.

AGENCY

N.W. LONDON Foundry, producing non-ferrous sand castings, wishes to contact Executives or Representatives of ferrous or die casting concerns with view to increasing contacts on reciprocal basis. Remunerative commission terms. Confidential.—Box 3798, FOUNDRY TRADE JOURNAL.

AGENCIES—*contd.*

TRAVELLERS or REPRESENTATIVES required, already calling upon Foundries, for sale of high-class PLUMBAGO. Good commission.—Write Box 3801, FOUNDRY TRADE JOURNAL.

AGENT, with excellent connection in Midlands Foundries for Foundry Requisites and Sundries, requires further Agencies, on commission basis.—Box 3802, FOUNDRY TRADE JOURNAL.

PROPERTY FOR SALE

SMALL, BLACK COUNTRY FOUNDRY; Grey Iron; well laid out; fully equipped; floor and stump moulding. Low figure for quick sale.—Box 3713, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

WANTED.—Pallet Conveyor Tracks. Approximately 250 ft.—Box 3779, FOUNDRY TRADE JOURNAL.

WANTED.—Core Sand Mixer, of rotary or trough type, preferably with motor attached. State price, condition, and where to be seen.—ERIFO, LTD., Manor Road, Erith.

WANTED.—TWO Pneumatic Squeeze-Pin Lift Type Moulding Machines. Please state price and where can be inspected.—Box 3804, FOUNDRY TRADE JOURNAL.

AIRLESS Shot Blast Machine wanted, with rotary table 6 ft. to 8 ft. diam.; new or secondhand.—Box 3803, FOUNDRY TRADE JOURNAL.

WANTED.

Pallett Conveyor. Plates about 3 ft. by 2 ft.
Pneumatic Jolt Moulding Machine. Table approx. 21 in. by 17 in.
Core Drying Stoves. Fitted panel front trays, gas fired, approx. 3 ft. 6 in. by 3 ft. 6 in. by 5 ft. 6 in.
Rotary Blower. 1,400 c.f.m., 7 lbs. p.s.i.
Air Compressor. 2,000 c.f.m., 30 lbs. p.s.i.
Sand Mills up to 6-ft. dia. pan.
Exhaust Fans and Blowers. All sizes.

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E.,
Hainge Road, Tividale, Tipton, Staffs.

MACHINERY FOR SALE

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. BREALEY (MACHINERY), LTD., Misterton, nr. Doncaster. Tel.: Misterton 202.

2 GREEN'S Oil-fired Furnaces. Lift-out crucible type; 150-lb. capacity. Complete with fans, motors and starters for 440/3/50. Purchased Jan., 1953; cost £340. Price £120 each.—SYDNEY ALUMINIUM CO., LTD., Sandy Lane, Lowton-St. Mary's, Lancs.

MACHINERY FOR SALE—*contd.*

FOR THE DISPOSAL AND PURCHASE OF ALL TYPES OF FOUNDRY PLANT AND MACHINERY.

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E.,
Hainge Road, Tividale, Tipton, Staffs.
TIPton 2448.

30 in. Metal Band Saw. Motorised, 400/3/50.
Pneulec Herman Rollover Moulding Machine. 750 lbs. capacity.
3 ft. 6 in. Cupola. Drop bottom type. Reconditioned.
2 ft. 6 in. Cupola. New and unused.
100 lbs. Bale-out Furnace. Oil fired. Complete.
3 h.p. Low Pressure Blower. 8 in. diam. outlet.
Four ½-Ton Wharton Pulley Blocks, with carriage. New, unused.
Two 5-cwt. Wharton Electric Hoist Blocks, with Pull travel carriage. 400/3/50.
3-Ton Morris Electric Hoist, including power travel. 400/3/50.

FRANK SALT & CO., LTD.,
Station Road, Blackheath, Staffs.

Morgan Crucible Tilting Furnace. 250 lb. cap. Gas, oil, with fan.
Polishing Barrel. 36 in. by 24 in. across flats, belt driven.
Adaptable Moulding Machine, with turnover attachment for 14 in. by 14 in. boxes.
Taylor's 874 Belt Driven Medium Double Headed Brassfinishers.
Milling Machine, with rapid dividing capstan.
Brassfinishers' Lathes. 7 in., 4 ft. 6 in. beds, complete with 2-jaw chucks.
NICHOLSON & WEST, LTD., Gaol Lane, Halifax. Tel. 3224.

THE BRITISH SHOTBLAST & ENG. CO., LTD., 772/4, Chester Road, Stretford, Lancs., have for disposal ONE SECONDHAND CABINET SHOTBLAST PLANT. Complete with Pressure Unit, Dust Arrester, Exhaust Fan-Motor and Starter. Also ONE TUMBLING BARREL SHOTBLAST PLANT, with Pressure Unit, Dust Arrester, Exhaust Fan, Motor and Starter.
Both these Plants have been taken in part exchange for larger new plants, and have been reconditioned in our works the equal of new.
Both Plants can be viewed at any time to suit your convenience.

Cupolette. 3 ft. dia., on legs.
Cupola, 6-ton cap. Excellent condition, with new lining bricks.
Cupola, 4-ton cap., with new lining bricks.
B.M.M. RD3. Jolt Squeeze Turnover Moulding Machine. 60 in. by 86 in. table.
Sand Slinger, "Senior" size, by Foundry Equipment.
Steel Converters. 2-ton cap., with Cupolas Screenarators, Models E. and S.
Pneulec Royer Sand Throwers. No. 2 size.
Ladles up to 20 tons.
7½- and 2-ton Monorail Hoists, power travel.
Webster & Bennett 24 in. Vert. Boring Mill. Excellent condition.
7-ton E.O. Travelling Crane, cabin controlled, 38-ft. span, low price.
5-ton E.O. Travelling Crane, cabin controlled. 58-ft. span,

S. C. BILSBY, A.M.I.C.E., A.M.I.E.E.,
Hainge Road, Tividale, Tipton Staffs.
TIPton 2448.

MACHINERY FOR SALE—*contd.*

600

CRANES.

NEW 10-ton Rushworth two-motored Electric Derrick Crane, with 120-ft. Jib. Motorized 400/3/50.

New 5-ton Rushworth two-motored Electric Derrick Crane, with 120-ft. jib. Motorized 400/3/50.

Anderson-Grice 5-ton two-motor Electric Derrick Crane, new 1950. With 120-ft. steel jib and complete with B & A automatic safe load indicator. Visible and audible warnings. Motorized 400/3/50.

Several new Rushworth, 2, 3 and 5-ton capacity Hand Derrick Cranes, with 50-ft., 60-ft. and 70-ft. Jibs.

Two Tate 6-ton, 4 motor, Electric Mobile Cranes, fully slewing and fed by overhead cable. Mounted on 4 twin solid-tyred wheels, fitted 24-ft. lattice cantilever jibs. Complete with cabs and suitable for 415/3/50.

Jones "Super" 40, 3-ton Mobile Cranes, fitted 30-ft. lattice Jibs, and powered by Ruston or Turner Diesel Engines. Mounted on crawlers and each complete with Cab.

Several Jones "Super" 22, 2-ton Mobile Cranes, fitted Cantilever Jibs, and powered by Ruston or Turner Diesel Engines. Mounted on pneumatic tyred wheels and each complete with Cab.

3½/5-ton Portal Wharf Crane by Derrick & Hoist Construction Co. Rail centres 15 ft. Length of Jib 64 ft. 5-motored, voltage 440/3/50. Weight approx. 70 tons.

New B. H. & C. "Pingon" 30/100-cwt. Tower Cranes. Practically self-erecting, load handled along full length of jib, no load swing, instantaneous control. Lifts up to 129 ft. outreach to 82 ft.

New Portable House Building Crane, by The British Hoist & Crane Co. Will lift 10 cwt. at 17 ft., 5 cwt. at 35 ft. radius. Lifts up to 48 ft. Easily erected by two men.

New Brayda Electric Tower Cranes, 1½-ton at 65 ft. radius, max. load 69 cwt. max. height of hook 130 ft.

GEORGE COHEN

SONS & CO., LTD.

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DELIVERY EX STOCK

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

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MACHINERY FOR SALE—*contd.*

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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.

FOR SALE.

Two Morgan Oil-fired Furnaces, type LA, for non-ferrous metals. ½-ton capacity. Tilting gear—one right-, one left-hand. With motor and fan, 400/3/50. £250 each.

Two standard "Adaptable" Squeeze Moulding Machines. Take plates 12 in. by 20 in. wide, 5 in. pattern draw, 24 in. between squeeze rods. As new. £55 each.

One "Grief" D/E. Dry Grinder. 16 in. by 2 in. wheels, on C.I. base. Motor belt driven by 7½ h.p., 400/3/50, motor in base. 1½ h.p. fan motor. £100.

One "Stockbridge" 14 in. stroke Shaper. 14 in. by 12 in. by 12 in. box table. 4-step cone pulley drive. Overhead c./shaft, with f. and l. pulleys. £60.

One "Covel" No. 15 hand feed Surface Grinder. Capacity 20 in. by 6 in., 10 in. dia. wheel. Built-in motor drive. 400/3/50. P.B. starter, isolator switch. 14 in. by 6 in. Eclipse Magnetic Chuck. £160.

One "Capco" motorised hand feed Surface Grinder. 400/3/50. 6½ in. by 20½ in. travel. 10 in. rise and fall. £50.

One 6 ft. by 2 ft. "Cunliffe & Croom" Planer. 30½ in. between pillars, 34½ in. under bridge. 15 h.p. L.D.C. motor and starter, 400/3/50. £450.

All prices ex-works.

GILLETT & JOHNSTON, LTD.,
Whitehorse Road, Croydon, Surrey.

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MACHINERY FOR SALE—*contd.*

ALBION (TWW) WORKS

FOUNDRY PLANT AND EQUIPMENT.

MOULDING MACHINES.

BMM. RD.5 JOLT SQUEEZE TURNOVER. Cap. 1,300 lb., pattern draw 12 in.; table, 48 in. by 30 in. Very good condition.

BMM. HPL.2 JOLT SQUEEZE STRAIGHT DRAW. Cap. 400 lb., pattern draw 9 in.; table 30 in. by 21 in.

C/WALLWORK on JOLT SQUEEZE PATTERN DRAW. Cap. 600 lb., pattern draw 10 in.; max. size boxes, 20 in. sq. or 25 in. by 12 in.

C/WALLWORK/WT562C JOLT SQUEEZE TURNOVER. Cap. 800 lb. pattern draw 10½ in.; table, 35 in. by 24 in.

C/WALLWORK R.2 CORE BLOWER.

FORWARD FOUNDRY SAND RIDDLE. Tripod type.

150/200 lb. ALUMINIUM BALE OUT FURNACE.

HALF-TON CENTRAL AXIS TILTING FURNACE.

BELT AND MOTOR DRIVEN RUMBLING BARRELS.

GEARED FOUNDRY LADLES. Up to 4 tons cap.

AIR COMPRESSORS OF ALL TYPES IN STOCK. 2 c.f.m. to 3,000 c.f.m.

THOS W. WARD LTD.
ALBION WORKS : SHEFFIELD
Phone 26311 'Grams: "Forward."
Remember . Wards might have it!

NEW Centre Axis Tilting Furnace. 600 lbs. Oil-fired, with Morgan Oil Burner and new Keith Blackman A.C. Blower. £375.

NEW motorised Ingersoll-Rand three cylinder, air cooled, two-stage Compressor with inter-cooler. £200.

Coleman Core Blowing Machine, seen little use, condition as new, size R2. £375.

Portable Electric Sieve, A.C. motorised. £33.

Fordath Senior Sand Drier. £85.

Also August Sand Drier. £30.

Over 40 Bale-Out Furnaces in stock, cheap.

Large stock of Air Receivers at reasonable prices.

New Broomwade Compressors.

New Keith Blackman Fans.

Morgan Tilting Furnaces.

Two new ½ ton aluminium capacity Lip Axis Tilting Furnaces by British Furnaces.

Immediate attention to all enquiries.

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

MACHINERY FOR SALE—*contd.*

PAN MILLS 4 ft. and 5 ft. dia. under-driven, stationary pans, self-discharging new, for delivery from stock.—W. & A. A. BREALEY (MACHINERY), LTD., Misterton, nr. Doncaster. Tel.: Misterton 202.

LADLES.

12-ton Crane Ladle. Less gearing.
5-ton Geared Crane Ladle.
30-cwt. Geared Crane Ladle.
10-cwt. Geared Crane Ladle.

FRANK SALT & CO., LTD.,
Station Road, Blackheath, Staffs.

FOR SALE.—70 Sterling Steel Moulding Boxes, 19½ in. pin centres, 7 in. deep, 16½ in. inside, beading top and bottom, fitted with double lugs, drilled for ¾ in. dia. pins, two central lifting handles, and wedge clamping keys. In very good condition.—ARTHUR LYON & CO. (ENGRS.), LTD., Park Works, Stamford, Lincs.

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.

WEST RIDING OF YORKSHIRE.—Huddersfield Foundry has capacity for Light, Medium, and Heavy Castings up up to 4 or 5 tons. Engineering castings a speciality. All enquiries will receive immediate attention.—Box 3765, FOUNDRY TRADE JOURNAL.

H. C. HOPPER (Kingston) Ltd.
HAMPDEN ROAD, KINGSTON.
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PATTERNS (Wood & Metal)
CASTINGS (Iron & Non-Ferrous)
GEAR CUTTING
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All at our

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WASHED FINE SILICA SAND — for shell moulding — over 50% minus 100's mesh
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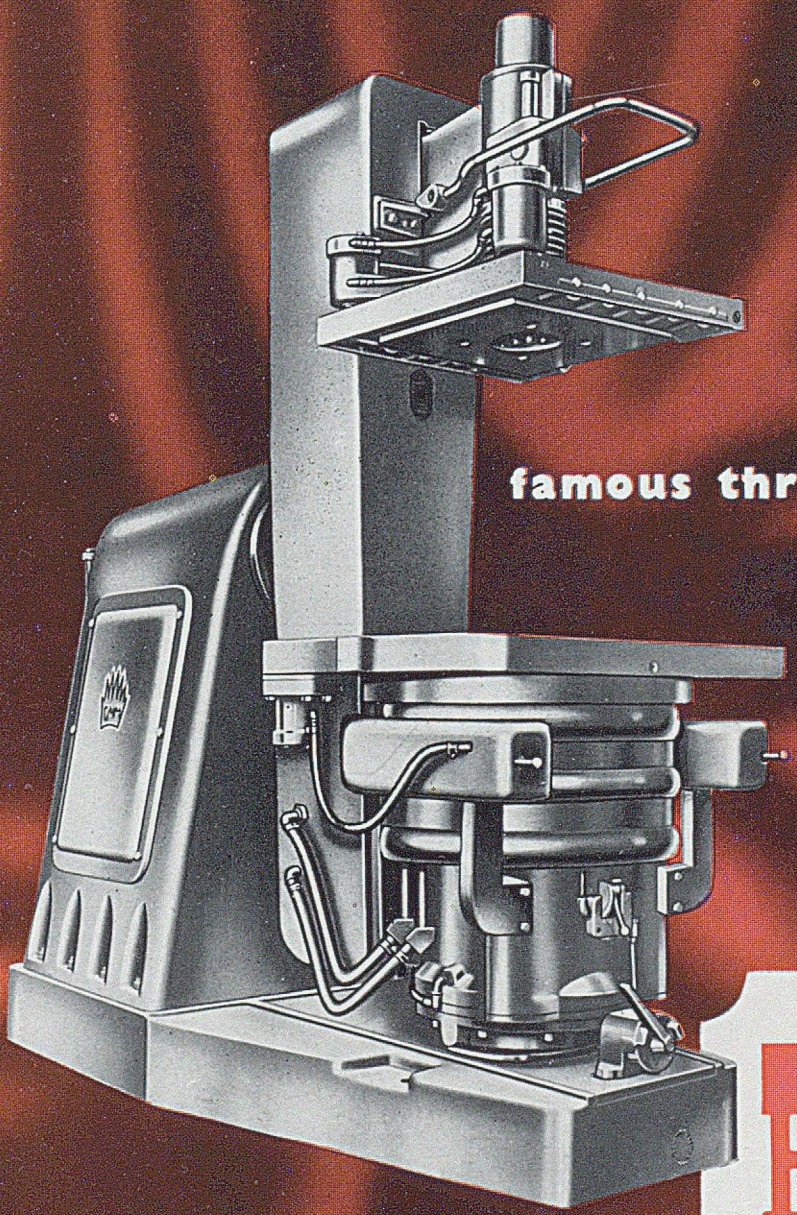

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FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 95
No. 1936
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

OCTOBER 8, 1953

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

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