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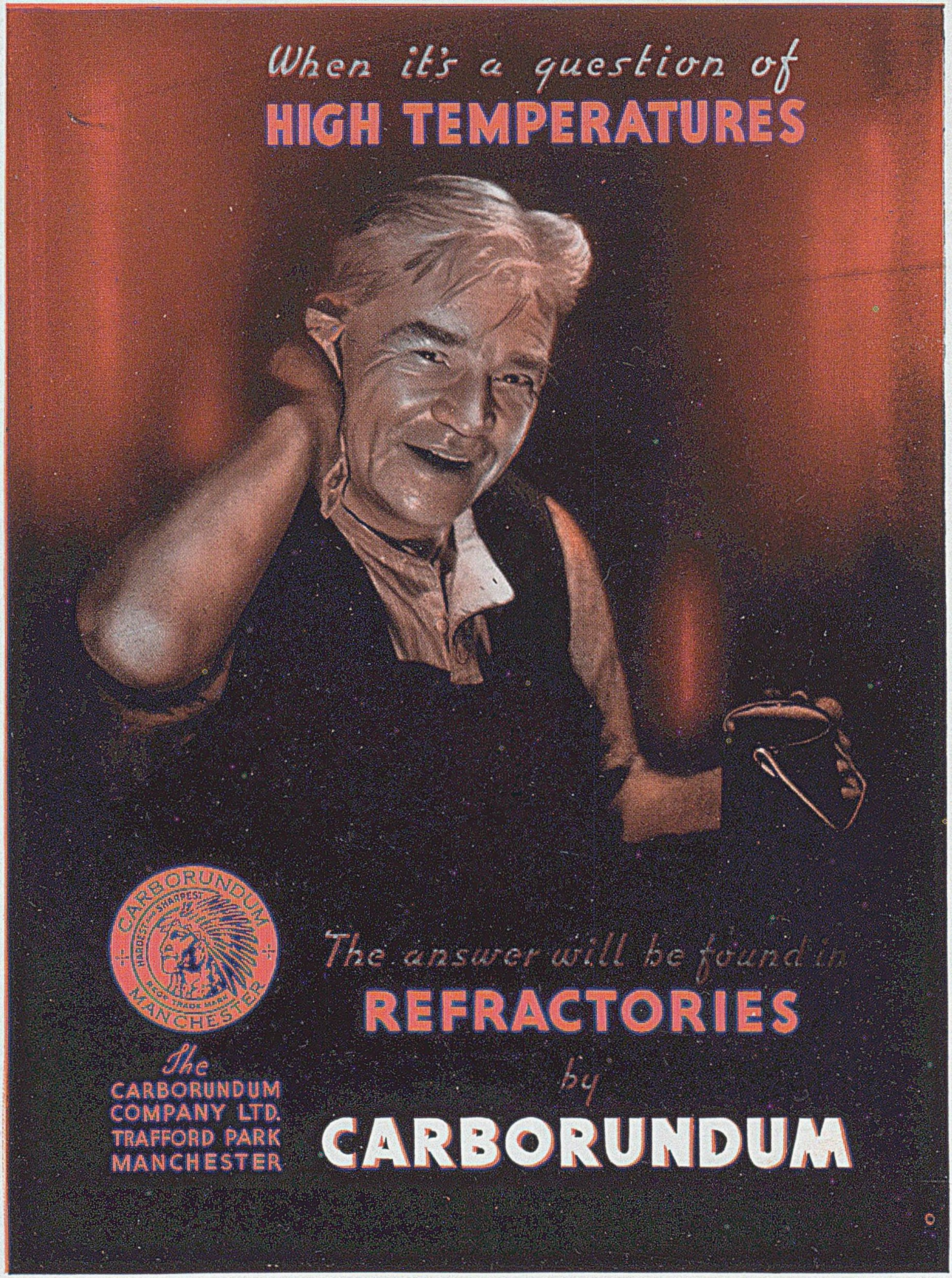
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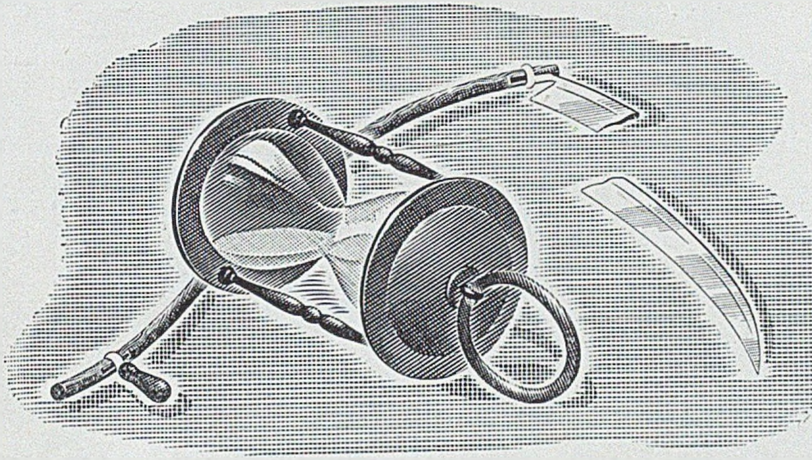

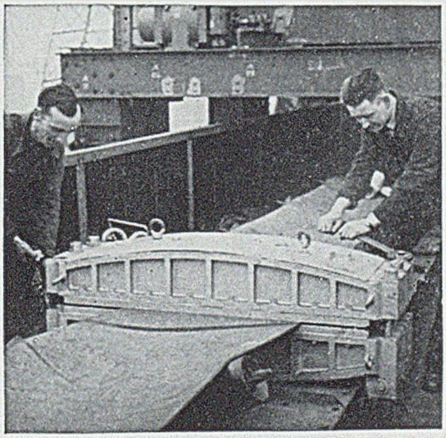


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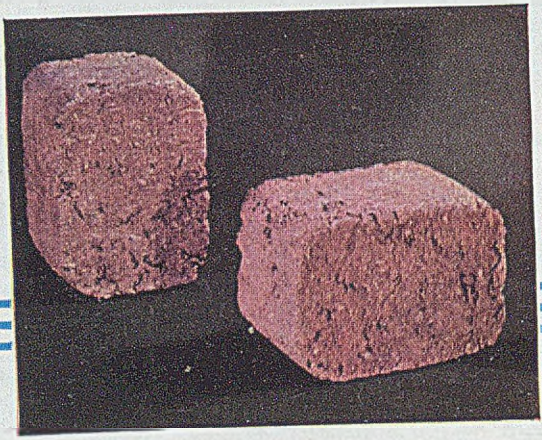

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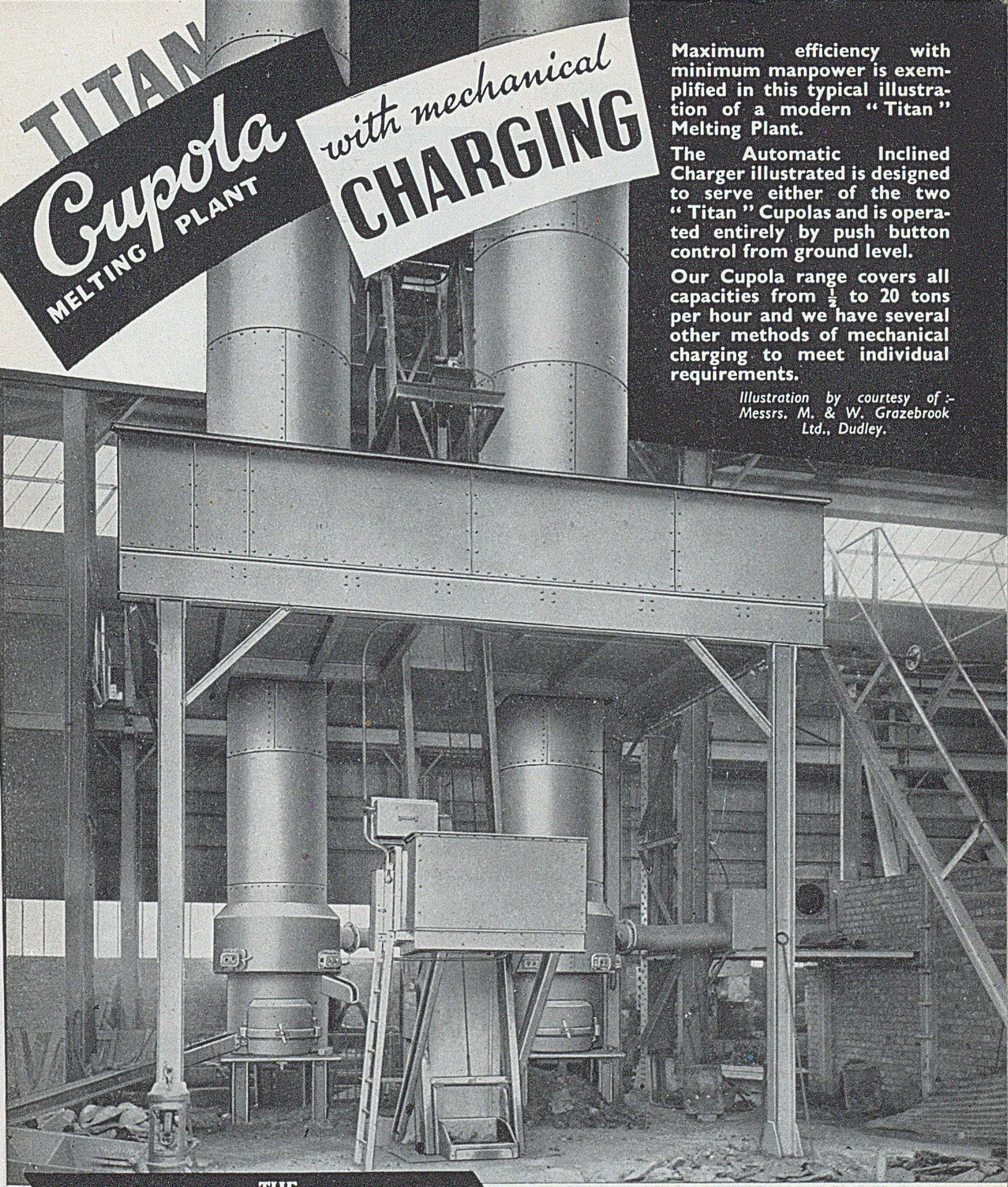

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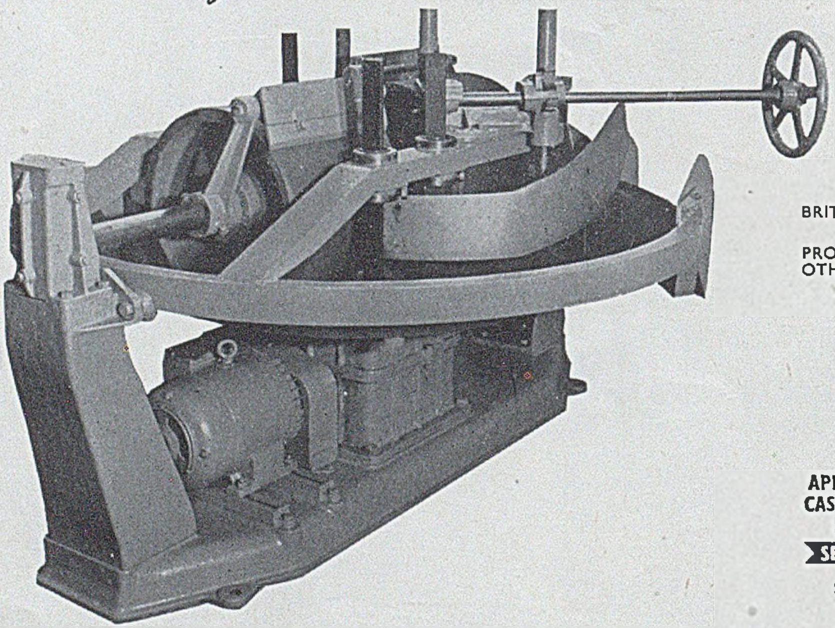

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Established 1902

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1949 Factory Report

The dispute in the printing trade is given as the reason for the delay in publication of this Report. Last year, it was available in January. It is pleasing to note that again there were fewer accidents (479 fewer non-fatal accidents and nine fewer fatal than in 1948). This amounts to a reduction of over 800 in two years in the former class and reflects credit both to the foundry industry and to the Factory Department. The actual statistics relating to the years 1945 to 1949 are:—*Non-fatal:* 11,947; 13,225; 12,884; 12,482, and 11,003. *Fatal:* 36, 31, 27, 29 and 20. There is a regrettable increase in the deaths of persons engaged in metal grinding (from 8 to 14) and in the fettling of steel castings (from 13 to 18). Sand blasting—surely by this time the name should be changed to shot blasting—has remained constant at an average of five over the last five years. This year the Chief Inspector has devoted more than a page to accidents resulting from the operation of die-casting machines, as no fewer than 40 cases were reported. Last year we commented with some surprise that 7½ pages were devoted to the iron founding industry. Now this has grown to over 11 pages, and is by far the largest of any section included in the make-up. Whether the industry should be flattered or worried because of this attention is difficult to decide. The casual readers may get a new and correct impression of its importance but, conversely, they may imagine that there is something basically wrong with it. However, if they take the trouble to read the Report—which we doubt—they will see such phrases as "steady progress"; "improvements have been noted" (both these refer to the requirements of the Garrett Report); "considerable progress" (an expression used when referring to general cleanliness); "a great improvement" (in a case of the provision of macadamised roadways); "improvements in natural lighting are reported from all over the country"; "progress is reported as outstanding from all parts of the country" (welfare amenities); "whilst a noteworthy advance has been made in the installation of suitable washing facilities"; "excellent clothing accommodation exists in those larger foundries"; "progress has been reported in the suppression of dust in cleaning and fettling processes," and "some excellent installations of fluorescent lighting have been noted."

Those are the credits and constitute a matter for congratulation. On the debit side the Report states that little progress has been made in the removal of dust from knock-outs in non-mechanical foundries. Here it seems germane to remind the Chief Inspector of last year's annual Report in which he classified iron foundries into various types. When, in the smallest foundries, knocking-out is left to the morning following casting-up, there is practically no dust problem. There are records of the incorporation of white tiles in foundry walls. Does not this break the regulation of periodic white-washing? It is interesting to note that the concreting of foundry floors and gangways has not met with universal approbation by the workmen. Some say that the former are hard on the knees, and that they increase accidents from burns. Gangways made

B

1949 *Factory Report*

of concrete, when subjected to heavy traffic, wear away too quickly. They need reinforcing. Moreover, when both floor and gangways are of concrete, there is an insufficiently sharp division.

A second reference is made to knock-outs in non-mechanised foundries and we learn that the potentialities of wet water are being investigated, and here a number of useful suggestions are made. Under the heading of new foundries, we think a chronological inexactitude has been perpetrated as the installation in question belongs to the year 1950. The concluding remarks refer to Section 47 of the Factories Act, 1937 (all practical measures shall be taken to protect persons employed against the inhalation of dust and fume, etc. and that foundries must find and adopt methods for the suppression of dust and the means to prevent its inhalation). This is reinforced by the subsequent arrival of a notice* from the Ministry of National Insurance that this question is to be studied by a select committee upon which the foundry industry does not appear to be represented. Every foundry owner should certainly read this section of the Report, as there is so much of real interest for him.

* This notice is printed below.

Pneumoconiosis as an Industrial Disease

Method of Prescription Being Reconsidered

The Minister of National Insurance has asked the Industrial Injuries Advisory Council to consider further the question of the methods of "prescribing" pneumoconiosis as an industrial disease under the National Insurance (Industrial Injuries) Act, 1946, *i.e.*, how the classes of insured persons eligible for benefit for the disease should be defined. Pneumoconiosis is at present "prescribed" in relation to insured workers in a number of occupations which are known to give rise to a risk of the disease. These occupations include stone and granite quarrying and masoning, sand blasting, pottery manufacture, metal grinding, steel fettling, coal and certain other forms of mining, coal trimming and slate dressing.

The Council's industrial diseases sub-committee under the chairmanship of Sir Wilfrid Garrett, who is also chairman of the Advisory Council, are now reviewing the present method of prescribing pneumoconiosis. They will consider such possible alternatives as prescribing the disease generally for all insured workers, or by reference to occupations involving exposure to concentrations of specified dusts. The committee may also reconsider the definition of pneumoconiosis for this purpose. It is at present defined as "fibrosis of the lungs due to silicon dust, asbestos dust or other dust, and includes the condition of the lungs known as dust-reticulation."

Persons and bodies interested in the question of the method of prescribing pneumoconiosis are invited to submit written evidence for consideration. Communications should be addressed to the council's secretary, Mr. S. E. Waldron, O.B.E., Ministry of National Insurance, 30, Euston Square, London, N.W.1, as soon as possible, and in any event not later than May 1, 1951. An explanatory memorandum can be obtained on request.

Institute of British Foundrymen

Annual Conference Papers 1951

The following is a list of Papers to be presented at the Annual Conference of the Institute of British Foundrymen, to be held from June 12 to 15 at Newcastle-upon-Tyne:—

No.

995 "Thermal Considerations in Foundry Work," by Dr. V. Paschkis. (Exchange Paper from the American Foundrymen's Society.)

996 "Study of the Industrial Applications of Platinum/Platinum-Rhodium Thermocouples," by M. Chaussain. (Exchange Paper from *l'Association Technique de Fonderie.*)

997 "Factors Affecting the Solubility of Carbon in Iron," by R. V. Riley, PH.D., B.SC.

998 Report and Recommendations of Sub-committee T.S.30—Synthetic-resin Corebinders.

999 "Patternmaking—Some Present-day Practices," by B. Levy.

1000 "Making an Ingot Mould in India," by S. N. Rao.

1001 "Production of Heavy Castings for Electrical Generating Equipment," by N. A. Charlton.

1002 "Manufacture of Propellers and other Castings in a Heavy Jobbing Foundry," by C. W. Stewart.

1003 "A System of Studying Casting Defects," by G. W. Nicholls and D. T. Kershaw.

1004 "Casting Characteristics of Some Aluminium Alloys," by D. C. G. Lees (British Non-Ferrous Metals Research Association).

1005 "D.T.D. 424—the Versatile Alloy," by A. P. Fenn (Aluminium Development Association).

1006 "Aluminium Casting Alloys—A Survey of their Properties and Methods of Production," by F. Smith.

1007 "Reduction of Dust in Steelfoundry Operations," by W. A. Bloor (British Iron and Steel Research Association).

1008 "Observation and Control of Dust in Foundry Dressing Operations," by R. F. Ottignon and W. B. Lawrie, M.SC., F.R.M.S., A.I.M. (British Steel Founders' Association).

1009 "Survey of Methods and Principles involved in the Mechanical Charging of Cupolas," by W. J. Driscoll, B.SC. (British Cast Iron Research Association).

1010 "Report and Recommendations of Sub-committee T.S.20—Soundness of Iron Castings."

1011 "Steel Foundry Radiographic Practice," by G. M. Michie, M.A., A.INST.P., A.I.M. (British Steel Founders' Association).

1012 "Report and Recommendations of Sub-committee T.S.31—Heat-treatment of Grey Cast Iron."

Full details of the Conference will shortly be published.

Luncheon

Institute of Metals

Professor A. J. Murphy presided over the Annual Luncheon of the Institute of Metals last Tuesday at the Park Lane Hotel, London, W.1. At the high table were Mr. A. R. Baer; Mr. H. W. Clarke; Mr. E. W. Colbeck; Dr. C. H. Desch; Col. Sir Paul Gueterbock; Mr. W. H. Henman; Col. L. C. Hill; Mr. J. L. McConnell; Professor H. O'Neill; Professor G. V. Raynor; Dr. R. Seligman; Mr. J. J. Sheehan; Mr. Christopher Smith; Sir Ewart Smith; Dr. C. J. Smithells; Sir Arthur Smout, and Mr. H. S. Tasker.

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THE MINISTRY OF SUPPLY announces that the price of Britmag (deadburnt magnesia) was increased by 10s. per ton to £14 per ton, delivered consumers' works, as from Thursday of last week.

Straight Cast-iron Pipes*

By J. L. Handley

This Paper describes generally the methods used in the making of straight cast-iron pipes from the smaller sizes used for soil and vent pipes to the larger sizes of pressure pipes. These pipes come under three headings as follows: (1) Soil and ventilation pipes; (2) vertically-cast pressure pipes, and (3) spun iron pipes (generally known as centrifugally-cast pipes).

SOIL AND VENTILATION pipes are usually of the socket and spigot type, 5 to 6 ft. in length and in sizes ranging from 2 to 8 in. dia., with a metal thickness of approximately $\frac{1}{4}$ in. Vertically-cast pipes in lengths of 9 to 12 ft., vary in size from 3 to 60 in. dia., and are made for either socket and spigot joints or are double flanged. The thickness is according to whether they are class A, B, C or D; the letter in each case representing the test pressure of the pipe. For example, class A has a test pressure of 200 ft. head of water, and class D 800 ft. The spun pipes are made in diameters from 3 to 27 in., and in lengths up to 18 ft. These are socket and spigot pipes, though the spigotted end has no beading as in the case of the sand cast pipes. Some pipes are cast with a single flange, and in this case the second flange has to be screwed on.

An attempt will be made to show the trend of mechanisation under the first two headings. Obviously a very high degree of mechanisation has been reached in the centrifugal method, which is gradually replacing the sand-cast pipes at least in sizes up to 27 in. dia.

Soil and Ventilation Pipes

Soil and ventilation pipes are horizontally cast in green sand, usually two castings per box. The larger sizes, 6 in. and upwards, are cast one per box, and the very small diameters, 2 in. and 3 in., are sometimes cast four per box. When cast two per box, a spray runner is situated between the two pipes and is fed by four downgates. A trough type ladle is used, with four teapot spouts which serve the four downgates simultaneously (Fig. 1). When making four castings per box the method of pouring and gating is the same; each pair of pipes being cast separately (Fig. 2).

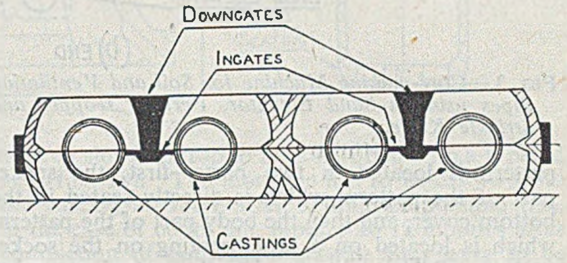


FIG. 2.—*Section through a Mould for Soil and Ventilation Pipes.*

It is very necessary to have perfect moulds, and the Author believes that patterns drawn through stripping plates give the best results. The sand should be as free as possible from gas-producing materials, such as coal-dust or pitch. The patterns can be constructed so that when they have worn small for one size they can be turned down for the next size smaller. Any ramming method can be used to suit local conditions.

Cores are made on a machine. Suitable core-sand falls under gravity on to a revolving core bar and is brought to shape by a knife set to the correct size and shape. On the top of the machine is a hopper loaded by a trough-type elevator. At the base of the hopper is a set of sifter bars. These bars control the amount of sand that is allowed to fall on to the core bar (Fig. 3).

Fig. 4 shows a layout for making rain-water, soil and ventilation pipes by slinging. The moulds are made and placed on a roller conveyor and taken to a central casting point. After knock-out, the sand, with a very small addition of new sand and water, is put through a rotary disintegrator and taken back to the hoppers over the slingers. The cores are made on the machine already described. It is usual to mill the core-sand dry and then to pass it through a fine-meshed screen using a 50/50 old and new sand mixture. Water is then added, and the sand finally aerated.

Vertically-cast Pressure Pipes

These pipes are made in cylindrical boxes which are fixed on steel gantries. The boxes are in halves, the smaller sizes being hinged together. To each box is hinged or cottered a bottom cover, as shown in Fig. 5. It is in this bottom cover that the pipe

* Paper delivered to the South African branch of the Institute of British Foundrymen.

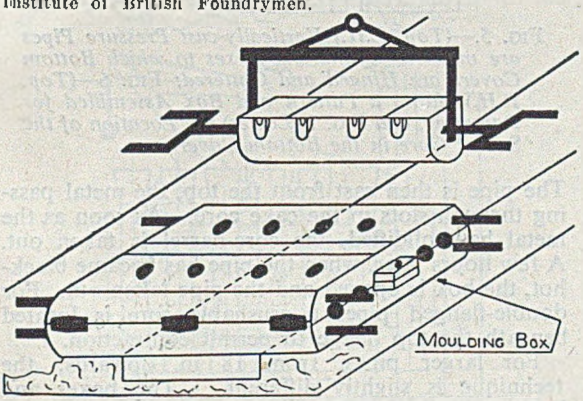


FIG. 1.—*Method of Casting Soil and Ventilation Pipes using a Four-spouted Teapot Ladle. Four Castings are made per Box.*

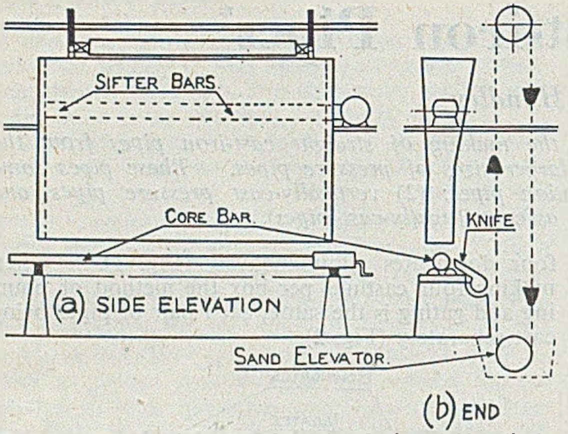


FIG. 3.—*Core-making Machine for Soil and Ventilation Pipes using a Sand Elevator, Vertical Hopper and Strickle Knife.*

pattern is located in two parts—first, the socket part of the pattern, which is directly seated in the bottom cover, and then the body part of the pattern, which is located on a taper seating on the socket pattern. Before commencing the actual ramming operation the halves of the box are cottered together and the bottom cover fixed in position. After the socket part of the pattern has been located, the body pattern is lowered into position from the top of the box. Sand is then fed into the box and rammed (Fig. 6). When the rammed sand reaches a certain height, the spigot part of the pipe is dropped over the body pattern. This part of the pattern is then rammed up and the ramming is then complete. The body pattern is now drawn from the mould through the spigot pattern which in effect acts as a stripping ring. The spigot pattern is next taken out and the bottom cover lowered, together with the socket pattern. The mould is finished, blacked and dried by a gas flame.

The core is made in two pieces consisting of the socket core and the body core. The socket core is made in the normal manner from a core-box and is made to seat in the bottom cover in the same seating as that of the socket pattern (Fig. 7). In the centre of this core is a metal seating in which the body core is located. This ensures concentricity.

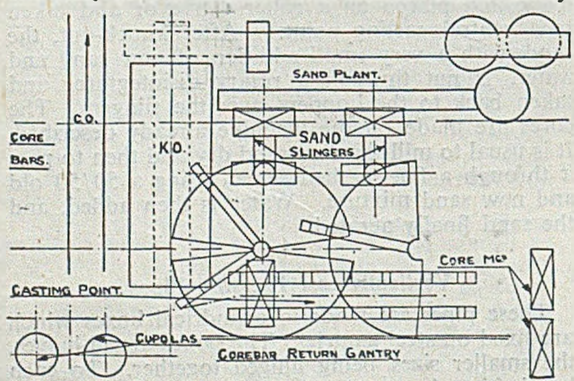


FIG. 4.—*Foundry Layout for making Rainwater, Soil and Ventilation Pipes by Slinging.*

The body core is made on a core barrel in the following manner:—

A splash coating of bonding material and chopped straw is put on the barrel. This is dried, after which a loam coat is applied. When this is dry the core is brought to size by rotating it against a metal straight edge, usually the strickle board. The core is then blacked and finally dried.

Core Placing

Coring up proceeds as follows. The socket core is placed in the bottom cover, which is then cottered up in position. The body core is then lowered into the mould through a leather or canvas muff and is located in the seating provided in the socket core (Fig. 8). The core is centred at the top by means of a cake core and is held in position by wedges.

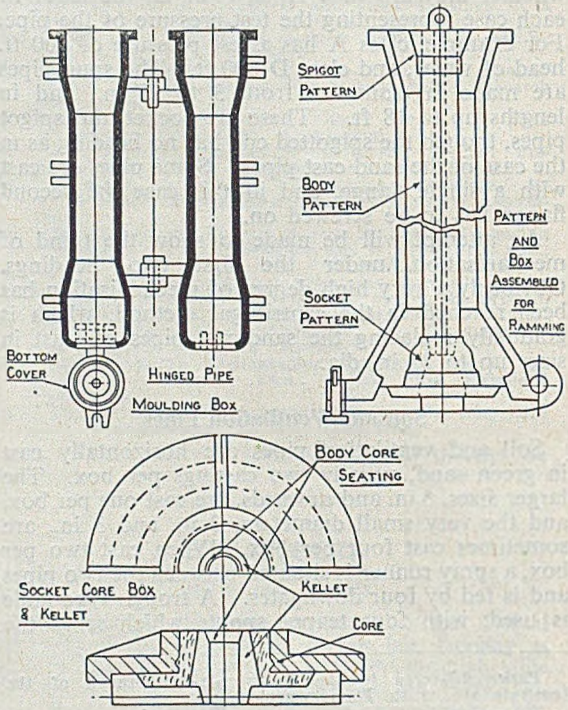
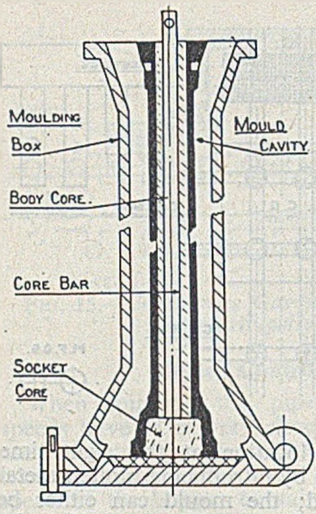


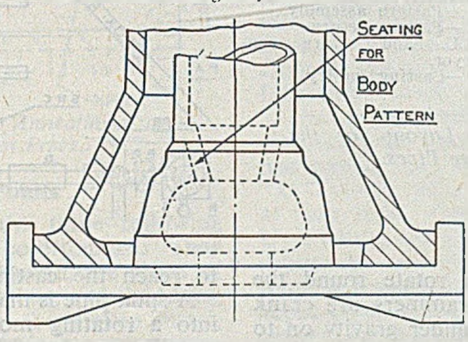
FIG. 5.—*(Top, L.H.) Vertically-cast Pressure Pipes are made in Cylindrical Boxes to which Bottom Covers are Hinged and Cottered;* FIG. 6—*(Top, R.H.) shows a Pattern and Box Assembled for Ramming, and* FIG. 7 *(Lower) the Location of the Socket Core in the Bottom Cover.*

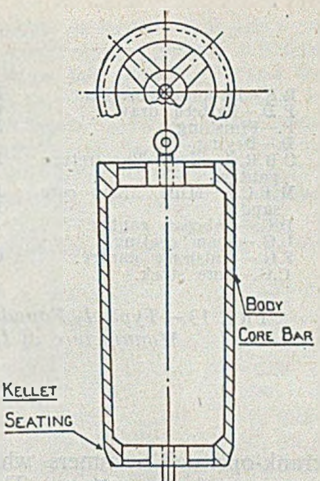
The pipe is then cast from the top, the metal passing through slots in the cake core. As soon as the metal has solidified, the core-barrel is taken out. A few hours later, when the pipe has became black-hot, the box is opened and the pipe taken out. For double-flanged pipes a crushable core is located beneath the top flange to permit contraction.

For larger pipes, from 18 in. upwards, the technique is slightly different. The boxes and bottom covers are not hinged. The loose half of the box moves to and from the fixed part on wheels supported on two short rails, and the bottom cover



FIGS. 8, 9 AND 10.—*Stages in making Vertical Pressure Pipes.* FIG. 8 *shows the Lowering of the Body Core into the Mould (through a Leather or Canvas Muff) and Located in the Seating Provided in the Socket Core;* FIG. 9 *(below) Illustrates the Bottom Cover and Socket Pattern Combined, and* FIG. 10 *a General Design of Hollow Core Bar.*





is put into position either by crane and wire sling or by a hydraulic lift mounted on a trolley which runs on a track directly underneath the box. In the case of these larger pipes, the socket pattern (or the bottom flange pattern, whichever the case may be) is made in one piece with the bottom cover. When this has been cottered in position, the body pattern is lowered into its seating in the socket pattern and ramming commences as before (Fig. 9). The socket core is also made up as part of the bottom cover, sometimes being swept up (on the very large pipes) concentric with the taper seating, in which the body core is located. For the body cores of 14 in. dia. and upwards, it is necessary to put straw rope on the core barrel before applying the splash coat, otherwise the procedure is the same as for the smaller sizes. There are two general designs of core bars—the plain barrel-type, tapered from top to bottom, and the barrel-type with a tapered slot from top to bottom, fitted with a tapered key (Fig. 10). The first type has to be drawn from the casting as soon after casting as possible (*i.e*,, in the case of 60 in. dia. pipes, 9 to 12 minutes after completion of pouring; otherwise they have to be "dug out," a very lengthy job). Obviously the second type only require the tapered key to be taken out after the casting is solid.

Mechanisation

Fig. 11 shows a typical layout for the mechanisation of vertical pipe making in sizes up to and including 18 in. dia. The boxes are mounted on a gantry in the form of a turntable, the sequence of operation being as follows:—

The mould is machine-rammed at the ramming station. The ramming machine consists of four

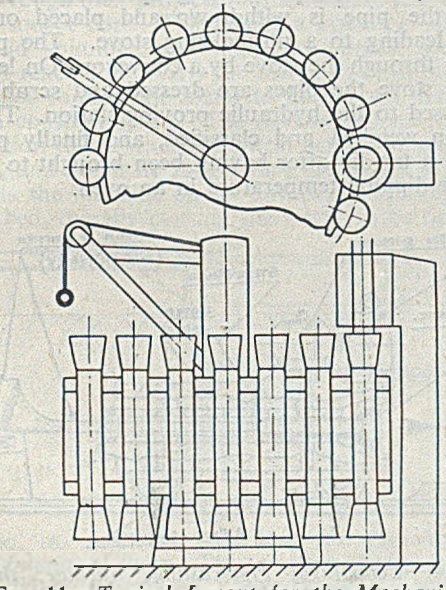


FIG. 11.—*Typical Layout for the Mechanisation of Vertical Pipe Production (Ardelt System).*

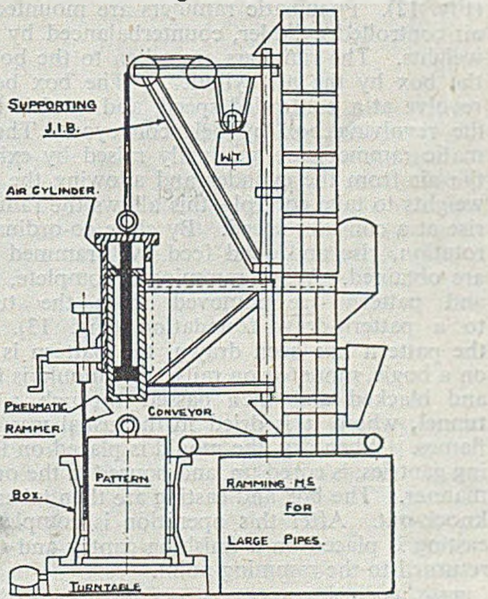
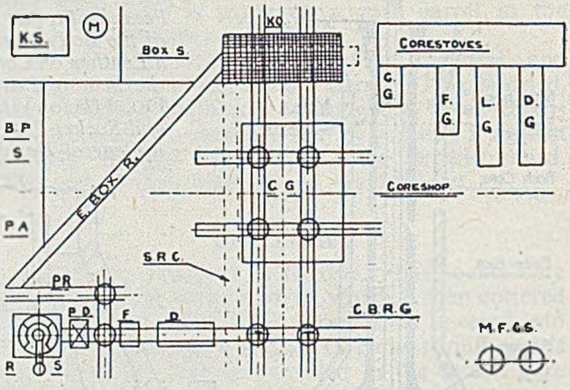


FIG. 12.—*Ramming Machine for Large Pipes, showing all the Tackle carried from a Supporting Jib; Conveyor Feed is Arranged for the Sand.*



R.S.—Ramming station.
P.D.—Pattern draw.
F.—Finishing.
D.—Drying.
C.B.R.G.—Core Bar return gantry.
M.F.C.S.—Mills for core sand.
D.G.—Dabcoat gantry.
L.G.—Loam coating.
F.G.—Finishing gantry.
C.G.—Core stock.
K.O.—Knock-out.
Box S.—Box storage.
M.—Mill for kellet sand (sockets).
B.P.S.—Body pattern storage.
P.A.—Pattern assembly.
P.R.—Pattern return.
S.R.C.—Sand return conveyor.
C.G.—Casting gantry.

FIG. 13.—*Typical Foundry Layout for the Manufacture of Large Pipes.*

crank-operated rammers which rotate round the stationary body pattern. The rammers are crank lifted and then allowed to fall under gravity on to the sand. As the rammed sand builds up in the moulding box, so the rammers rise until ramming is complete. The turntable is then rotated through a few degrees. The pattern is taken out by the jib crane, and the mould is then finished and blacked. It is then rotated to the drying station, where it is gas-dried. When dry it is cored up and poured. Core bars are drawn and the castings removed from the boxes by the jib crane. The box is then back at the ramming station.

Arrangement for Larger Sizes

For the making of pipes larger than 18 in. the set-up is again somewhat different. The machine for ramming the moulds operates as follows:—

The box and pattern is placed on a turntable (Fig. 12). Pneumatic rammers are mounted on an air-controlled cylinder, counterbalanced by balance weights. The rammers are taken to the bottom of the box by the air cylinder. The box begins to revolve at a controlled speed, and sand is fed into the revolving box by belt conveyor. The pneumatic rammers are gradually raised by exhausting the air from the cylinder and allowing the counter weights to take control—this allows the rammers to rise at a constant speed. By close co-ordination of rotation, rise and sand feed, well-rammed moulds are obtained. When ramming is complete, the box and pattern are removed from the turntable to a pattern-draw foundation (Fig. 13). After the pattern has been drawn, the pattern is placed on a bogie, mounted on rails. The mould is finished and blacked and then passed through a drying tunnel, where it is dried in the usual way by gas flames. When dry, the mould is placed on the casting gantries, is cored up, and poured in the orthodox manner. The box and casting are then taken to the knock-out. After this operation is completed, the casting is placed on a finishing gantry and the box returned to the ramming point.

The cores are made in the way previously described, except that after each operation they are progressively passed through a stove nearer to the casting gantries. The bottom covers are made so as to reach the casting location at the right time.

A spun pipe is made by introducing molten metal into a rotating mould; the mould can either be metallic or a sand-lined case. The method to be outlined here is that in which steel moulds are rotated in a water-jacketed machine (Fig. 14). By this method, pipes from 3 in. up to 27 in. dia. can be produced, the larger sizes being in 18-ft. lengths. Pipes 22 ft. long have been spun, but transport difficulties were encountered.

The spun-iron pipe has its own British Standard specification. It is designed without a spigot band and is thinner in section than the sand-cast pipe of a corresponding diameter. This gives an all-round saving, as weight and transport charges are considerably reduced. To give a rough idea of what is involved in spinning a pipe the following is the sequence followed:—

The metal is brought by overhead monorail to the casting hoppers of the machines. From here it is fed down a pouring spout or trough into the rotating mould. When the casting operation is completed, the pipe is withdrawn and placed on a gantry leading to a normalising stove. The pipe is taken through the stove by a conveyor. On leaving the stove the pipes are dressed and scrubbed and passed to the hydraulic proving station. They are then weighed and classified, and finally pass through a tar-dip after having been brought to the requisite dipping temperature in an oven.

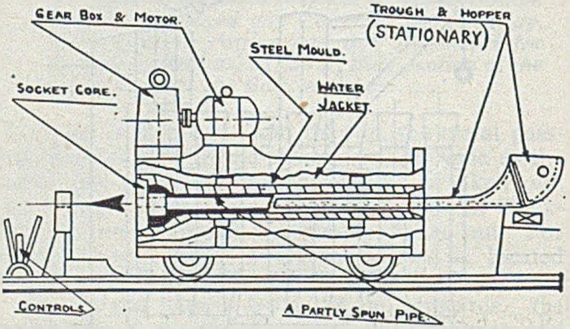


FIG. 14.—*Centrifugal Pipe-casting Machine; the Trough and Hopper Remain Stationary during Casting while the Mould Travels in the Direction of the Arrow.*

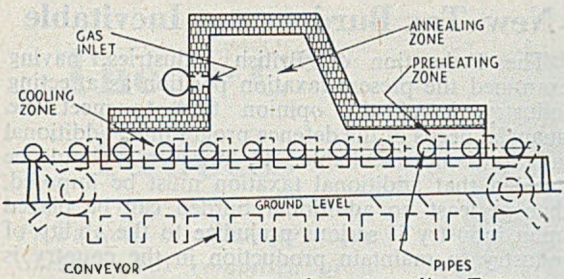


FIG. 15.—*Continuous Gas-fired Annealing Furnace for Centrifugally-cast Pipes.*

Speed Control Points

When spinning the pipe, the three following speeds have to be very closely co-ordinated. They are the rotating speed of the mould, the speed of travel of the machine down the bed, and the tilting speed of the hopper containing the molten metal. These speeds are all checked before casting commences for the day and thereafter at regular intervals throughout the day. The last two are timed by stop-watch. There are four operators to each machine with the following duties—the machine operator, the socket-end man, the trough boy, and the skimmer. The machine operator controls the movements of the machine. The socket-end man puts in the socket cores and grips the pipes for pulling out, the trough boy keeps the trough clean and applies dressing, and the skimmer keeps the hopper clean and skims the metal to prevent any dirt entering the mould.

Casting

At the commencement of casting a pipe, the hopper is fitted with the requisite amount of metal and the machine is taken to the top of the bed after the socket core has been "put up." The end of the trough then projects into the mould just short of the socket core. The machine operator starts the mould spinning, and when the correct speed has been reached he starts the tilting mechanism of the hopper causing the metal to flow down the trough at a constant speed. The machine operator is in a position to see when the metal arrives at the socket end, and when he judges that the socket is full he starts the machine on its downward journey along the bed, thereby causing the metal to be deposited

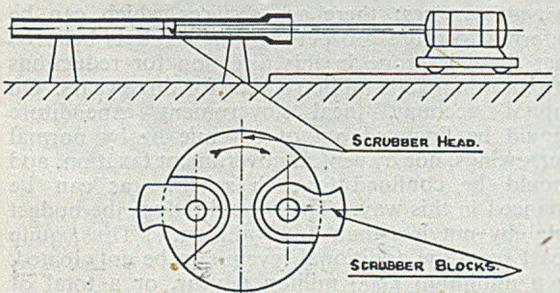


FIG. 16.—*Scrubbing Machine for Cleaning the Interior of Pipes. The Scrubber Blocks are flung out by Centrifugal Force during Rotation and the Pipe is held on the Gantry while the Machine Head is Mechanically Traversed.*

on the walls of the mould in exactly the place required, the impinging metal stream tracing a helical path. When the machine has almost reached the limit of its downward movement it is checked to allow the spigot to be completely filled. If this were not done the spigot end would be thin, as can be readily appreciated. One additional item comes into the actual casting operation, namely, a powdered dressing has to be deposited on the mould in front of the advancing metal. This is done in the following manner:—

The trough—which is made from a solid-drawn steel tube, the upper part slightly above the centre-line having been cut away—is lined with cast-iron "U" blocks, with a cut-away smaller inverted U at their base. Beneath the blocks (in the inverted U) is a tube containing a helical spring. This, when rotated by an electric motor at its end, acts as a spiral conveyer. The outlet for the powder, conveyed from a small hopper at the motor end, is underneath the trough, 4 to 5 in. from the delivery end so that it is deposited in a thin layer in advance of the metal stream. The powder conveyor is

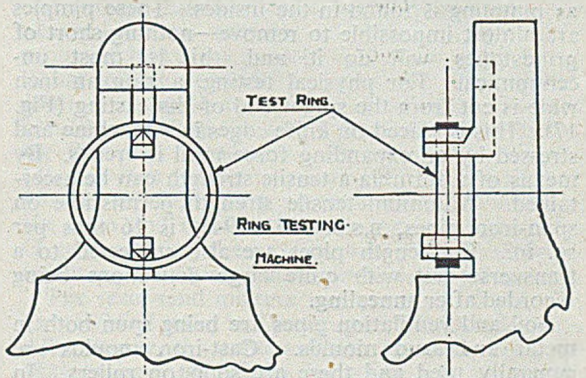


FIG. 17.—*Tensile Testing Machine for Pipe Castings. Rings Cut from the Castings are Broken on Expanding Knife Edges.*

started-up as soon as the machine starts to travel down the bed. This powder—a mixture FeSi, CaSi, fine sand and coke breeze—has a number of functions. In the first place, it considerably lengthens the life of the mould. Secondly, it minimises the chilling effect of the mould. It also prevents certain skin defects, such as pinholing. While on the subject of defects, it might be mentioned that there are tabulated about 150 defects associated with this method of spinning

Extraction and Treatment

The pipe having been made, it now remains for it to be taken from the mould. There is a post at the socket end of the machine for this purpose. After the socket cover plate has been removed, a pair of expanding pullers are inserted into the pipe behind the socket and anchored to the post. The machine is then traversed up the bed leaving the pipe behind. The pipe is supported by a pair of gates which swing in as the machine proceeds up the bed. From the gates the pipes are rolled on to a conveyor and taken to the gantries leading to the normalising

Straight Cast-iron Pipes

furnace. They are checked for weight and thickness, which information is signalled back to the operator who takes any action that may be necessary. This avoids a run of, say, light or thin pipes which are very definitely scrap. The pipes next enter the normalising furnace which is divided into three zones, pre-heating, soaking and cooling (Fig. 15). The top temperature is around 900 deg. C, and it takes about an hour to put a pipe through the stove. When the pipes pass from the stove a "spike hammer" test is applied to see if all chill has been removed. As the "insides" of spun iron pipes are slightly rough, they are scrubbed with hard metal blocks (Fig. 16).

Metallurgical Aspects

Touching on the metallurgical side, a typical composition is as follows:—C, 3.2 to 3.5; Si, 1.8 to 2.2; Phos, up to 1.0; Mn, 0.35 max. per cent., and sulphur as low as possible. Regarding the Mn content, if over 0.35 per cent. is used, a defect known as pimpling is found in the insides. These pimples are almost impossible to remove—nothing short of grindstones will do it, and this is most uneconomical For physical testing, a ring an inch wide is cut from the spigot end of the casting (Fig. 17). This is placed on knife edges in a machine and stressed by an expanding force until it breaks. By means of a formula a tensile strength can be ascertained. Minimum tensile strength permissible on spun-iron pipes, B.S.S. 1211/1945, is 16 tons per sq. in. Full-length pipes are also subjected to a transverse test with quite large deflections being recorded after annealing.

Soil and ventilation pipes are being spun both in metal and sand moulds. Cast-iron moulds are generally used and these are spun on rollers. In some cases split moulds are used; no water cooling is necessary (or possible) with a split mould. The mould dressing is the principal factor in the spinning of these pipes—all trace of chill must be eradicated, as annealing makes the pipes very expensive.

T.U.C. and the Budget

Among the measures which the T.U.C. General Council is recommending to the Chancellor of the Exchequer for budgetary action is increased taxation on distributed and undistributed profits. The council also calls upon the Chancellor to increase the standard rate of income tax, with some concessions to people with low incomes, make a number of changes in purchase tax, and increase subsidies. The T.U.C. also declares that the Government should cut the costs of its administration.

The profits tax, the memorandum states, should be withdrawn. An additional fiscal burden imposed on companies, it is a severe handicap to the ability of industry to provide finance from its own savings; it is inequitable in that the incidence falls entirely on ordinary shareholders; and it tends to cause a distortion of company finance by giving a fiscal advantage to finance by loans in lieu of finance by new capital.

New Tax Burdens not Inevitable

The Federation of British Industries, having examined the present taxation position as affecting industry, is of the opinion that, to meet the financial needs of the defence programme, additional taxation is not inevitable. If, however, it should be decided that additional taxation must be imposed, then at least no additional burden can be placed upon industry if serious prejudice to the ability of industry to maintain production in the country is not to ensue.

In a memorandum to the Chancellor of the Exchequer, the F.B.I. says it is reasonable to assume that the impact of the defence programme on an already strained economy will result in increased inflationary pressure which it will be difficult to resist. The economic climate, in the light of which the taxation policy for the forthcoming year will require to be framed, may thus be that of a further drop in the value of money. On that assumption, it is the conviction of industry that in the national interest the broad objects of the Government's budgetary policy should be as follow:—

(1) To preserve industrial capital in the face of inflationary pressure.

(2) To remove discriminatory taxation on corporate bodies and to spread direct tax more widely over the general body of taxpayers.

(3) To counter inflationary pressure by drawing off surplus purchasing power where it lies.

(4) To avoid any increase in the total burden of taxation and to find the major part of the finance for rearmament by reductions in other forms of Government expenditure.

(5) To readjust the incidence of taxation so that it does not constitute a deterrent to greater effort, in particular by industry; this involves a fair reward for capital as an incentive to saving, as well as for labour.

Government's Expenditure

The federation states categorically that Government expenditure as a whole is excessive, and should be drastically overhauled. There is an ample field for economies in central and local Government expenditure other than defence. On revenue account there is a substantial, if indeterminate, amount to be saved by economies in the administration of the present services; there are services which can be deferred to more prosperous times. It is believed that there is scope in this direction for reductions of more than £300 million a year for three years. On capital account, local government expenditure should be financed out of revenue or by normal borrowings, not by central government taxation, and should be confined to such schemes as can be financed in this way. This would reduce the budget total by not less than £300 million. Thus, quite apart from the additional revenue to be anticipated, at a minimum £600 million a year, or a total of £1,800 million over three years, and possibly considerably more, of the funds required for rearmament could be found through economies.

(*Continued at foot of column* 1.)

The "C" Process

Production of Castings from Shell Moulds comprised of a Thermo-setting Mixture of Sand and Synthetic Resin. The Mould Shells are formed by contact between the Mixture and a Heated Pattern.

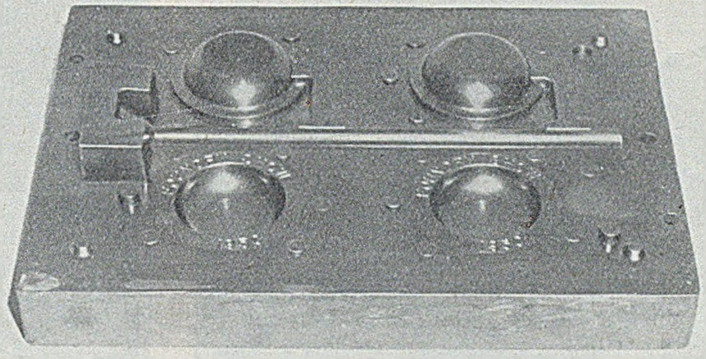


FIG. 1.—*Metal Pattern, including Gates and Riser, Mounted on a Plate.*

THE "C" process for producing foundry moulds and cores is said to combine the advantages of increased production, reduced cost, and improved quality of the casting. The method,* which was developed by Johannes Croning of Hamburg, Germany, employs a thermosetting plastic as a sand binder to produce a shell mould by application of the resin-sand mixture to a heated pattern. The accompanying illustrations show the principal steps in the process as demonstrated in the exhibit of Bakelite Div., Union Carbide and Carbon Corp., at the 1950 A.F.S. Foundry Exhibition.

* Previously reported in the JOURNAL, December 4, 1947, and February 19, 1948.

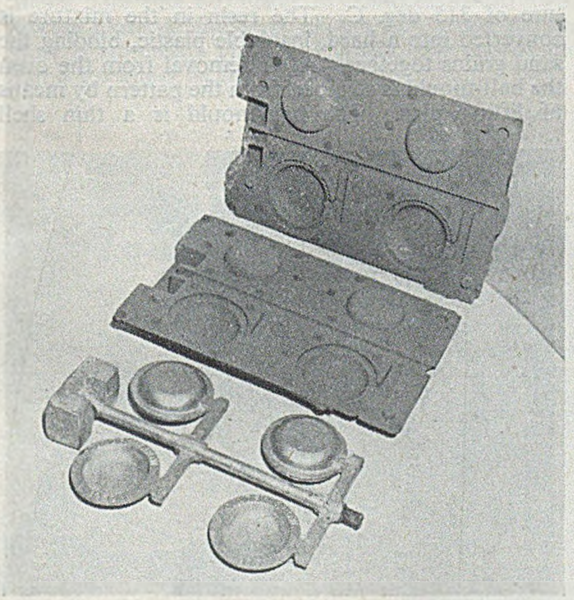


FIG. 2.—*Two Half-moulds and a Spray of Castings Produced by the Process.*

Demonstration

The demonstration included the actual production of moulds and pouring of metal. The casting produced had good as-cast surface and close dimensional tolerances (0.002 to 0.003 in.). The demonstration equipment used for producing the shell moulds including the following:—(1) Dry blender, for thorough blending of the resin/sand mixture; (2) cast-iron pattern, used for producing half moulds; (3) Moulding machine for application of the resin and sand mixture to the hot pattern; (4) Oven for curing the moulds, and (5) Strip table for removing the finished half-mould from the pattern.

The resin-sand mixture contains 6 to 10 per cent. by weight of resin, and sand up to 150 A.F.S. fineness. After curing, the cores and moulds made from the mixture have no affinity for water and no volatile content and can be stored indefinitely.

FIG. 3.—*Charging the Mould-making Machine with the Resin/Sand Mixture.*

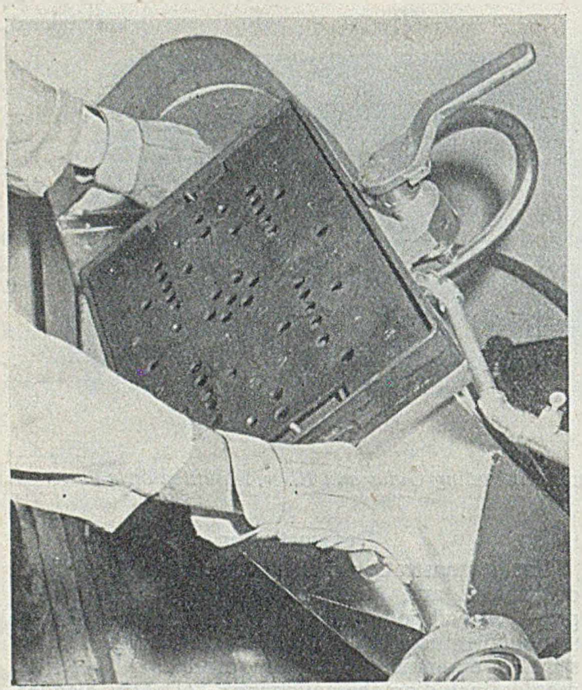


FIG. 4.—*The Preheated Pattern is placed over the Open Hopper of the Machine and Clamped. Next the Whole is Inverted, allowing the Mixture to fall on the Hot Pattern.*

Metal patterns, including gates and risers, are mounted on metal plates to withstand the pre-heating temperature of 400 deg. F. (205 deg. C.). After the initial pre-heat the period in the mould-curing oven during production maintains the pattern at the proper temperature.

The pre-heated metal pattern is clamped face

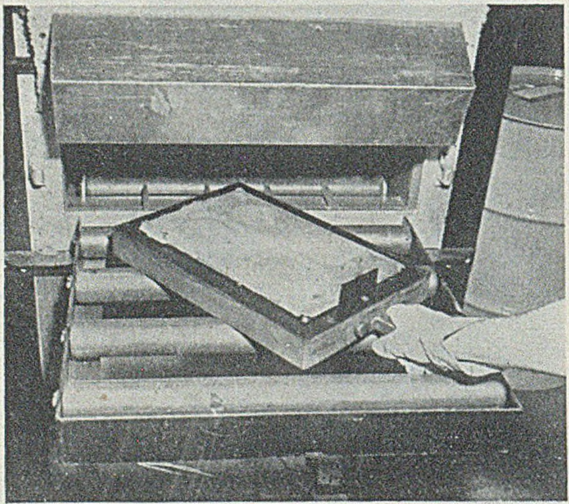


FIG. 5.—*The Pattern with its Adhering Layer of Resin/Sand Mixture is placed in an Oven for Curing the Half-mould.*

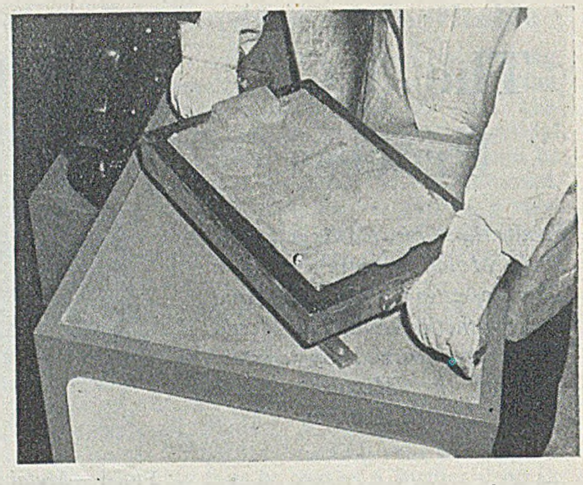


FIG. 6.—*After Curing, the Mould is Removed from the Pattern by Means of Knock-out Pins.*

downward over the moulding machine containing the resin-sand mixture and the assembly is quickly inverted. The moulding mixture falls against the hot pattern face and plate. The resinous material softens under the heat of the pattern and adjusts itself to the face of the pattern and plate, forming a continuous coating. As the resin-sand mixture warms up, the coating builds up over the pattern to a thickness of $\frac{3}{16}$ in. in 6 sec. The assembly is again inverted, the excess moulding material falling away from the soft coating and is suitable for use on the next mould.

Curing

Curing consists of placing the pattern plate and adhering coating in an oven for 2 min. at temperature of 315 deg. C. The resin in the mixture is converted into a hard, insoluble plastic, binding the sand grains together. After removal from the oven the half-mould is stripped from the pattern by means of lifting pins. The half-mould is a thin shell

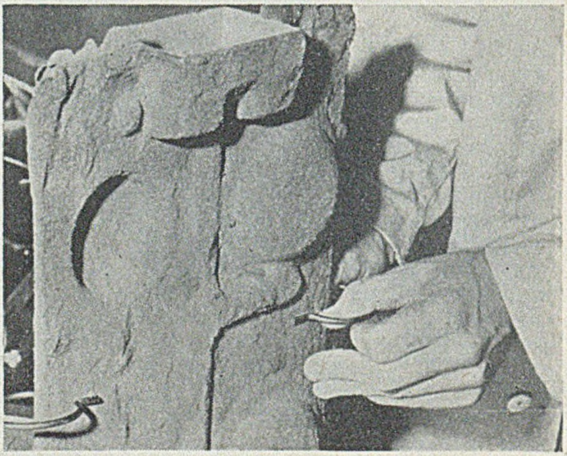


FIG. 7.—*Two Half-moulds are Assembled Face to Face and held together by Metal Clamps.*

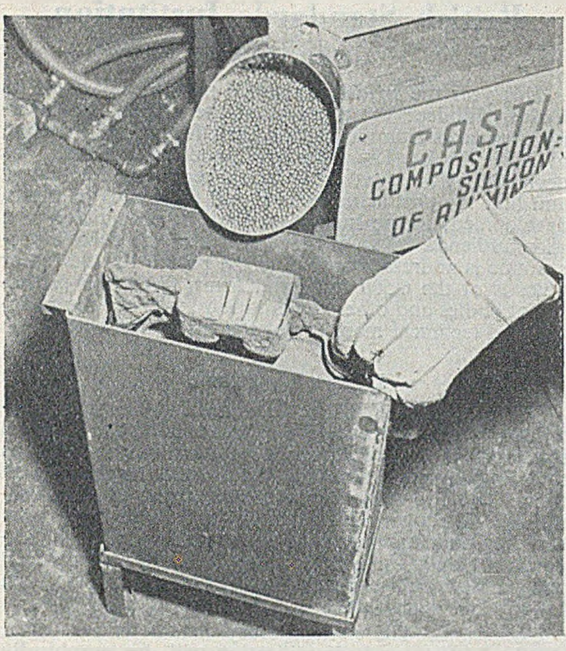


FIG. 8.—*Assembled Mould in a Container is backed by Steel Shot.*

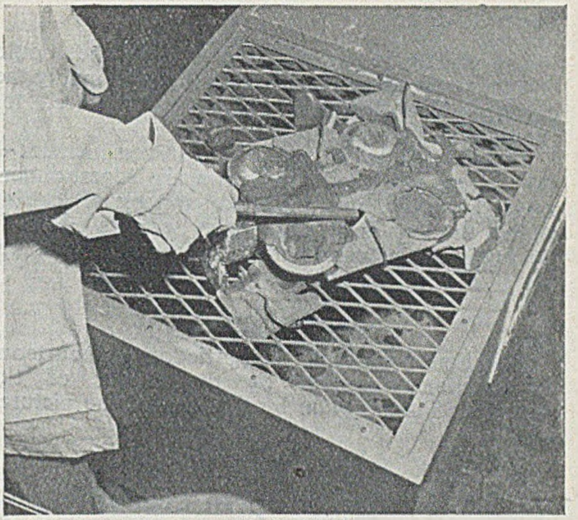


FIG. 10.—*Knock-out; much of the Resin is Burned during Casting and the Sand Breaks Away Easily.*

with sufficient strength and rigidity for the casting operation. A complete mould is assembled by clamping two half-moulds together. If cores are required, they are assembled in the mould in the usual manner.

Cores are made in the same manner, except that the resin-sand mixture is blown up into a hot split metal core box by means of compressed air. The excess material falls out of the box when the air flow is stopped. The cores are hollow and of the same thickness as the moulds.

Casting

The moulds are prepared for casting by placing the clamped half-mould assembly in a box with the gate in a vertical position, and the surrounding space filled in with steel shot or other suitable bedding material. The bedding supports the thin mould shell so that it will resist the pressure of the liquid metal and maintain dimensional stability.

The liquid metal is poured into the mould in the usual manner. The hot metal on coming into contact with the mould and cores is formed to the desired shape and surface finish. Gases generated pass readily through the mould shell, since the mould has very high permeability. The mould and core offer very little resistance to the casting as it solidifies and contracts, minimising the formation of cracks or hot tears.

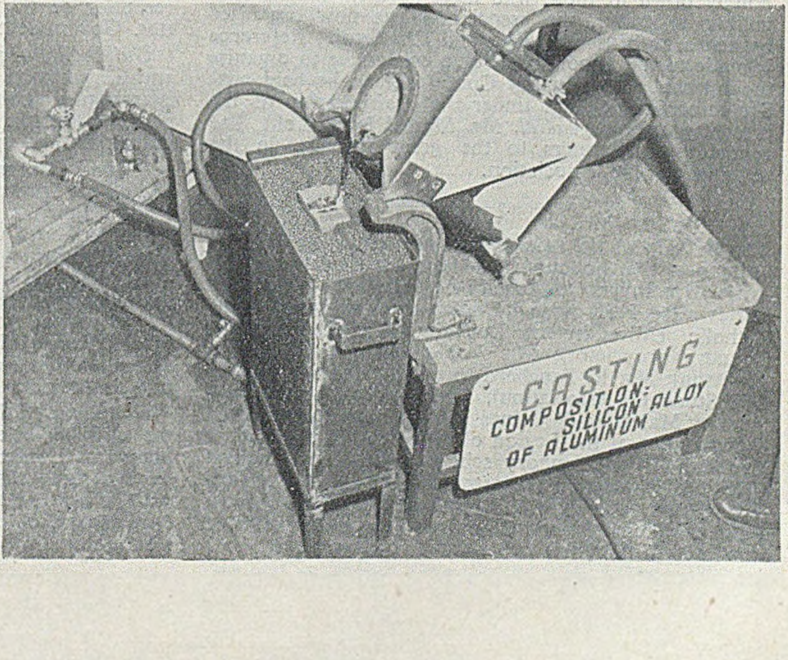


FIG. 9.—*Pouring the Mould from a Model Furnace. (This was used at the Exhibition for Demonstration Purposes but, Normally, Metal melted by any of the Conventional Methods is Suitable.)*

The "C" Process

The casting is easily removed from the mould and the cores can be removed by lightly tapping the casting. The bedding material is recovered for re-use.

The advantages claimed for the process include:—(1) Castings are produced with sharp edges, dimensional accuracy, and unchilled surfaces; (2) casting of thin sections is possible—steel sections 1/16 in. in thickness can be cast; and (3) increased production for given moulding floor space and labour.

Acknowledgment

[The Editor gratefully acknowledges the courteous co-operation accorded by the Editor of the *American Foundryman* by the loan of the pictures used.]

Drive for Scrap in Scotland

In an all-out drive to maintain the flow of scrap to the steel mills in Lanarkshire, a survey of remote areas in the North of Scotland is now being carried out by the Scottish scrap campaign committee. Once a survey has been completed, details are passed to merchants in Inverness who arrange to collect the scrap from remote areas by lorry. It is then taken in quantities of about 100 tons to the nearest port and shipped to the Clyde. Need for scrap is so great that no stock-piling has been arranged. Every cargo of metal is immediately unloaded at Clydeside docks and despatched direct by rail to the steel plant. When the present area north of Inverness has been thoroughly scoured the campaign will move south until the whole of Scotland has been covered.

Belgian Foundrymen's Association

The annual meeting of the *Association Technique de Fonderie de Belgique* was held on January 21. The report of the executive shows that really great progress is being made. Following the precept of bringing technology down to those who most need it—that is men unable to travel, the association has now organised branches at Brussels, Liège and Charleroi. Reference is made to the appointment of a committee to organise the International Foundry Conference to be held next September in Belgium under the chairmanship of the present *president général*, Mr. Marcel Borgerhoff. The report signally refers to the great increase in the activities of the association.

The Bulletin of the *Association Technique de Fonderie* announces that honours have been awarded to the following members of their organisation:—Professor Portevin has been made a Doctor (*honoris causa*) of the Catholic University of Louvain; Mr. J. Derdinger (foundry proprietor); Mr. A. G. Granpierre (Pont à Mousson); Mr. R. Penchard (president, *Arts et Meteirs* Old Students' Association), Mr. O. Vautiers (Compteurs et Materials d' Usines à Gaz) have been created Commanders of the Legion of Honour. Mr. A. Debar (Professor at the foundry school), Mr. R. P. Ganivet (Technical Education Department), Mr. M. Josset (lecturer at the foundry school) and Mr. M. Pons (Industrielle de Transmissions Colombes-Texrope) have been appointed to the grade of Chevalier of this Order.

British Standards Institution

Golden Jubilee

This year the British Standards movement attains its Golden Jubilee: the pioneers of the original Engineering Standards Committee held their first formal meeting in April, 1901. The General Council of the B.S.I. has decided that the event shall be appropriately celebrated, and that the past achievements and the trends of future development of the Institution shall be proclaimed to a wide audience. This advance notice of the Jubilee programme is addressed mainly to the principals and senior officials of the 6,500 industrial firms, trade and professional bodies and other organisations, who are the financial and technical mainstay of the Institution's work.

Jubilee Programme

"*Fifty Years of British Standards*."—This specially-written history traces the development of the national standards movement, from its foundation in 1901 as the Engineering Standards Committee, to the present time. The book shows how the principles of standardisation laid down half-a-century ago have since been accepted and applied in an ever-widening range of important industries, and how, as in many other social and political fields, the original British model has been followed in nearly all other countries in the world.

Exhibition.—The contemporary benefits of standards, standardisation, and simplification will be graphically presented at an exhibition to be staged at the Science Museum, South Kensington, London, from June 18 to 29, and in which practically all the major industries who use the B.S.I.'s services will take an active part.

Each industry will show how standards have simplified production, reduced costs and maintained quality, and how, in turn, they have benefited users of its products. Test apparatus designed to secure compliance with British Standards will be shown, together with many special exhibits of an unusually interesting nature. Among them will be features showing pictorially "What are Standards?" and "How Standards are Prepared."

Overseas Visitors.—The international affiliations and influence of the B.S.I. will be marked by the presence in London during Jubilee week of the presidents and directors of the national standards bodies of more than 30 Commonwealth and foreign countries. An official reception to the Institution's guests is being given by H.M. Government at Lancaster House on June 18.

Guildhall Banquet.—By courtesy of the Lord Mayor and Corporation of the City of London, the Institution is arranging a banquet for its overseas guests on June 20, at the Guildhall. Distinguished figures in Government, industrial and professional circles will be present.

Annual General Meeting.—The annual general meeting of the Institution will be held on the afternoon of Friday, June 22. The overseas visitors will be invited, and it is hoped that a large number of B.S.I. members will be present to meet them.

At 7.30 p.m. on the day of the annual general meeting, a conversazione will be held at the Natural History Museum, which has been kindly made available by the British Museum authorities. This function has also been arranged primarily to enable a large number of B.S.I. members to meet the overseas guests.

Commonwealth Conference.—In the week preceding the Jubilee celebrations, the second Commonwealth Standards Conference is to be held in London. Nearly all the standards organisations in the Commonwealth will be represented, and the agenda will cover important aspects of collaboration in standards work in the Commonwealth.

Notes from the Branches

London Branch—Slough Section

The meeting of the Slough Section of the Institute of British Foundrymen held on February 13 was the occasion of a visit by the London branch president, Mr. F. E. Tibbenham, whom the Slough section were very pleased to welcome.

A Paper entitled "The History and Development of Aluminium/Silicon Alloys" was read by Dr. E. Scheuer, research director of International Alloys, Limited. As introduction he gave an interesting historical account of the development of these alloys from their first preparation roughly 100 years ago culminating in their widespread industrial application following the discovery of the modification treatment by Pacz in 1920. Due to their enhanced properties as a result of modification and good castability, the last 30 years had seen a development of these alloys supplying as much as 80 per cent. of the total aluminium alloy castings produced.

Dr. Scheuer proceeded to discuss the theoretical aspects of modification, laying stress on the recent work of Chalmers in this respect, who concluded that modification both by chill casting and by sodium treatment was caused by undercooling of the eutectic. In the former he explained this by preferential growth of the aluminium due to its higher thermal conductivity and lower latent heat, and in the latter the same factors were at work, aided, however, by a lowering of surface tension at the solid/liquid interface due to presence of sodium.

The development of other aluminium/silicon alloys was then described, combining the good casting properties of the eutectic alloy with better machinability and greater stiffness, of which DTD 424 was the most popular example. Later developments were in alloys deriving high resistance to deformation from heat-treatment:—Alpax (beta and gamma)—these being amongst the strongest aluminium casting alloys in existence. A group of special alloys developed for pistons exploited the low coefficient of expansion and high wear resistance produced by silicon additions up to 22 per cent. The structures, properties and uses of these alloys were described by Dr. Scheuer and clearly illustrated by an excellent series of slides.

Discussion

MR. RAYBOULD said that the difficulty in obtaining reproducible results in the foundry commenced with the variation in material obtained from different countries. He would be interested to have Dr. Scheuer's opinion on the avoidance of shrinkage unsoundness.

DR. SCHEUER replied that adequate feeding where possible and economical was the best method of avoid unsoundness. Another less commendable method was the introduction of a little gas which would disperse concentrated unsoundness into the relatively harmless fine form.

MR. A. R. PARKES thought that the possible effects of trace elements on modification should not be overlooked, and he urged for more thorough analysis in this respect. He gave as an analogy the effect of sodium and lithium which was said to act like cerium and magnesium in the production of nodular iron.

In reply, DR. SCHEUER said that the solubility and effect of some trace elements were known. Phosphorus had some influence on the amount of sodium required for modification, magnesium lowered the amount, while titanium had no effect.

MR. GWYTHER thought that Chalmers' theory could be disproved on thermo-dynamical grounds. How did it account for the presence of coarse silicon in an over-modified structure? He thought it was more reliable to regard modification as undercooling of the ternary eutectic of sodium/aluminium/silicon. He would like to know how to obtain reproducible results on modification in the foundry.

DR. SCHEUER replied that the ternary eutectic undoubtedly existed, but he did not think that it affected modification since it did not show a lower melting point. Variable results in the foundry were mainly due to burning out of sodium and this could be minimised by: (1) covering with a slag; and (2) reducing surface contact with air by using a narrow deep crucible.

A vote of thanks proposed by MR. BRITTEN concluded the meeting.

Middlesbrough

On February 9 a very interesting lecture was given to the Middlesbrough branch of the Institute of British Foundrymen by Mr. G. G. Musted who was a member of the sub-committee T.S. 23 set up by the Institute in September, 1947 with the following terms of reference:—"To consider the reclamation of grey-iron castings by burning and welding."

MR. MUSTED gave a resumé of the more interesting findings of this Committee. The Report has been published in its entirety but the lecture gained much from Mr. Musted's colourful personality. He was a mine of information on this subject and has had experience in every shape and form of this type of work. The interest of all members was closely held throughout and there was certainty that many castings which would formerly have been discarded as useless would now be reclaimed.

After the lecture was over, the president, MR. L. JOHNSON, said that there was no doubt that the branch had been listening to a man of great practical experience and many members would benefit from the suggestions made.

One of the first questions was whether grey-iron castings which had been welded were suitable for a new job. Mr. Musted said that provided complete fusion was obtained there was no reason why this should not be done. Such castings could be successfully machined.

Another questioner wanted to know how long it took to train a really good welder. Mr. Musted said that a really good welder could be trained in six months. He said that it had been discovered that men who had been employed on maintenance work made good welders but one of the chief requirements was perfect eyesight. Many firms underestimated the valuable work which could be done by welders.

MR. JOHNSON asked about the strength of cast-iron welds made with gas, and whether such strength could be checked. MR. MUSTED said it was possible to do this.

MR. STANLEY asked how Mr. Musted would repair high-pressure steam mains. The latter replied that these should be gas welded preferably. Anything for high-pressure work must be treated very carefully.

MR. STANLEY asked for information on the repair of fractured gas mains. Mr. Musted said that he knew of only one man who could deal satisfactorily with this type of weld.

MR. G. B. TAYLOR proposed a vote of thanks of Mr. Musted and pointed out that several members of the Institute of Welding were also present. Though the aim of members was to make flawless castings they were still glad that something could be done about the few imperfect ones which were turned out.

Book Reviews

Chemical Analyses of Cast Irons and Foundry Materials. By W. Westwood and A. Mayer. Published by George Allen & Unwin Limited, Ruskin House, 40, Museum Street, London, W.C.1. Price 42s. net.

The most interesting feature of this book is strangely enough not the work itself but that it is to be one of a series of manuals on foundry technology, edited by Dr. J. G. Pearce. Three further books are listed, and because of the dearth of foundry textbooks to-day the promised collection will indeed be welcome.

The book carries what are in truth two forewords—one by Dr. Pearce and the second by Dr. Gregory, who strongly commends the work for study by the foundry industry. There are nine sections, the first of which deals in a general way with laboratory practice and apparatus. The second is remarkable in that it details the methods to be used for the determination of no fewer than 25 elements which can be present in cast iron. This being so, no surprise should be evinced, that to compound these elements seventeen sorts of alloys and the like need individual consideration. Iron-ore, slags, sands and refractories, coke and coal dust, all of which are of real importance in the conduct of a foundry, are dealt with seriatim both as to sampling and analysis. Finally, there is a much-needed chapter on the analysis of linseed oil. This is especially valuable as the average foundry laboratory superintendent has only been trained in inorganic chemistry and needs help in the organic field. To complete the book there are 12 appendices, and amongst these is a list of text-books, occuping two pages. When the reviewer was in charge of a steelworks laboratory many years ago, the standard works were by Arnold, Ibbotson and Crooks. Such has been the progress made that none of these is included. As the book is sponsored by the British Cast Iron Research Association it would be advantageous if it could be made dynamic—by this is meant the publication from time to time of the analysis of materials not listed, such as molasses, flour, talc and mica, and the like, for those named have actually had to be analysed in one foundry laboratory. As this book already runs to over 550 pages, the reviewer would hesitate to recommend dilution with matter but seldom needed, yet it should be available if required. Perhaps one of the service departments takes care of this. The volume is rendered more valuable by the particularly good indexing of the subject matter. As prices go to-day the book is "inexpensive" and is of such a character that it is an essential addition to the library of every foundry laboratory in the country. If those which are to follow maintain the high standard set by this book, the ironfoundry industry will receive material benefits.

V. C. F.

Aluminium—Taschenbuch, 10th Edition. Published by Aluminium-Zentrale E.V., 31, Alleestrasse, Dusseldorf, Germany. Price 12.60 D. Marks.

The fact that a book reaches its tenth edition indicates that it has been generally accepted as a standard book. Moreover it has had the co-operation of many of the best-known German metallurgists and engineers. This "pocket book" runs to over 600 pages and covers every phase of the subject ultra-logically. There are 15 major sections, 70 sub-sections, and a few hundred sub-sub-sections. It is not all pure technology, as the various employers' organisations are listed and the standard specifications are given both for the pure metal and its alloys. Publications and books on the subject are detailed in an appendix and elsewhere. For those who can read German and are interested in aluminium and its alloys this book will be found to be both interesting and instructive.

Share-transfer Office Procedure, by M. F. Marshall Parkes, M.C., and G. Brian Parker, M.A., LL.D., published by Jordan & Sons, Limited, Chancery Lane, London, W.C.2, price 15s. net.

If, as the Authors think, it is the first time this work has been brought together into one book, it is certainly overdue and should be of invaluable help to the student, the secretary, and the registrar of a company. Well printed, of a handy size and "easy" to read, it covers the workings of a share-transfer office very thoroughly, and its appendices make it a self-contained volume. It is very moderately priced at 15s.

House Organs

Nickel Bulletin, Vol. 23, No. 11. Published by the Mond Nickel Company, Limited, Sunderland House, Curzon Street, London, W.1.

The Nimonic series of alloys forms the subject of an article in the current issue. The part played by these important nickel-chromium alloys in the practical realisation of the gas turbine is now well known, and the tabular data provided are therefore of considerable interest. These cover the alloys available and the specifications to which they are produced, the physical and mechanical properties, tensile properties and creep characteristics. Illustrations show examples of turbine blading, stator blades and combustion chamber components. Further material on the Nimonic alloys will be found among the abstracts published on high-temperature materials. In addition, physical data on nickel-containing permanent-magnet alloys production and experience with spheroidal-graphite cast iron are among other abstracts printed. Copies may be obtained free on application to Sunderland House.

USCO Magazine, January, 1951. Published by the Union Steel Corporation of South Africa, Limited, Vereeniging.

This issue inaugurates a series of articles on "Steel Towns of the World." Sheffield has been chosen to open the batting. The Grey Iron Productivity Team Report is reviewed at some length. For the rest, social events and sport with the organisation are very intelligently treated.

New Catalogues

Refined Pig Iron. Warner & Company, Limited, of Cargo Fleet, Middlesbrough-on-Tees, have just issued, perhaps a little belatedly owing to printing difficulties, a centenary commemoration brochure. After all, the centenary is one of the birth of an idea by Mr. Arthur Warner, for the actual works were not established until 1872, and this the firm claim was the birth of the refined-iron industry. The brochure runs to 32 pages and is brilliantly illustrated. The reviewer usually likes to have an appreciation of the size of castings illustrated, but it can be presumed, as the photographs were sent in from their customers, it would be too difficult to have dimensions indicated. However, many are of well-known castings. The catalogue is quite up to date and includes indications of the service given to producers of nodular irons; this, of course, involves the making of irons carrying 0.01 to 0.02 per cent. sulphur and 0.05 per cent. phosphorus. The section is adequately illustrated. Altogether it is a very commendable publication and is available to our readers on writing to Cargo Fleet.

Selecting Components for Die-casting

By W. M. Halliday

PRESSURE OR GRAVITY die-castings are customarily employed, either in respect of a new, component or as a substitute for some article previously manufactured by some entirely different method. With each of these applications very worth-while savings and economies may be attained. In the former case, it will be more readily possible to design a component *specifically* for die-casting, which policy will often ensure the achievement of the maximum advantages and economies inherent in the die-casting processes, which are fairly well known.

Where a proposed die-casting is to replace a component formerly produced, say, as a sand-moulded iron or brass casting; a sheet metal pressing; or a wholly-machined component, some restriction of the nature and scale of modifications applicable to the original design may be encountered. To the extent which such restrictions occur, the resultant design form selected for reproduction as a die-casting may fail in some respect, or even wholly, to conform with the requirements and limitations attaching to this method of casting. Whichever of these two design policies be adopted, the user will generally determine the basic features—at least—of the die-cast component.

Very often, however, such a user will possess but the scantiest practical knowledge of all the intricacies and problems associated with die-casting; the requirements of sound die design and construction; the properties of die-cast alloys; the vagaries of actual casting, and all similar critical points affecting closely the character of a component design, and its economical casting. Lacking full knowledge of these important practical matters, a component may unwittingly be evolved which embodies shapes, forms and features unsuitable for reproduction, or at best one which will be unnecessarily difficult to produce.

For instance, certain features may be stipulated which will prove extremely difficult and costly to form, in negative fashion, as a cavity in the die. Alternatively, features may be employed which will render the finished component less able to meet the rigorous service requirements required. The following notes, covering some of the chief points affecting component design, and giving the underlying reasons why certain preferred forms should be used, have been compiled to guide prospective users when developing a die casting. These are presented largely in the form of simple general rules, which broadly outline the requirements, possibilities and limitations associated with both gravity and pressure die-casting.

They will doubtless be found helpful especially when determining which particular die-casting process has to be employed; the kind of alloy to be used to ensure specific physical and mechanical qualities in the casting; and precisely what kind of features, shapes and forms may be advantageously incorporated in such a casting.

Gravity or Pressure-cast Component

One of the primary questions to be settled at the outset of any die-casting project, is whether the proposed article has to be made as a gravity or pressure die-casting. Several important considerations will require careful attention before this matter can be satisfactorily determined.

Choice of Alloy

The selection of a particular alloy will largely be determined by the nature of the functions required in the component, and the character of the service duty to be fulfilled. Naturally an alloy will have to be chosen possessing adequate physical, mechanical or other properties, which in the die-cast state, will enable the component to meet all, or most of the working requirements. When an extremely light but strong component is desired, it may at once be apparent that an aluminium or magnesium-alloy casting will have to be used.

If extremely light weight is not of paramount importance however, yet reasonable strength has to be attained, coupled with rigidity and durability, one of the well-known and now widely used zinc-base alloys may be found eminently suitable, especially if produced as a pressure casting. As a general rule, pressure die-casting is confined largely to the use of the lower-melting-point alloys, such as tin, antimonial lead, and zinc-base materials. Several aluminium alloys are also extensively used in the pressure die-casting process, being produced by the "cold-chamber" machines, which are, however, somewhat slower, thus castings may be slightly more expensive on this account than those in the lower-melting-point alloys produced by the more rapid hot-chamber type of machine.

Gravity die-castings are generally confined to the alloys in the higher-melting-point range, such as aluminium-bronze, aluminium-silicon, magnesium, copper-base materials, and certain brass alloys. As a further general guide to the selection of a die casting alloy, it is worth mentioning that most alloys capable of being sand-moulded may also be gravity die-cast, always providing their melting point lies within the suitable range, and that they are not unduly prone to "hot-shortness." Gravity die-castings will usually be appreciably stronger, more durable and slightly more ductile than the same material sand-moulded. The surface appearance and clarity of fine detail will also be much superior.

Where the same component can be produced as a pressure casting in the same alloy, it will be stronger and more durable than the gravity casting. The

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appearance, dimensional accuracy, and uniformity of shape will also be greatly superior to those obtainable with gravity castings, sand-moulded castings, pressings, or components fabricated by other non-casting processes. Gravity die-castings incidentally are well-suited for components in the light-weight alloys which have to be heat-treated after leaving the die, to improve their physical and mechanical properties, such as is desired in the case of components used for aircraft.

Not all alloys can be die-cast however. The limitations in this connection being the melting-point and the tendency towards "hot-shortness." Modern die-casting practice is therefore generally confined to the use of those alloys which melt, or can be operated, at temperatures not exceeding 1,000 deg. C. Higher temperatures than this may result in over rapid deterioration of the dies especially

TABLE I.—*General Properties and Features Governing the Selection of a Die-casting Alloy.*

Casting alloy.	Melting point. deg. C.	Tensile strength, tons per sq. in.	Advantageous features.	Disadvantageous features.
Lead-base alloys ..	238	3.6 to 4.5	Excellent corrosion resistance. Resists most acids. Free running in the die. Fine detail easily cast by pressure process. Good surface finish. Long die life. Small dia. holes can be cast with ease.	Low strength and other mechanical features. Low melting point. Lack of rigidity. Low abrasion resistance. Liable to extensive distortion on ejection. Easily marked on surfaces. Flashing prone to occur. Unable to withstand any but light loadings.
Tin-base alloys ..	204 to 238	3.5 to 4.5	High corrosion resistance. Suitable for part to be immersed in water. Good running and bearing qualities. Can be die cast with remarkably fine dimensional tolerances. Small taper required on cored holes. Fine, smooth surfaces. Long die life.	High cost of raw material. Low strength. Low abrasion resistance. Prone to distortion and warpage during ejection and use. Usually confined to use for die castings lightly loaded. Best suited for very small castings. Large ones will be weak on some sections.
Zinc-base alloys ..	371 to 382	18 to 22	Several good alloys available. Moderate strength-to-weight ratio. Low cost of raw material. Excellent reproduction of fine details. Good running in the die. Can be cast with very thin-wall sections. Small holes, down to 0.030 in. dia. easily cast. External/internal threads are possible. Excellent surface finish. Good corrosion resistance. Easy to machine.	Unsuitable for use with acids, excessive moisture or salt water. Only moderate elongation. Unsuitable for use at very high or low temps. Strength reduced by gravity die casting. Some susceptibility to impurities leading to loss of strength. Difficult to solder.
Aluminium alloys..	593 to 649	13.5 to 18	Very light weight. High strength-to-weight ratio. Excellent corrosion resistance. Good stability and durability. Reasonably good bearing and wearing qualities. High heat and electrical conductivity. Good surface finishes. Fine detail easily produced. Can be cast with relatively small wall thickness.	Usually more difficult to cast than zinc-base alloys. Small dia. holes, fine threads, etc., not possible. Lower rate of production. Material attacks die steel. Relatively high die-maintenance costs. Not easily soldered. Dimensional tolerances have to be greater than with low-melting-point alloys. Prone to shrinkage variations, etc.
Aluminium - bronze	1,037 to 1,093	29 to 35	Great mechanical strength and other physical qualities. High ductility. Exceptionally good wearing and anti-corrosion properties. Mechanical properties can be enhanced by heat-treatment after casting. Suitable for gravity die-casting method.	Relative high cost of raw material. Very short die life. Increased die maintenance costs. Thick walls to be allowed. Slow production speeds. Low electrical conductivity. Difficult to solder, or weld.
Magnesium alloys..	593 to 649	13.5 to 14.8	Extremely light weight. High strength to weight ratio. Approximately same physical and mechanical properties as best aluminium alloys. Ease of machining. Corrosion resistance moderate for general applications. Good stability and durability. Excellent running qualities. Good surface finish and fineness of detail.	On weight to weight basis cost of material is high. Increased cost of production due to high melting temperature, and proneness to ignition. Much wear on dies gives low die life. Corrosion resistance low with moisture, salt water, and some acids. Chemical treatment usually necessary to prevent corrosion.
Copper alloys ..	899	29 to 47	Considerable strength and durability. High corrosion resistance. Can be soldered and plated. Mechanical properties improved by heat-treatment. Produced with smooth surface finish and quite good detail.	High cost due to raw material and slow rate of casting. Large castings, *i.e.*, exceeding about 15 lb. not economical. Dimensional tolerances have to be kept large. Very short die life. Only certain forms can be pressure die-cast, but necessitate machines with high pressure. Die costs high, owing to use of hard alloy steels.

on critical cavity walls, and core surfaces, due of course, to the intimate contact occurring between these portions of a die and the molten charge admitted, and the resultant severe chemical attack taking place.

The advantages and disadvantages applying to various high- and low-melting-point alloys, as listed in Table I, will serve usefully as a further guide when selecting an alloy for a particular component designed to have specific mechanical, physical, or other features.

When initiating a component design it will be a useful practice to make a complete list of all the physical, mechanical, chemical or other qualities which *must* be possessed by the finished die casting, together with other specified conditions. Undesirable properties to be avoided in the component should then similarly be listed. On the basis of this information it will then usually be more easily possible to select a specific alloy which most satisfies all the listed preferred requirements, and is devoid as far as possible of the undesirable features.

In this regard it will prove unwise to allow a decision to be unduly influenced by the comparative cost of such alloys, because not always the least expensive one will give the most satisfactory working service.

Size of Component

To some extent the magnitude of surface area and weight of a proposed die-casting will also determine the process of manufacture to be adopted. Generally speaking, the larger and heavier castings can be produced much more economically and easily by the gravity method. With pressure die-casting considerable restriction arises in respect of size of component producible, owing to the need to instal the die upon a die-casting machine, the delivery capacity of molten alloy of which, per shot, will be limited.

The effective working surfaces of a pressure die, that is, those in which the essential cavity configurations, cores, and ejector mechanisms can be situated, will similarly be controlled by the size of the machine. The cavity formations, coring provisions, ejectors, and kindred elements will normally have to be located strictly within a specific area, which is determined by the space between the main guide bars of the machine, the position of the injecting nozzle, the size of the platens on which die is mounted, and the capacity of the ejector box casting at the rear of the movable platen.

With modern large-size automatic pressure-die-casting machines, the maximum surface area capable of being reproduced on a casting will usually not be greater than about 250 sq. in. On the other hand, gravity dies, being specifically designed and constructed for manual operation will be relatively free from the foregoing limitations. Thus larger castings can normally be produced without difficulty or additional cost of operation.

Aluminium gravity die-castings have been produced, on a production basis, weighing as much as 120 lb., and having considerable surface area. Magnesium gravity die-castings ranging up to about 50 lb. may be cast in the same way, whilst zinc-base gravity castings weighing up to 45 lb. are quite feasible. Zinc-base alloys, by the way, whilst capable of being gravity die-cast quite easily, are generally regarded as being rather unsatisfactory, because of the coarsened grain structure. This may be the source of some embrittlement and unsatisfactory service especially if the component is subjected to irregular, intermittent loading, or an undue amount of vibration when in use.

Physical Limitations

The overall dimensions, and to some extent the weight and shape of a pressure die-casting, in any alloy, will be conditioned by a further important factor worthy of note by the component designer. With pressure casting it is essential to hold together the two halves of a die very powerfully during the actual injection of the molten charge. The latter may be pumped into the die under pressure ranging from about 1,000 to 3,000 lb. per sq. in. and at velocities anything up to 400 ft. per min. Thus the forces acting internally in the die cavity and tending to open the die will be tremendous. Therefore, for safety's sake the " projected surface area " of the die cavity (which is the exact reverse of that of the component) must be kept sufficiently small to insure that the total opening pressure will always be *less* than the clamping pressure available for holding the die closed. Failure in this critical respect would incur the risk of the die opening at the instant of injection, and the leakage of metal across the parting line surfaces. This in turn would lead to gross inaccuracies on important dimensions of the casting, and the formation of unduly-thick flash at the sides thereof, involving considerable difficulties in trimming.

Quantities Required

The total quantity of die castings required is also an important factor governing the choice of process. In the general run, quantities below about 5,000 will be found uneconomical as pressure die-castings, due to the fact that die manufacturing costs will be large and when distributed over a small number of components will be found to inflate the unit cost. Moreover, the method of production is so rapid that the overhead costs of setting up a complex die-casting machine for a small quantity would in most instances prove prohibitive. In certain special cases, however, quantities of 5,000 or even fewer may show overall economies to a user if the component is produced from a single cavity tool, and its use enables costly machining or assembly operations, formerly employed, to be eliminated. With gravity die-casting suitable quantities range from 2,000 up to about 5,000 parts.

Again, exceptions to this will frequently occur in practice since a great deal depends upon the complexity of the part, the type of alloy, and the magnitude of savings to be effected by using a casting to displace more expensive machine parts. Gravity dies are nearly always designed with a single cavity formation, in order to facilitate their handling and general manipulation, and also to keep the cost as low as possible. Very small castings, weighing only a few ounces and of fairly intricate shape, may however be successfully gravity cast, in a single

Selecting Components for Die-casting

spray, from a die with a number of duplicate impressions.

Pressure dies, on the other hand, are most often of the multiple impression type, so that for each shot a whole set of castings will be produced, thus ensuring large-scale production and low unit cost per piece. Furthermore, gravity dies, by reason of the purely manual operation entailed in their use, will be worked at much slower speeds, so to produce very large quantities would incur much additional cost, in comparison with pressure die-casting. With gravity dies a good output may be regarded as from 300 to 350 castings per working day, whereas with the pressure method anything up to 2,000 shots per day may be achieved. If a multiple-impression die is employed as many as 25,000 castings daily may be produced without difficulty.

Initial Die Costs

Another factor certain to arise for consideration is that of the cost of the necessary dies. These very often will determine the selection of the particular casting process adopted. When assessing these, much depends upon the character of the component, its intricacy, and the degree of dimensional accuracy desired. The kind of alloy and the quantity of parts to be produced will also have an important bearing upon the design, construction, and materials used in the die, and thus its resultant cost. As a general guide, gravity dies will cost from 3 to 10 times *less* than a comparable pressure die, because of their greater simplicity of construction and operation, and the use of only one cavity.

With both gravity and pressure die-castings, considerable economies can often be achieved, which will go far to offset initial die costs, by combining several components, previously made by some other method, into a single casting. Such overall savings should always be measured against first die costs to obtain a fair assessment of costs. Conversely, sometimes greater economy may be achieved by using several simple forms of die castings, in place of a single complicated article formerly produced in some other way. This will often be the means of permitting the use of two or three relatively-simple, and therefore less-expensive, dies.

Die Life and Maintenance Costs

In many instances when considering initial die costs it will prove useful to consider also the allied question of die maintenance and costs involved, or in other words the anticipated working life to be obtained from a die. Gravity dies are normally subject to much more severe handling than pressure dies, expressly due to their form of use. Therefore, damage, wear and error are more liable to arise with such tools, which in turn may cause inaccuracies on some critical dimension, or serious loss of shape, or excessive flash formation on the joint.

These tendencies towards damage and wear will be aggravated when alloys of very high melting points are used, which will entail some chemical action on the die steel. Use of alloys at such elevated temperatures also mean that the gravity die has to be worked at a high temperature, unlike the pressure die. This again will give rise to excessive alteration in the expansion and contraction of the die itself. Slender cores, ejector plugs, and sharp edges or corners of the die cavity may all suffer speedy damage and wear from the above causes, hence the need for closer maintenance attention.

A soundly-constructed gravity die should suffice for producing about 10,000 to 35,000 castings with reasonably-uniform accuracy of size and shape. This again will depend upon the kind of alloy used, the die materials, and the degree of intricacy of the component. If magnesium alloy be used, a somewhat longer working life may be expected, *viz*., from 25 to 30 per cent. more due to the fact that this alloy does not so readily attack the die steel. With pressure die-castings in zinc-base alloy, 25,000 components or more may be produced quite satisfactorily. Dies for producing pressure castings in aluminium alloy will be good for 25,000 to 100,000 parts. Dies for producing castings in copper alloys have a much shorter working life, *i.e.*, from 5,000 to 25,000 parts.

Here, again, it should be emphasised that much depends upon the melting point of the alloy, the die materials, whether the die is heat-treated, the complexity of the cavity shape, and the weight of the casting.

Quotations

It is worth mentioning that die costs are usually quoted separately and distinct from the cost of components. Customary practice is to charge part cost only of this tool. This is done on the understanding that the die remains in the possession of the die caster, with the client having exclusive use therefrom, and all reasonable maintenance required on the die to produce the quantity of parts ordered shall be borne by the die caster. This is a good practice, often resulting in the greatest practical advantage for the user, especially when very large quantities of parts are ordered, and the component design has been stabilised.

Gas Exhibition Hall Rebuilt

Redesigned and rebuilt after having suffered heavy damage during the war, the Watson House Exhibition Hall of the North Thames Gas Board at Fulham, London, S.W.6, was opened last Thursday by Prof. James M. Mackintosh, Professor of Public Health, University of London. Among those present at the ceremony was Sir Edgar Sylvester, chairman of the Gas Council and the chairmen of the Area Gas Boards.

English China Clays, Limited, has made an offer to acquire the entire issued share capital of Lovering China Clays, Limited (425,000 £1 shares), in exchange for an equivalent number of the company's ordinary £1 shares. The offer is conditional upon the fulfilment on or before March 28 of the following conditions:—(i) Acceptance by the holders of 90 per cent. of the issued shares of Lovering China Clays, Limited, or such less percentage (if any) as the offerors may elect; (ii) the increase of the share capital of English China Clays, Limited, by the creation of 425,000 ordinary £1 shares.

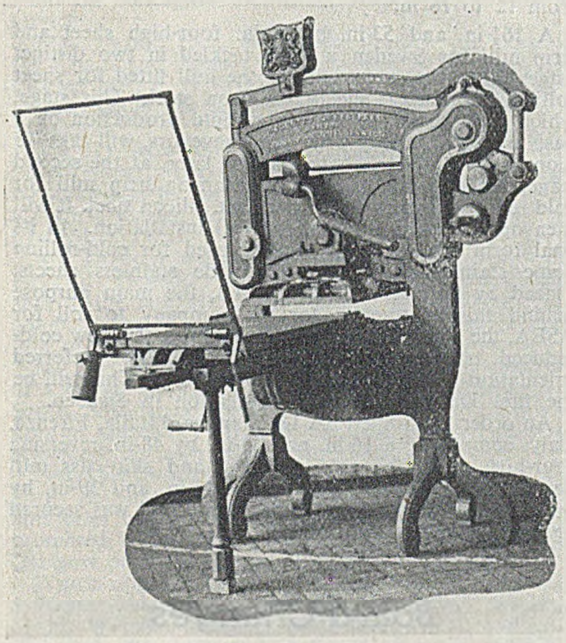
Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

HISTORIC PRINTING PRESS

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—We have noted with interest the picture and comments on the historical printing press shown on page 226 of your issue of March 1, and we thought perhaps you might be interested in the enclosed photograph, which is of a very similar type of printing press made by this company round about 1840. Apparently this company made numbers of this type of press, which you will see from the photograph bears the Royal Coat of Arms and the wording " Leggett's Queen Press made by J. R. & A. Ransome, Ipswich."



This press has now been purchased back by this company from a small firm of printers quite near to Ipswich. They informed us that they had been using this press for approximately 100 yrs. and only recently decided to put in a more modern type. The press itself is in the most wonderful state of preservation and we are proposing to keep it as a relic of the past. It is interesting to note that except for the very elaborate design of the Columbian Press, the working details are similar in many respects.

Yours, etc.,
for Ransomes, Sims & Jefferies, Limited.
H. H. DAWSON,
Director.

March 6, 1951.

CORE BLOWER OPERATION

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—Due to some misunderstanding, an amended discussion to the paper on " Coreblower Application and Operation " was not submitted to you. This means that one reply to a Mr. Colwell does not read correctly. The correct reading is as quoted:—

" MR. FEARFIELD answered that his foundry had used resins with success. They were using Congleton sand: 168 lb. of sand, 1¾ lb. cereal, 1¼ lb. of resin, 2¼ pints of water, ½ pint parting compound. Any tendency to stickiness in the core-box could be remedied by a small addition of parting compound. The tensile strength was 124, 126 and 128 repeated, and there was a scratch test of 70 to 80. Fine sand was rather sticky to get along with."

Yours, etc.,
G. W. FEARFIELD.
Ley's Malleable Castings Company, Limited.
Derby, England.

March 6, 1951.

NOT NATIONALISED

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—We observe that in the editorial article headed "Au Revoir" in your issue of February 15, 1951, you include the Sheepbridge foundries amongst the eighteen foundries which were stated to have been lost to private enterprise as the result of the nationalisation of the iron and steel industry.

We are happy to inform you, however, that the foundries at Sheepbridge were included in the " hiving-off " operation carried out in 1948, and were transferred to Sheepbridge Engineering, Limited, which company with its many subsidiaries continues under private enterprise.—Yours etc.,

G. R. CLARKE,
Secretary.
Sheepbridge Engineering Company,
Chesterfield.

March 5, 1951.

Steelfounding Productivity

Target announces that an American foundry team is to visit this country. Amongst the firms to be visited is F. H. Lloyd & Company, Limited. The appended table shows the commendable progress made by this firm over the last five years.

The F. H. Lloyd & Co., Ltd., Productivity Chart.

Year.	Castings despatched (tons).	Average earnings per employee, manufacturing departments.	Average output per man per year manufacturing departments. (tons.)	Percentage scrap and castings rejects.
1946	12,289	£7 4 10	11.6	6.7
1947	14,196	£7 14 5	13.2	7.2
1948	16,776	£8 7 6	14.6	6.4
1949	17,472	£8 15 2	14.9	5.3
1950 (*first nine months only*)	18,400	£9 2 10	15.5	4.4

1950 (*first nine months only*), Annual output per man, based on all employees (1,500), 12.3 tons.

Hot Ingot Transported nearly 200 Miles

Believed to be the first experiment of its kind, a 13½-ton hot alloy ingot was recently transported nearly 200 miles from Dominion Iron & Steel, Limited, at Sydney, to Trenton Steel Works, Limited, at Trenton, N.S. According to a report published in " Blast Furnace and Steel Plant," December, 1950, the ingot was allowed to solidify, was stripped and placed in a cast iron box insulated with a pre-moulded vermiculite. The remaining space was filled with loose vermiculite and the steel lid placed on the box. It was securely fastened and braced to the railway car floor. The ingot was at 925 deg. C. on leaving Sydney and arrived at Trenton with a temperature of 860 deg. C. Transferring ingots while hot eliminates the danger of cracks from cooling and reduces costs.

Parliamentary

Imported Finished Steel Prices

Asked by Mr. Osborne why a price-fixing policy for imported finished steel had been adopted, and why a loss on this account of £6,282,064 was transferred from the trading account to capital account, Mr. G. R. Strauss, Minister of Supply, said that imported finished steel cost more than home-produced steel, and the extra costs, including import duty, had as a matter of policy been borne by public funds in order to secure maximum imports and to maintain uniform steel prices to United Kingdom consumers. The additional cost in question was written off by transfer to the capital account, since it did not arise from ordinary trading operations and was not recoverable in future sales.

Aluminium Exports

The Minister of Supply was asked by Mr. M. Lindsay how many aluminium ingots and how much aluminium scrap were exported from Great Britain in the last three months of 1950.

In reply, Mr. Strauss said that 721 tons of aluminium ingots was exported during the last quarter of 1950, but much of this was in respect of licences already granted. Exports of aluminium ingots were now restricted to a small, token quota. Shipments of aluminium scrap were not separately recorded in the Trade and Navigation Accounts, but an export licence for a quarter of a ton was issued during the same period.

Increases of Capital

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

MANGANESE BRONZE & BRASS COMPANY, LIMITED, London, W.1, increased by £300,000, in 5s. ordinary shares, beyond the registered capital of £350,000.

W. TYZACK SONS & TURNER, LIMITED, steelmakers, etc., of Sheffield, increased by £80,000, in 5s. ordinary shares, beyond the registered capital of £120,000.

RICHARDS (LEICESTER), LIMITED, constructional engineers, ironfounders, etc., increased by £120,000, in £1 shares, beyond the registered capital of £30,000.

DYSON & COMPANY, ENFIELD (1919), LIMITED, die-casters, etc., of London, E.C.2, increased by £110,000, in £1 shares, beyond the registered capital of £40,000.

ARTHUR BALFOUR & COMPANY, LIMITED, Sheffield, increased by £50,000, in 10s. ordinary shares, beyond the registered capital of £450,000.

COAL & IRON TRADES INSURANCE COMPANY, LIMITED, Birmingham, increased by £200,000, in £1 ordinary shares, beyond the registered capital of £50,000.

HEENAN & FROUDE, LIMITED, engineers and ironfounders, of Shrub Hill (Worcs), increased by £25,000, in 5s. ordinary shares, beyond the registered capital of £975,000.

HENRY BALFOUR & COMPANY, LIMITED, engineers and ironfounders, of Leven (Fifeshire), increased by £70,000 in £1 ordinary shares, beyond the registered capital of £80,000.

WOLVERHAMPTON DIE-CASTING COMPANY, LIMITED, increased by £105,000, in 170,000 6 per cent. cumulative preference shares of 10s. and 200,000 ordinary shares of 2s. each, beyond the registered capital of £195,000. The capital has been reorganised and is now £300,000 in 300,000 6 per cent. cumulative preference shares of 10s. and 1,500,000 ordinary shares of 2s. each.

An interesting announcement is made by the Paints Division of Imperial Chemical Industries, Limited, Wisham Road, Slough, that they have developed and placed on the market Hot Spray "Dulux," which has many industrial applications. The gun used incorporates a heating chamber for raising the temperature of the paint to 160 to 165 deg. F. Better flow, and a reduction in the solvent content, associated with a fewer number of passes are claimed for this new technique.

Davy-United's Export Orders

Orders for rolling-mill equipment from Canada, the United States, Sweden, and Italy totalling nearly £750,000 are announced by the Davy & United Engineering Company, Limited, Sheffield. Of this total more than half is represented by hard-currency orders, included in which are contracts alone worth nearly $500,000. The order for Canada covers the supply of five Morgan mills to the Algoma Steel Corporation, and comprises one 24-in. vertical mill, two 16-in. vertical mills, and two 12-in. edging mills. The dollar contract secured from the U.S.A. comes direct from the Morgan Construction Company, the original designers of the famous marque of continuous high-production mills which bear the company's name and with which Davy-United has worked in close association for over 30 years. The order comprises 12 edging mills ranging in size from 12 to 16 in.

A 16½-in. and 53-in. by 56-in. four-high sheet and strip mill for Sweden will be tackled in two distinct stages. The first stage will see the mill fitted for sheet rolling of electrical sheets in silicon steel. This stage, which will enable the mill to go into production on a basis of hand feeding with belt conveyors, will take 15 months to complete. Nine months later, at the second stage, the mill will become a reversing strip mill for cold reduction of up to 3.5 per cent. silicon steel. It will then operate as a fully mechanical installation. In its final form the mill will also be used for cold-rolling some stainless-steel strip and wide stainless sheets. Placed by Surahammar Bruks AB, the main purpose behind this contract is for the company to roll for ASEA, the chief Swedish electrical group, this new cold-reduced transformer sheet which has the preferred orientation for such electrical applications. This will be the first Davy-United mill installation in Sweden.

An order from Spett SA La Magona d'Italia, Firenze, Italy, comprising a 16-in. and 53-in. by 48-in. reversing four-high combined cold-reduction and skin-pass mill for tinplate and wide strip and a 13-in. and 39-in. by 36-in. four-high reversing cold tinplate mill was secured against strong US competition.

Board Changes

Thomas Bolton & Sons, Limited—Dr. W. E. Alkins and Cmdr. W. T. A. Bird have been appointed directors.

Metal Traders, Limited—Brig. H. P. Crosland has been elected chairman in place of the late Mr. Frank L. Baer.

British Jeffrey-Diamond, Limited—Mr. D. Pearson, chief engineer of the mining division, has been elected a director.

Colvilles, Limited—Mr. Peter Baxter has resigned from the board, and also from the boards of certain associated companies, owing to ill-health.

International Combustion (Holdings), Limited, and International Combustion, Limited—Mr. F. G. Penny has been appointed managing director of both companies in place of Sir George Usher, who remains on both boards.

Power Securities Corporation, Limited—Mr. C. K. F. Hague, deputy chairman and managing director of Babcock & Wilcox, Limited, has been appointed a director to fill the vacancy caused by the death of Sir John Greenly.

Goodlass Wall & Lead Industries, Limited—Mr. H. S. Tasker, who retired from active employment on February 28, has resigned the chairmanship, but continues as a director. Mr. J. L. McConnell, the vice-chairman, has been appointed chairman.

Personal

Dr. J. G. Wilson has been promoted to a Readership in Physics at Manchester University.

Mr. G. A. Morgan, managing director of Padley & Venables, Limited, Sheffield toolmakers, has returned from a business trip to Sweden.

Mr. Charles G. Ferguson, deputy principal of Stow College, Glasgow, has been appointed head of the department of mechanical engineering in Dundee Institute of Art and Technology.

Lieut.-Col. Austin G. Bates has been elected chairman of the General Council of British Shipping, and Mr. C. E. Wurtzburg and Viscount Runciman have been elected joint vice-chairmen.

Mr. Walter Clare, senior power station driver with the Shelton Iron, Steel & Coal Company, Limited, Stoke-on-Trent, has received presentations from his colleagues on his retirement after 53 years' service.

Mr. Frank Law has been elected chairman of the Chain and Anchor Manufacturers' Association to succeed MR. E. N. WOODHOUSE, who had intimated that he could not again accept the position owing to ill-health.

Mr. T. Rowland Hill, a director of the City Sheet Metal Works, Limited, Leicester, has been nominated as the next Lord Mayor of Leicester. He was first elected to the Labour group on the City Council in 1926.

Mr. Donald Morris, who has been appointed secretary of General Refractories, Limited, in succession to the late Mr. James Walker, has been with the company for 14 years and formerly occupied the position of cost accountant.

Mr. M. Coverdale, general manager and secretary of Charles W. Taylor & Son, Limited, ironfounders, South Shields, completed 50 years' service with the firm on March 3. To mark the occasion, the directors presented him with an inscribed silver salver.

Newman Industries, Limited, announce that Mr. E. R. A. Milne, A.M.I.E.E., who was formerly an assistant sales engineer in the Manchester area, has been promoted to be branch manager for Scotland at their Glasgow office, in charge of electric motor sales.

While going to catch a bus in Brighouse, last week, a 76-year-old retired iron fettler, Mr. Allen Hodgson, of 12, Woodlands Place, Birds Royd Lane, collapsed and died. He had worked for 38 years at J. Blakeborough & Sons, Limited, engineers and valve makers, Brighouse, retiring in 1941.

Major E. C. Peckham, managing director of Metalock (Britain), Limited, is now on the last lap of a 20,000-mile business tour. He visited ten countries, including the United States and Canada, in February, and last week flew to Lisbon to complete some discussions. The Metalock process of cold repair to iron castings is being widely used by industrialists and shipping companies all over the world.

Mr. W. Craig, who has served the Glasgow firm of J. & E. Hall, Limited, refrigerating engineers, for half-a-century, was honoured at the annual dinner to senior employees on March 6, when he was presented with a cheque by the deputy chairman of the company, Mr. V. A. Patterson. Proposing the toast of "The Glasgow Works," Mr. Arthur Greenfield spoke of the increasing difficulty of getting work, with competition becoming more keen.

Mr. Leslie Gamage, vice-chairman and joint managing director of the General Electric Company, Limited, *en route* for Australia, will doubtless muse over some of the many changes he can expect to find in his business interests there since his last visit 15 years ago. In the intervening years the British General Electric Company, Limited has expanded both its sales and manufacturing interests in Australia. He will meet and discuss mutual problems with Sir Harry Brown, chairman and joint managing director of B.G.E., and Mr. E. Hirst, the company's vice-chairman and joint managing director.

A business visitor to the Commonwealth is Mr. R. Kent, sales director of George Kent, Limited, the Luton industrial instrument manufacturers, who sailed for Australia on March 1, accompanied by Mrs. Kent. He is making an extensive tour of the company's branches and agents both in Australia and New Zealand, and will return home by air *via* America. Although this is Mr. Kent's first visit to Australia, he has done a great deal of foreign travelling on behalf of his firm, including a year and a half with the South African branch in Johannesburg before the war.

Obituary

Sir Colman Battie Walpole Rashleigh, chairman of New Consolidated Mines of Cornwall, Limited, has died at the age of 77.

Mr. R. S. Robinson, a partner in the former engineering firm of Blake & Robinson, Limited, Sunderland, has died at the age of 62.

Mr. S. J. Ellis, who had been in charge of the mechanical engineering laboratories at Birmingham University for the past 32 years, died suddenly last Friday.

Mr. John Kingsley Rooker, who died in Paris on February 28, was a director of A. Johnson & Company (London), Limited, exporters and importers of Swedish iron and steel, etc. He was 64.

Mr. Arthur Henry Peppercorn, well-known locomotive designer, has died at Doncaster at the age of 62. He retired in 1949 from his position as chief mechanical engineer of the Doncaster Railway Works.

Mr. J. R. Lynas, who was secretary of John Spencer & Sons, Limited (now John Spencer & Sons (1928), Limited), before its iron and steel works at Newburn (Northumberland) were closed in 1924, has died at the age of 84.

Mr. James McNeal Allan, a former managing director of the Sheffield and Penistone works of Cammell, Laird & Company, Limited, died on February 28. He was 91. Mr. Allan became managing director in 1913, retiring from the position in 1928. He was chairman of the Midland Railway Carriage & Wagon Company, Limited, Birmingham.

Mr. Robert Fenwick Brigham, chairman and managing director of Brigham & Cowan, Limited, shiprepairers, of South Shields, has died at the age of 87. He was one of the oldest ship-repairers in Britain. He was also chairman of Brigham & Cowan (Hull), Limited, and of the British Arc Welding Company (NEC), Limited. Mr. Brigham joined Brigham & Cowan as managing director in 1898 after the death of his father, Mr. T. E. Brigham. The company is stated to be the oldest private family ship-repairing firm in Britain. Mr. R. F. Brigham introduced arc welding to Britain in 1910 when he bought patents from a German firm and formed the British Arc Welding Company. He was also a pioneer of the gas turbine.

Wills

Smith, Capt. E. C. E., late chairman of Rolls-Royce, Limited, and a director of John Brown & Company, Limited, Clydebank, and other companies £266,152

Murray, Donald, late a director of Walkers, Parker & Company, Limited, lead manufacturers, of Newcastle-upon-Tyne, and of the Cookson Lead & Antimony Company, Limited £38,335

News in Brief

IT HAS BEEN DECIDED to hold the next conference of the Combustion Engineering Association in May, 1952.

BRADLEY FORGE & ENGINEERING COMPANY, LIMITED have extended their Abercorn brass foundry and installed another ½-ton furnace for non-ferrous castings.

THE *Engineer and Foundryman* has changed its address to Rooms 402-5, Fourth Floor, Transvalia House, 21, Stiemens Street, Braamfontein, Johannesburg.

THE SECOND annual summer school of production engineering, organised by The Institution of Production Engineers, will be held at the University College, Durham, from August 29 to September 2.

AN ORDER for 900 brake blocks made of CY abrasion-resisting alloy has been despatched to Holland by Follsain Wycliffe Foundries, Limited, Lutterworth, near Rugby. This is the largest single export order to date for these special brake blocks.

TEES TRADE RETURNS for the month of January record a decline of 80,000 tons in the imports of foreign ore and a 17,000-ton drop in the imports of iron and steel scrap. There were increased tonnages of chemicals and manufactured iron and steel shipped overseas.

THE ASSETS OF JOHN EVERY (LEWES) LIMITED were acquired by East Sussex Engineering Company, Limited, on February 27. The nature of the business undertaken will be of the same type as hitherto—that is iron and brass founding, and constructional engineering.

A TEAM, under the auspices of the Anglo-American Council on Productivity, will shortly visit America to study the relationship between universities and industry in that country. The leader will be Dr. Dunsheath, director of Henley's Telegraph Works Company, and also chairman of Convocation of the University of London.

DETAILS OF A PROJECT to harness the water power resources of an area of 250 sq. miles in Sutherland were announced in Edinburgh on Monday last by the North of Scotland Hydro-Electric Board. Its estimated cost is £8,000,000 and will involve the erection of one main and six subsidiary power stations with a total capacity of 44,000 kW.

THE MANAGING DIRECTOR of T. & C. Clark & Company, Limited, Shakespeare Foundry, Wolverhampton, Mr. Howard Edwin Perry, celebrated his 80th birthday on Tuesday of last week. On Wednesday night Mr. and Mrs. Perry were entertained by the directors of the firm to a staff dinner, when there were presentations from directors and staff.

ON BEHALF OF THE STAFF, Mr. J. W. Harrison, with 36 years' service, handed to Mr. Perry an inscribed musical cigarette box. The youngest member of the staff presented a bouquet to Mrs. Perry. On Thursday there was a short ceremony at the works, during which one of the oldest employees, Mr. S. Harris (34 years' service), on behalf of the workmates, presented Mr. Perry with a table lighter.

LEVELLING of the 10-acre site at Barugh Green, near Barnsley, has commenced in preparation for building a new factory for Brook Motors, Limited. The payroll at the existing factory at Barnsley now numbers over 400, and it is estimated that the new works will absorb a further 600 people. It is hoped that the new building will be completed by the end of this year.

REPRESENTATIVES of the British Electricity Authority and consulting engineers have inspected a 132,000-volt air-blast circuit-breaker built at Hebburn by A. Reyrolle & Company, Limited, for Barking power station. Twenty-three circuit-breakers of this kind are to be installed at Barking. The company has orders for similar equipment for a power station at Drakelow-on-Trent.

A STANDARD TARIFF for electricity supplies to industry throughout south-west Scotland would probably come into operation within the next 12 months, Mr. J. Gogan, chief commercial officer of South-West Scotland Electricity Board, told a gathering of electrical engineers at Paisley on March 6. He added that the tariff would apply whether the industry was located in the wilds of Lanarkshire or adjoining a distribution centre.

THE ROYAL SOCIETY OF ARTS announce that the Industrial Art Bursaries Competition organised by them resulted in Mr. Ronald David Carter, a student at the L.C.C. Central School of Arts and Crafts, and Mr. Michael Fitzpatrick, on the staff of Radiation Group Sales, Limited, Birmingham, winning £150 prizes, whilst Mr. Colin Tonks, also of the Radiation Group Sales, Limited, Birmingham, was commended in the Domestic Solid-fuel-burning Appliances Section.

THE UNITED KINGDOM TRADE COMMISSIONER at Johannesburg has reported that the City Council of Johannesburg are inviting tenders for the supply of foundry equipment as follows:—One 18-in. dia. cupola, complete with a fan or blower, motor and starter of adequate capacity, and a complete set of loose refractory bricks; one gas-fired core-drying oven, 6 ft. by 3 ft. by 3 ft., with steel walls suitably insulated and with thermostatic temperature control; one core-sand mixer with a capacity of approximately 50 lb. per batch, to be motor-driven, and one core-extruding machine to produce cores from ¾-in. to 3-in. dia. rising by ⅛ in. Tenders must reach the Town Clerk at the Municipal Offices not later than 10 a.m. on April 5, 1951, and the covering envelope should be marked "Contract No. 367—Foundry Equipment." A copy of the tender documents is available for inspection by representatives of interested United Kingdom manufacturers at Commercial Relations and Exports Department (Industries Branch), Board of Trade, Thames House North (Room 1085), Millbank, S.W.1. (Reference C.R.E. (IB) 55651/51.)

International Nickel Appointments

The new chairman of the International Nickel Company of Canada, Limited, is John F. Thompson, who succeeds the late R. C. Stanley. President of the company since 1949, Dr. Thompson will combine the duties of both offices. He received his early training as a mining engineer, and spent three years as assistant in the metallurgical department of Columbia University before joining I.N.Co. in 1906. His early work with the company was concerned with research; later he dealt with plant construction and technical activities. In 1931 Dr. Thompson was made a director and a member of the executive committee and five years later he was appointed executive vice-president.

Paul D. Mercia, the company's executive vice-president, has been elected a member of both the executive committee and the advisory committee. He joined the company in 1919 as director of research and was responsible for the development of numerous iron/nickel and copper/nickel alloys.

Mr. R. L. Prain's appointment to the board of the International Nickel Company of Canada, Limited, is announced. Mr. Prain, who is well known in mining circles in London, is chairman of Rhodesian Selection Trust, Limited, chairman and managing director of Roan Antelope Copper Mines, Limited, chairman and managing director of Mufulira Copper Mines, Limited, chairman of the Anglo Metal Company, Limited, and a director of the Climax Molybdenum Company of Europe, Limited, in addition to holding directorships of several other companies mainly connected with mining.

Reinstatement in Civil Employment Act

By F. J. Tebbutt

THE Reinstatement in Civil Employment Act, 1950, amplifies the provisions of the 1944 Act (now in the National Service Act, 1948) and brings these into conformity with current matters, and although Korea was the reason for the new Act, it has been constructed so that it can apply to any other incident which might arise (*e.g.*, "Z" reserves).

This legislation of course places an obligation upon employers to reinstate former employees in civil employment on discharge from the Forces. It should be understood, however, that the Acts do not apply in respect of Regular Servicemen the principle adopted by the Government (*vide* Parliamentary statements) being that when the State compels a man to leave his civilian job and enter the services (*i.e.*, Army, Navy, Air Force) he is entitled to have his job back when his compulsory period of service is finished. But when a person volunteers for a regular engagement he has chosen the Service as a career; but it should be noted that some volunteers for temporary service are included as will be seen. It might be useful to note that, as the term "whole time service" is used in the Act and this article, this means the two years to be served as a National Service man, such men being required afterwards to do "part time service" (*i.e.* as a Territorial) and has nothing to do with Regular engagements.

National Servicemen during their "whole time service" are already covered for reinstatement rights under the older Acts, but this new Act (1950) brings in more classes of persons such as: Reservists (officers and other ranks) called up; persons who enlisted for 18 months for service in Korea; National Service men whose "whole time service" was due to end before October 1, 1950, and who volunteered (between July 15 and October 1, 1950) for another six months after their "whole time service" would have expired.

Any person within the categories as above, who may have been returned to civil life (*e.g.*, medically unfit for service) before the passing of this 1950 Act (that is. December 15, 1950) is, nevertheless, covered for reinstatement, this new Act providing for this.

Matters of Importance

The obligation upon employers is that the person on return to civil life should be re-employed in the occupation in which he was last employed before starting Service and on terms and conditions not less favourable to him than those which would have applied had he not joined the Forces; if it is not "reasonable and practicable" for the person to be so re-employed the obligation is met by providing employment in the most favourable occupation and on the most favourable terms and conditions which are "reasonable and practicable" as regards the returned person.

The returned person is required to make application to his former employer, which must be made during the period beginning with the end of the applicant's service and ending with the third Monday after the end thereof, and the employer must be informed when he will be available to start work at a date not later than 21 days from the latest application date allowed as above. These dates (for the categories mentioned above) are extensions beyond the period allowed ordinarily under the main National Service Acts, being an extra period of seven days in each case.

Employment on re-engagement must continue for 26 weeks or for as much of the period as is "reasonable and practicable"; if the pre-Service employment had been for at least 52 weeks, 52 weeks re-engagement applies instead of 26 weeks, and on the other hand if employed for only 13 weeks previously, only 13 weeks applies.

To determine questions between the parties, there are Reinstatement Committees and if a Committee decides that the employer is at fault as regards re-employment (decisions mostly turn on the term "reasonable and practicable") an Order can be made requiring that employment be found and/or an Order made requiring compensation to be paid the returned person for any loss suffered. But this is not to exceed the amount of the remuneration which an employee, under the Act, is entitled to receive.

Ministry of Labour Exhibition

The Ministry of Labour and National Service is organising an exhibition on the theme "Man-power: The Human Factor in Industry." It will be open for approximately six months from May 18 at the Ministry's Safety, Health, and Welfare Museum in Horseferry Road, Westminster, London, S.W.1. The exhibition will point to the more important factors in the efficient use of man-power to-day, and will illustrate the achievements of this country in the field of human relations in industry. The main sections of the exhibition will deal with:—Vocational guidance for young people; employment and advisory services; training and apprenticeship schemes; training and resettlement of the disabled; industrial health; industrial relations; joint consultation, and personnel management; welfare, and safety in the factory.

Many interested organisations, including the British Institute of Management, the Institute of Personnel Management, the British Association for Commercial and Industrial Education, the National Institute for the Blind, the National Institute of Industrial Psychology, the Industrial Welfare Society, the Royal Society for the Prevention of Accidents, the British Council for Rehabilitation, the Council of Industrial Design, and the International Labour Office, are co-operating with the Ministry and other Government departments in staging the various sections of the exhibition. Admission will be free, and the exhibition will be open from 10 o.m. to 6 p.m. daily, Monday to Saturday.

Monopolies and Restrictive Practices

The second annual report by the Board of Trade on the working of the Monopolies and Restrictive Practices (Inquiry and Control) Act, 1948, reveals that several new subjects have been referred to the Monopolies Commission. The report is one made annually by the Board of Trade. Reports by the Monopolies Commission itself deal with subjects referred to it, and appear as and when investigations are completed. Its first report (on the supply of dental goods) was published last December, and a report on the supply of cast-iron rainwater goods is expected in a few weeks' time.

The Board of Trade reports progress with inquiries into the manufacture of electrical filament lamps, insulated wires and cables, and machinery for making matches. Reports are expected to be submitted this year. New matters referred to the commission include the supply and export of certain semi-manufactured products of copper and copper-based alloys. The Board of Trade is asking only for investigation into the facts. The main interest in that subject, it is stated, "may be found to lie in the study of an international agreement which is known to be in operation."

Bulk Electricity Supply Charges

The cost of electricity to the Area Electricity Boards will be increased as from April 1, on which date a revised tariff will come into force which is estimated to increase the overall cost of bulk supplies by approximately 2 per cent., although the effect on individual boards will vary. This increase is exclusive of the effect of the recent rise of 4s. 2d. per ton in the price of coal.

The tariff incorporates a fixed charge per kilowatt of maximum demand and a running charge per unit consumed. It will apply on a uniform basis to all area boards, subject only to regional fuel cost adjustments. The kilowatt demand charge has been raised by 7s. 6d. per kw. from £3 15s. to £4 2s. 6d. On the other hand, the running charge of the new tariff has been reduced from 0.335d. to 0.33d. per unit—reflecting economies in operating costs resulting from new and more efficient plant—and is subject to a coal price adjustment of 0.0007d. per 1d. variation in the price of fuel in the respective areas from a basic figure of 38s. per ton.

The British Electricity Authority states that the raising of the kilowatt demand charge is made necessary by a change in the basis of assessment, the rising capital charges on new plant and equipment, and other increased costs, and the decision of the authority to build up its statutory central reserve fund out of its own revenues instead of relying only on contributions from the area boards as hitherto.

The chargeable demand will be the simultaneous maximum demand of an area board on the authority instead of, as formerly, the two years' average of the aggregate maximum demands at all points of supply in the respective areas. As in the case of the tariff for 1950-51, the maximum demand will be measured on working days during the daytime, *i.e.*, between 7.0 a.m. and 7.0 p.m. from Monday to Friday and 7.0 a.m. to noon on Saturday. If the demand so measured is exceeded by the demand at other times, the excess will be charged for at the rate of one-third of the demand charge. This is designed to encourage the development of night and week-end loads and thus improve the national load factor.

English Electric's Prospects

In recommending a final dividend of 11 per cent. on the ordinary stock, the directors of the English Electric Company, Limited, state that they have had regard to the fact that as a result of the extension and improvements of its manufacturing facilities provided in recent years, both the company's output and earnings from its normal business are amply sufficient to support this rate of dividend in normal trading conditions in the foreseeable future.

The final dividend of 11 per cent. makes a total for the year of 15 per cent., which compares with a final dividend of 6 per cent., making a total of 10 per cent., last year.

Course in Theoretical Metallurgy

A course of about nine lectures is to be given in the Technical College, Bradford, commencing on Thursday, May 10, 1951. The lectures will be given by Mr. E. W. Fell, Mr. W. R. Moore, and Mr. R. B. Bentley. The aim of the course is to present some recent advances in theoretical metallurgy, with particular reference to their practical applications. The course is designed particularly for practising metallurgists and advanced students, and will provide an opportunity to keep abreast with modern developments and their practical application. Details can be obtained by writing to the principal of the college.

Development of Industrial Health Services

The committee of inquiry on the industrial health services, which was appointed by the Prime Minister in June, 1949, published its report on March 5. In general, it finds that there is no overlapping between the industrial and the general health services, recommends that the development of the services should be encouraged, and proposes the formation of a standing joint committee to co-ordinate the two services. About 230 doctors are engaged whole-time on factory work, and, including whole-time doctors, there are 1,789 appointed factory doctors and 1,287 other doctors taking part in factory medical services. There are also believed to be about 2,600 State registered nurses and 1,400 other nursing staff employed in factories.

The committee emphasises the value of the industrial health services to the population as a whole as well as to the workers, adding: "Great Britain is an industrial nation and dependent on her industries being maintained at the highest pitch of efficiency. Our present economic position merely emphasises this fact. The nation cannot afford to ignore the contribution which industrial health services make to industrial efficiency and productivity."

The encouragement of the voluntary provision of these services is stressed as being particularly important, and the committee recommends that the usual inter-departmental consultation on day-to-day matters should be supplemented by a standing joint advisory committee with strong medical representation, consisting of representatives of the Government departments concerned as well as those of employers and workers.

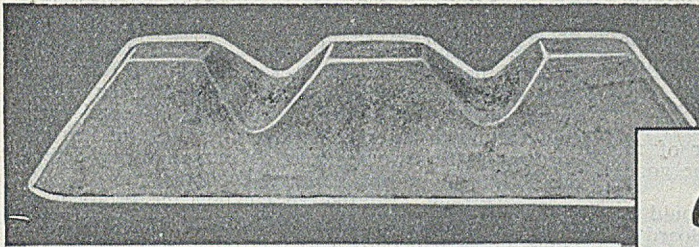
Before health supervision beyond the minimum already provided can be extended on even a moderate scale in small factories, there will have to be a considerable increase in the medical and nursing man-power available. Meanwhile the report states, any detailed planning of a nation-wide scheme remains largely academic.

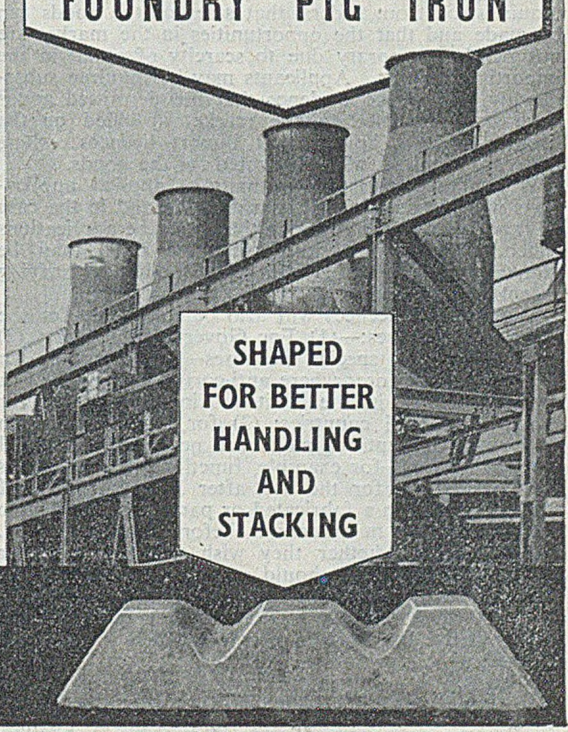
Glasgow University Honours

During the celebrations in June to mark the 500th anniversary of the founding of Glasgow University, honorary degrees will be conferred on a number of people outstanding in their various fields.

Among those who will receive the honorary degree of Doctor of Law are:—Sir John Douglas Cockcroft, FRS, Director of the Harwell Atomic Energy Research Establishment; Sir John Craig, chairman and joint managing director of Colvilles, Limited, and chairman and director of many other steel and allied companies; Sir Richard Vynne Southwell, FRS, formerly Rector of the Imperial College of Science and Technology, South Kensington; Sir Victor Dunn Warren, Lord Provost of Glasgow since 1949, who was appointed regional manager for Scotland and Northern Ireland for Imperial Chemical Industries, Limited, in the same year.

Distinguished persons from oversea to be similarly honoured include:—Neils Hendrik David Bohr, Professor of Theoretical Physics, Copenhagen University; Hugo Rudolph Kruyt, Professor of Physical Chemistry, Utrecht University; Ernest Orlando Laurence, Professor of Physics, California University; Leopold Stephan Ruzicka, Professor of Chemistry, Zürich University; Stephen Timoshenko, Professor of Mechanics, Stanford University.





Exemptions from Copper and Zinc Prohibitions

Our March 1 issue contained details of the prohibition of the use of copper, zinc, and their alloys in the manufacture of certain goods. Arrangements have now been made for certain exemptions from this prohibition—particularly for goods for export.

Applications to manufacture for export goods on the prohibited list should be made by the manufacturer who is himself either an established exporter of the goods or who seeks permission to produce the goods to the order of an established exporter.

Applications for licences to manufacture should be made in writing to the regional offices of the Board of Trade or of the Ministry of Supply, depending under which Order the goods concerned are included.

The Orders are:—The Copper and Zinc Prohibited Uses (Board of Trade) Order (SI No. 275, 1951), made by the Board of Trade for those articles for which it is the sponsoring department, and the Copper and Zinc Prohibited Uses (Ministry of Supply) Order (SI No. 277, 1951), made by the Ministry of Supply for all other articles.

Basis of Applications

Applications must normally satisfy the following tests:—(*a*) The export value (f.o.b.) of the finished goods, as compared with the value of the contained copper, brass, zinc, or their alloys shows a conversion factor of: (i) at least 15 times in the case of exports to the dollar area and Sterling Commonwealth countries; (ii) at least 50 times in the case of exports to other markets; (b) it is established, by past trade, definite inquiries, or from orders, that sales of the goods can be made and that the opportunities in the market are not purely temporary due to scarcity of metal in the importing country. Applicants may be required subsequently to produce evidence that the permitted goods have been exported to the market specified on the licence; (*c*) it is known that import licences, where these are required, will be granted for the goods.

While these rules will normally be applied, applications will have individual consideration and in the case of exports to North America there may be applications which, although not satisfying these tests, may be granted by reason of special considerations justifying exceptional treatment.

The issue of licences will also be considered for the following purposes:—(1) For Government orders; (2) for articles for special purposes—for example, for ships or for purposes where anti-corrosive material is a necessity either in the United Kingdom or in, for example, tropical countries; (3) for articles in which very small amounts of metal are needed for essential parts of articles—for example, functional parts such as gear wheels; (4) for the use, after June 30, 1951, of stocks of metal in a fabricated or partly processed state acquired by the manufacturer before March 1, 1951. Manufacturers, whether they wish to apply now, or expect to apply later, should as soon as possible send a statement of the quantity of metal in their possession in this form on March 1, 1951, or at a current date; (5) for metal for work in progress which is not quite finished.

TWO UK MANUFACTURERS, Sulzer Bros. (London), Limited, and Crompton Parkinson, Limited, Chelmsford, are sharing in an order for 20 350 b.h.p. Diesel-electric shunting locomotives for the Spanish National Railways. Of the 20 oil engines, 16 are to the supplied by Sulzer Bros., while the complete electrical equipment for all 20 locomotives will be built by Crompton Parkinson.

Metals Scarcity to be More Acute?

The three-day Dollar Convention at Eastbourne ended on Saturday week, on which day Mr. G. R. Strauss, Minister of Supply, warned the delegates that the scarcity of some metals might become worse, bringing the possibility of full control of their distribution. He said that this was the background to the formation of a distribution policy, without which chaos would ensue and scarce materials would be diverted from manufacture of essential products to those of less importance, with serious effects on our ability to defend ourselves and on the national economy.

The Minister said that in tackling the problem of how to secure balanced distribution of metal, the Government had chosen to rely on industry to do the job itself under general guidance.

Mr. Strauss explained that first-line users, in the light of their knowledge of the purpose for which their customers wanted the metal, had been left to apportion materials in such a way as to give due preference to important objectives such as dollar exports. This arrangement was supplemented by machinery for dealing with the anomalies and unforeseen difficulties that were bound to arise. But, he emphasised, if this system broke down, perhaps because supplies became even scarcer, or stocks in consumers' hands got lower, then the Government would have to take more drastic steps.

"We shall have to eliminate further less important uses. And if, for a particular metal, that is still insufficient, we shall have no alternative but to apply a fully detailed control."

He pointed out that there would be problems on certain types of steel, such as alloy steels, arising from the high demand for rearmament and the shortage of ferro-alloys, which would involve drastic reductions in the use of nickel for stainless steel and for electroplating.

There was a slightly better prospect for aluminium—enough had been secured to cover essential current and future needs. Nevertheless, to meet defence requirements, it would be necessary to impose some restrictions on the use of light metal for various less essential purposes. Proposals had been put forward by the aluminium industry, he said, offering a practical basis for a distribution scheme to be administered by the industry itself under Government guidance.

THORN ELECTRICAL INDUSTRIES, LIMITED, has acquired the whole of the ordinary share capital of Smart & Brown (Engineers), Limited, whose factory is situated at Spennymoor (Co. Durham).

IN ADDITION to recommending payment of a final dividend of 7½ per cent., making 12½ per cent. for 1950 (same as for the previous year), Radiation, Limited, proposes to pay a bonus of 2½ per cent. The last bonus was paid for 1937.

AT THE ANNUAL GENERAL MEETING of the Institute of Metals this week, Professor A. J. Murphy was inducted to the presidential chair. Dr. C. J. Smithells was elected senior vice-president and Mr. A. B. Graham and Mr. P. V. Hunter, C.B.E., as junior vice-presidents. At the luncheon on Tuesday, Mr. Christopher Smith, F.I.M., was presented with the W. H. A. Robertson Medal and the Walter Rosenhain Medal was awarded to Professor G. V. Raynor.

AN ORDER worth £20,000 has been received from Italy by the Distington Engineering Company, Limited, Workington, for 15 shaker conveyor drives. Orders for similar equipment have been executed by the company for Poland, Holland, Australia, and New Zealand.

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Raw Material Markets

Iron and Steel

The present stringency in supplies of all grades of pig-iron does not augur well for future outputs at the foundries. Unless improved deliveries are forthcoming production of castings will fall considerably below the record outputs achieved last year. In many instances, the rate of production exceeds the quantity of pig-iron coming to hand, the difference being accounted for by the use of stocks, which compensate for reduced deliveries. This procedure cannot be continued indefinitely. Stocks are dwindling rapidly and when the foundries have to rely on current deliveries, it is feared that production will suffer, unless, of course, circumstances arise to effect an improvement in supplies.

Many of the small foundries are devoid of stock and are being severely incommoded by delays in deliveries. For various reasons consignments are being held up *en route*. Some receiving stations in the Midlands have been closed for traffic for weeks on end, due, it is understood, to congestion on the railways. The position is now being relieved to some extent, but without some reserve of pig-iron the resultant delay in receipt of supplies would have been disastrous for many foundries.

The engineering foundries continue to be very well placed for business, and fresh orders are quickly forthcoming to replace completed contracts. Apart from the large quantities of castings required by home consumers, they are heavily committed on work for the export market. Outputs of low- and medium-phosphorus iron are fully absorbed, and all available tonnages of hematite, refined iron, and Scotch foundry iron are readily accepted. There is very little improvement in deliveries of hematite, as producers are still unable to obtain the required supplies of ore to enable the furnaces are on a reduced scale. With a combination of new furnaces cannot be blown in. The shortage of coke also impairs production.

The jobbing and light foundries are obtaining outputs commensurate with the tonnage of pig-iron they can secure. They are finding the supply of high-phosphorus pig-iron very difficult. Allocations made by the furnaces are on a reduced scale, with a combination of stocks and current deliveries of pig-iron, the foundries have been able to maintain fairly good outputs, but the forward outlook is not very bright.

Forwardings of foundry coke have shown much improvement, but delays in transit have resulted in many foundries being in difficulties, and road haulage has been resorted to in some instances.

The demand for cupola scrap is keen, and foundries have difficulty in securing suitable parcels, particularly of heavy cast-iron scrap.

Non-ferrous Metals

The details of stocks and consumption in respect of the month of January have been published by the British Bureau of Non-ferrous Metal Statistics. In copper, it was reported that consumption amounted to 50,709 tons, of which 31,965 tons were virgin copper and 18,744 tons secondary. The January total was nearly 7,000 tons more than December. Our stocks of copper at the end of January stood at 101,457 tons, about 3,000 tons down on the total at December 31. Consumption of zinc, all grades, amounted to 24,864 tons, compared with 24,338 tons in December. Stocks of virgin zinc in the United Kingdom at January 31 were 36,186 tons. Consumption of lead during January was heavy at 31,948 tons and might be taken to suggest that users feared the onset of the 10 per cent. cut which became effective on February 1. Stocks of virgin lead fell by more than 7,000 tons to 54,591 tons. These figures are certainly encouraging and were we sure that succeeding months would approach the same level then 1951 would rank as a good year. Unfortunately, this is not likely to be the case for the cut in copper, effective from January 1, and the reduction in lead supplies made a month later must tell their tale. Zinc, of course, has been rationed since October 1 last.

The announcement that stockpiling of tin was to cease in the United States came as a shock to the market last week and values plunged heavily last Thursday on receipt of the news. At the end of the week the tone was steadier. It is hard to say how far the reaction in tin will go. At the top the market reached £1,615, having climbed about £1,000 from the price ruling before the Korean war. The Americans have said they will not buy for the stockpile till the price is reasonable. What, in fact, is a reasonable price? Costs of production are certainly up and perhaps £1,000 per ton might be considered a figure likely to keep production going at a proper level.

Metal Exchange official tin quotations were as follow:

Cash—Thursday, £1,210 to £1,225; Friday, £1,215 to £1,225; Monday, £1,240 to £1,260; Tuesday, £1,250 to £1,270; Wednesday, £1,305 to £1,315.

Three Months—Thursday, £1,095 to £1,105; Friday, £1,090 to £1,100; Monday, £1,105 to £1,110; Tuesday, £1,095 to £1,100; Wednesday, £1,115 to £1,125.

Last Monday the Aluminium Scrap Order came into force and prices of secondary aluminium as well as aluminium alloy are now fixed at maximum levels. At the time of writing, there is still no news of the amended Order covering copper, zinc, and lead secondaries and scrap. Business is on a small scale, but last week saw a slight improvement. Consumers are believed to be very short of secondary metal.

Maximum Prices for Aluminium Scrap

The Aluminium Scrap Prices Order (SI 1951, No. 391), made by the Minister of Supply, after consultation with the trade, came into operation on Monday. Over the past few months scrap prices have soared; in certain cases they have exceeded the price of virgin ingots. The effect has been to encourage speculation, and to create an unstable state of affairs which was threatening the structure of the secondary aluminium producing industry, at a time when the demand for secondary metal to meet the rearmament programme and other essential requirements was rapidly increasing.

The fixed maximum prices per ton, delivered, ex works (delivered buyers' address in parentheses) are:—New pure aluminium scrap (excluding foil scrap), £96 (£105); oil rolled pure aluminium scrap (excluding foil scrap), £86 (£95); clean aluminium alloy scrap, £81 (£90); aluminium turnings, £59 (£70).

The Order provides a formula for fixing the maximum prices of any types of aluminium scrap not included in the list. All prices are subject to abatement for inferior quality or lack of cleanliness, and an additional 2s. 6d. per bag has been allowed for bagging. The Order requires records to be maintained of all scrap transactions, describing the material sold and the price charged. The Order contains an exemption for scrap situated outside the UK. There is also an exemption for scrap intended for export; but aluminium scrap is subject to export control and licences are not normally granted.

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

(Delivered, unless otherwise stated)

March 14, 1951

PIG-IRON

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

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

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

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

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

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

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

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

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

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered.)

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

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

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

Ferro-titanium.—20/25 per cent., carbon-free, £167; ditto, copper free, £183.

Ferro-tungsten.—80/85 per cent., 41s. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 43s. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £66, basis 60% Cr, scale 22s. per unit; 6/8 per cent. C, £61, basis 60% Cr, scale 21s. per unit; max. 2 per cent. C. 1s. 6¾d. per lb. Cr; max. 1 per cent. C, 1s. 7¼d. per lb. Cr; max. 0.15 per cent. C 1s. 8d. per lb. Cr; max. 0.10 per cent. C, 1s. 8¼d. per lb. Cr.

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

Metallic Chromium.—98/99 per cent., 5s. 9d. per lb.

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

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

SEMI-FINISHED STEEL

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

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

Sheet and Tinplate Bars.—£17 6s. 6d.

FINISHED STEEL

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

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

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

Tinplates.—I.C. cokes, 20 × 14, per box, 42s. 7½d.; f.o.t. makers' works.

NON-FERROUS METALS

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

Tin.—Cash, £1,305 to £1,315; three months, £1,115 to £1,125; settlement, £1,305.

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

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

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

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

Brass.—Solid-drawn tubes, 21¾d. per lb.; rods, drawn, 29¼d.; sheets to 10 w.g., 26⅜d.; wire, 27¼d.; rolled metal, 25⅛d.

Copper Tubes, etc.—Solid-drawn tubes, 23½d. per lb. wire, 226s. 6d. per cwt. basis; 20 s.w.g., 254s. per cwt.

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

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

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

Nickel Silver, etc.—Ingots for raising, 2s. 3½d. per lb. (7%) to 3s. 2½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 2s. 9¼d. (7%) to 3s. 8¾d. (30%); to 12 in. wide × .056, 2s. 9½d. to 3s. 8¾d.; to 25 in. wide × .056, 2s. 11½d. to 3s. 10¾d. Spoon and fork metal, unsheared, 2s. 6¼d. to 3s. 5¼d. Wire, 10g., in coils, 3s. 3d. (10%) to 4s. 2½d. (30%). Special quality turning rod, 10%, 3s. 2d.; 15%, 3s. 6¾d.; 18%, 3s. 11d. All prices are net.

Forthcoming Events

MARCH 16

Manchester Association of Engineers

Annual General Meeting, followed by "Design in Relation to Manufacture," by C. A. Sparkes, M.I.MECH.E., 6.30 p.m., at the Engineers' Club, Albert Square, Manchester, 2.

MARCH 17

Institute of British Foundrymen

West Riding of Yorkshire Branch:—"Some Notable Aluminium Castings," by A. R. Martin, 6.30 p.m., at the Technical College, Bradford.

MARCH 19

Institution of Production Engineers

Manchester Section:—Annual General Meeting, followed by "Foremanship," by A. P. Young, O.B.E., 7.30 p.m., at the College of Technology, Sackville Street, Manchester.
North-Eastern Section:—Annual General Meeting, followed by a Film Show, 7 p.m., at the Neville Hall, Westgate Road, Newcastle-upon-Tyne, 1.

MARCH 20

Institute of British Foundrymen

Coventry Students' Section:—"Foundry Layout and Equipment," by J. D. Berry, 7.15 p.m., in Room A.5, at the Coventry Technical College.

Institute of Metals

South Wales Local Section:—Annual General Meeting, followed by films of metallurgical interest, 6.30 p.m., at the University College, Singleton Park, Swansea.

East Midlands Metallurgical Society

"Research in Deep Drawing," by Prof. H. Swift, D.SC., 7 p.m., at Chesterfield Technical College.

Institution of Works Managers

Leicester Branch:—"Management Research, with Particular Reference to Work Study and Job Evaluation," by Prof. T. U. Mathew, 7 p.m., at B.T.H. Company, Limited, Rugby.

MARCH 21

Institution of Production Engineers

Birmingham Section:—Annual General Meeting and Address by the Section President, 7 p.m., at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3.

Institute of Industrial Supervisors

West Bromwich Section:—"Some Aspects of the Operation of Production Control," by A. J. Smith, 7.45 p.m., at the Grammar School, West Bromwich.

Institute of Vitreous Enamellers

Northern Section:—Paper by Mr. Poole, of Keighley Laboratories (details from the hon. secretary).

MARCH 22

Institute of Industrial Supervisors

Newark-on-Trent Section:—"Modern Foremanship," by H. R. Harbott, 7.30 p.m., at the County Technical College, Newark.

Purchasing Officers' Association

North of Ireland Group:—Films—"Steelmaking" and "Mitia," by Thos. Firth & John Brown, Limited, 7.30 p.m., at Queen's Hotel, Victoria Street, Belfast.
South Wales Branch:—"Purchasing Practice" by H. Golding, 7.30 p.m., at the King's Head Hotel, Newport, Mon.

MARCH 24

Institute of British Foundrymen

Bristol and West of England Branch:—Annual General Meeting and Short Paper Prize Scheme, 3 p.m., at the Grand Hotel, Broad Street, Bristol.

NOTICE

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

SITUATIONS WANTED

FOUNDRY FOREMAN, age 39 (moulder), City & Guilds, desires position as SUPERINTENDENT or MANAGER. Experience machine tool, marine engineering and jobbing castings. Greensand, drysand, loam, 200 tons week. Mechanisation, sand control, furnaces, etc.—Box 676, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN/METALLURGIST (41), thoroughly conversant castings production, seeks position as FOUNDRY MANAGER. Grey or whiteheart malleable; mechanisation; good disciplinarian.—Box 694, FOUNDRY TRADE JOURNAL.

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

JOBBING FLOOR MOULDER (age 30), City Guilds, Associate I.B.F., and 6 years' patternmaking experience, seeks position with prospects. Tees-side area preferred.—Box 746, FOUNDRY TRADE JOURNAL.

EXPERIENCED Foundry Production and Technical MANAGER, interested in developing grey iron foundry in modern production and metallurgical practice. Also in building up Sales, particularly for high-duty castings. Would take financial interest in foundry, preferably in South, wanting to develop on these lines.—Box 744, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER (41), A.M.I.B.F., desires change. 25 years' practical and executive experience in production of grey iron castings for engineering, machine tool and motor trade, also builders' castings. Wide experience mechanised plants. Methods, design, patternmaking wood, metal, plaster, etc. Practical and technically trained. Sheffield area preferred. Would consider position as Representative.—Box 722, FOUNDRY TRADE JOURNAL.

ADVERTISER seeks Representation in London and surrounding Counties area for progressive Iron Foundry. Good connection available with grades of work suitable for a foundry producing jobbing, repetition and loam work in normal and high duty cast irons. Contacts established are with leading engineering companies in the above area. Object is to create, on a commission basis, a steady trade of mutual benefit to both parties. Advertiser has had experience of running an iron foundry producing the above range of work and is conversant with up-to-date prices.—Box 684, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

WANTED.—ALUMINIUM FLOOR MOULDERS, for Foundry in South Midlands area. Piece Work Rates.—Write, giving age, experience, to Box 714, FOUNDRY TRADE JOURNAL.

EXPERIENCED CUPOLA MAN wanted for Iron Foundry. S.E. London area. Good wages and prospects.—Box 718, FOUNDRY TRADE JOURNAL.

AN experienced FOUNDRY MANAGER required for Light/Medium Foundry in Lancashire producing 200 tons finished castings weekly. Experience of mechanised plants essential. Good house available. Salary £1,000 to £1,200, according to experience. Non-contributory pension scheme in force.—Applications in confidence, stating previous experience and qualifications, to Box 682, FOUNDRY TRADE JOURNAL.

MANAGER (40/45) wanted for Machine Shop and Grey Iron Foundry on Tyneside. Combined staff 60/70. General engineering with foundry products in loam, dry and green sand. 20 tons per week, partly mechanised. Pension scheme.—Full details, experience, etc., to Box 702, FOUNDRY TRADE JOURNAL.

A STEEL FOUNDRY in Yorkshire requires an experienced FOREMAN, to take charge of machine moulding. The applicant should possess initiative and a sense of organisation, together with the ability to train and control green labour. Technical knowledge is secondary to these, and on completion of a satisfactory period of 6 months housing accommodation will be found. The salary offered is £600 per annum.—Write, giving details of age, experience and references, Box 688, FOUNDRY TRADE JOURNAL.

WORKS ENGINEER. — Midland concern of Metal Manufacturers have vacancy for experienced adaptable Works Engineer (30/45), with first-class qualifications (degree or equal) to direct plant, furnace and building maintenence and development, including control of personnel—considerable responsibility entailed. Good prospects for right man.—Apply, stating experience and salary required, to the SECRETARY, The Wolverhampton Metal Co., Ltd., Wednesfield Staffs.

A STEEL FOUNDRY in Yorkshire requires a FOREMAN to take charge of the loose pattern section of the foundry. The applicant must have experience of loose pattern production up to a casting weight of 5 tons, and possess initiative to develop productivity. After a satisfactory period of 6 months housing accommodation will be found. The salary offered is £550 per annum.—Write, giving full details of age and experience to date, with available references, Box 686, FOUNDRY TRADE JOURNAL.

DRESSING SHOP SUPERINTENDENT.—Experienced practical man, with knowledge of requirements of automobile and associated trades, principally cylinder and heads, for Iron Foundry in South Midlands. Must have capacity to operate modern methods, and ensure economical production. Permanent staff appointment to suitable applicant, who must have held a similar position in a large modern foundry. Would suit a production engineer with intimate knowledge of foundry trade.—Write, giving particulars of qualifications and salary required, to Box 736, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

SKILLED MOULDERS, PATTERN MAKERS, PLATERS, TURNERS, BORERS, etc., required by DISTINGTON ENGINEERING Co., LTD., Workington, Cumberland. For further details apply to the Labour Manager.

FIRST-CLASS Metal PATTERN-MAKER required; previous experience with bench, floor and machine patterns essential. Knowledge of stove and grate trade an advantage. Prospects of early advancement to suitable applicant who can work on own initiative.—Apply CHATWINS, LTD., Sunbeam Grate Works, Tipton, Staffs.

CRAVEN BROTHERS (MANCHESTER), LTD., require immediately FOREMAN COREMAKER, to take charge of a large Core Shop producing cores for Machine Tool castings up to 30 tons in weight in straight sand and oil sand mixtures. Candidates must have first-class experience in producing cores in the most expeditious manner.—Apply to VAUXHALL WORKS, Reddish, Stockport, either personally or by letter, stating age and experience.

METALLURGIST, with some practical experience in aluminium gravity diecasting or sand casting, required as ASSISTANT to Foundry Superintendent. North-West area.—Write, stating age, education, experience, and salary required, Box 752, FOUNDRY TRADE JOURNAL.

LARGE Foundry in Midlands, producing Light Castings for vitreous enamelling, require a FOUNDRY SUPERINTENDENT, with Light Castings experience and a knowledge of mechanisation. Must be capable of taking complete charge of Foundries, including Pattern Shop. Excellent opportunity for the right man.—Apply in confidence, stating age, experience, and salary required, to Box 750, FOUNDRY TRADE JOURNAL.

ASSISTANT FOUNDRY MANAGER required for large Foundry in South Wales, comprising mechanised, plate moulding and jobbing sections. Practical and technical experience in post of similar nature is essential.—Applications in confidence, giving age, qualifications, experience and salary required, to Box 732, FOUNDRY TRADE JOURNAL.

ENGINEER required for large Mechanised Foundry in South Wales. Must have had practical foundry experience in similar position and be capable of taking complete control of maintenance section employing 20-40 maintenance fitters.—Applications in confidence, giving age, qualifications, experience and salary required, to Box 734, FOUNDRY TRADE JOURNAL.

AN experienced FOUNDRY MANAGER required for Light Medium and Heavy Ferrous and Non-Ferrous Foundry in the Leeds district, producing up to 400 tons finished castings per month. Experience of mechanisation essential. Pension scheme in force. House found if necessary.—Apply, stating age, experience, and salary required, to Box 730, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

ALUMINIUM Founders, requiring additional Gravity Die making facilities would be pleased to hear from Die Makers with capacity available.—Box 728, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS (Wood and Metal). Excellent opportunities for younger men on all classes of work, under ideal conditions in the largest modern pattern shop.—G. PERRY & SONS, LTD., Hall Lane, Leicester.

REQUIRED, for Middle East, experienced MELTER, copper, aluminium. Minimum contract 6 months. Fares paid. Accommodation available. First-class man required.—Box 740, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS, first-class, required. With master-shop experience on wood and metal; capable of earning 4s. to 4s. 8d. per hour. Steady employment and usual paid holidays, etc.—Write experience to B. LEVY & Co., Osbert Street, Vincent Square, London, S.W.1.

MANAGER for large mechanised Iron Foundry in South Midlands. Proved administrator, with practical foundry and pattern making experience essential. Successful applicant must warrant four figure salary. Status will be that of Senior Executive, and the company has a first-class Superannuation Scheme in operation.—Full details of past experience, which will be treated in strictest confidence, to Box 738, FOUNDRY TRADE JOURNAL.

SAND FOUNDRY MANAGER required by a large Industrial undertaking in the North Midlands area, to take complete control of modern foundry, including floor, mechanical, and batch output. Applicants must have held positions of a similar capacity and must possess ability for leadership. Assistance with housing given to the successful applicant.—State age, experience, and qualifications to PERSONNEL MANAGER, Box 742, FOUNDRY TRADE JOURNAL.

FOREMAN for Production Core Shop. Age 30/40. Must be conversant with Osborne Core Blowing Machines and have all round experience in making cores for cylinder heads, crank cases, and other internal combustion engine part. Modern foundry in North Midlands area.—Apply, giving full details of previous experience and salary required, Box 724, FOUNDRY TRADE JOURNAL.

FINANCIAL

REQUIRED TO PURCHASE part or whole interest in an established Engineering concern or Ironfounders. Amount of capital involved secondary consideration, provided justified by profit-earning record. Continuity of management and personnel desirable.—Write Box 748, FOUNDRY TRADE JOURNAL.

AGENCY WANTED

AGENCY required for Midland Counties, with reputable Company, for Repetition Grey Iron Castings. Can build up very substantial weekly tonnage immediately for permanent work. Commission basis. Please state full details.—Box 666, FOUNDRY TRADE JOURNAL.

WORK WANTED

WORK wanted. Low phos. iron suitable Diesel and other pressure work. Pieces not over 1 ton. Patts. required suitable machine moulding. Location Clyde area.—Box 534, FOUNDRY TRADE JOURNAL.

PATENT

THE Proprietors of Patent No. 518,838, for "Improvements in or relating to Torque Transmitting Universal Joints," desire to secure commercial exploitation by licence or otherwise in the United Kingdom.—Replies to HASELTINE, LAKE & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

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WANTED.—Stock Converter Plant, 25/45 cwts. capacity.—Box 662, FOUNDRY TRADE JOURNAL.

OFFER YOUR SURPLUS PLANT TO
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WANTED.—Reasonably modern Electric Arc Melting Furnace, about 3-tons capacity; with or without transformer.—Box 720, FOUNDRY TRADE JOURNAL.

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MISCELLANEOUS—*Contd.*

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MISCELLANEOUS—*Contd.*

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MISCELLANEOUS—*Contd.*

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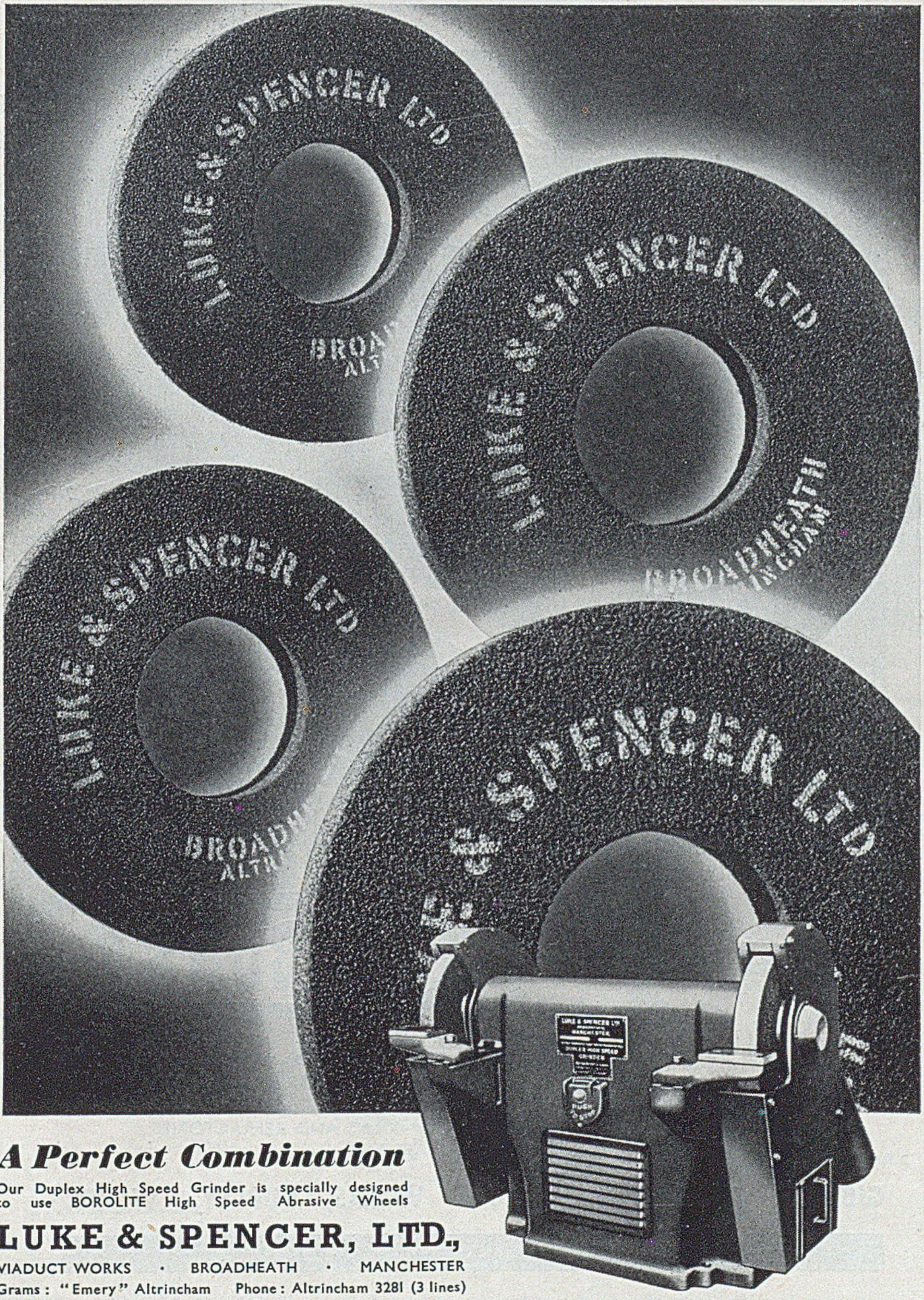
PATTERNMAKERS' Section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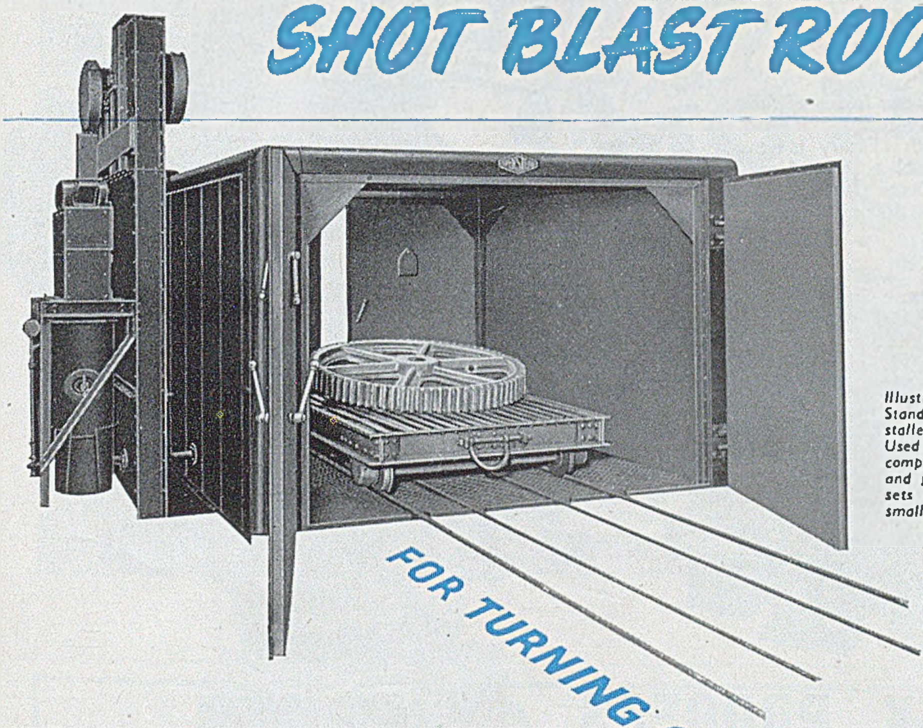

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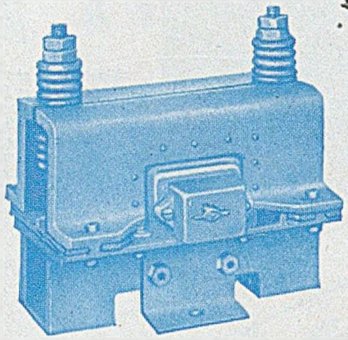
The lost-wax process is one of the oldest methods of casting; it was used for this 8th Century Indian copper figure of Shiva. Reproduced by courtesy of the Director of the Victoria & Albert Museum.



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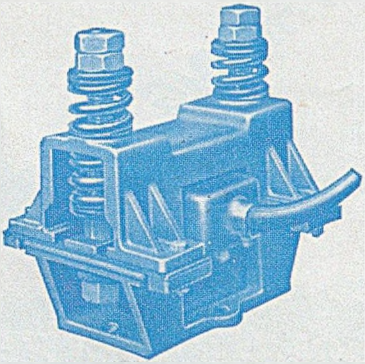

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