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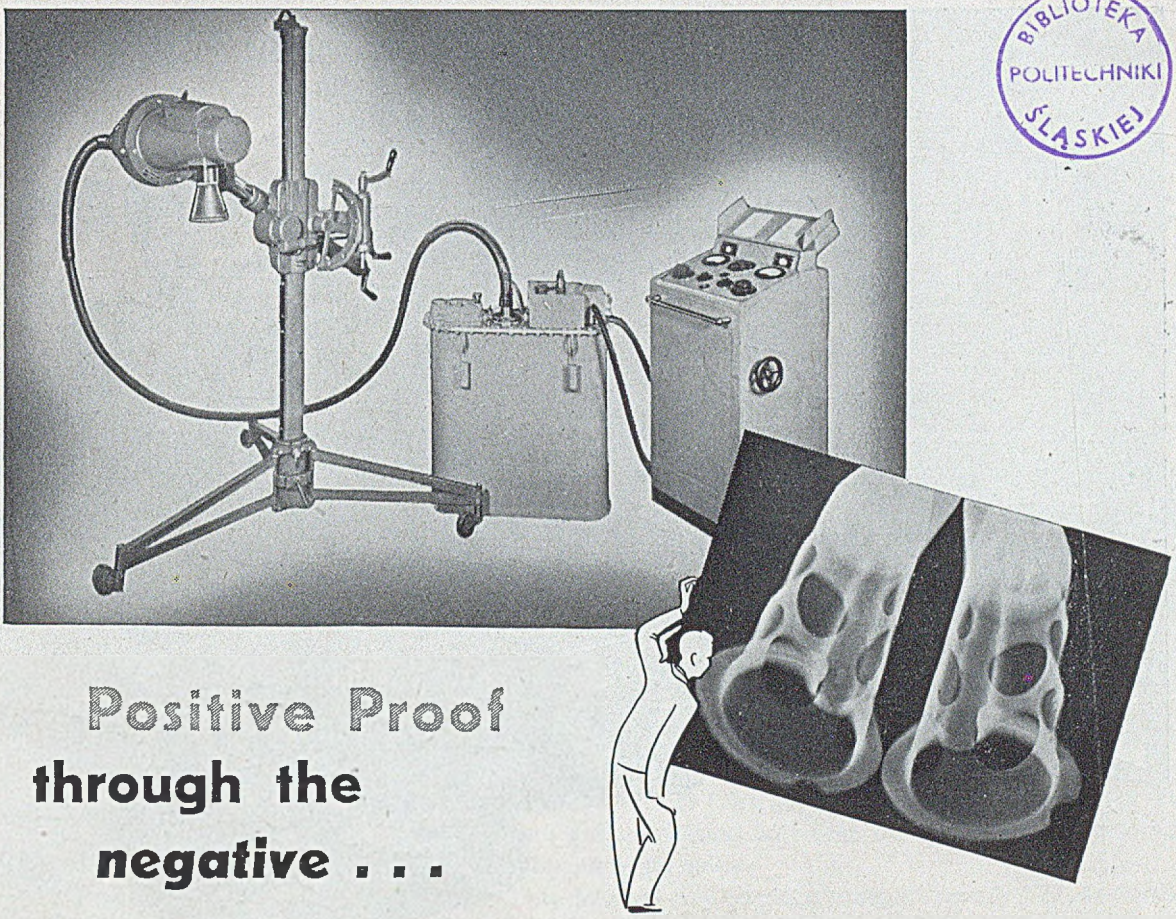

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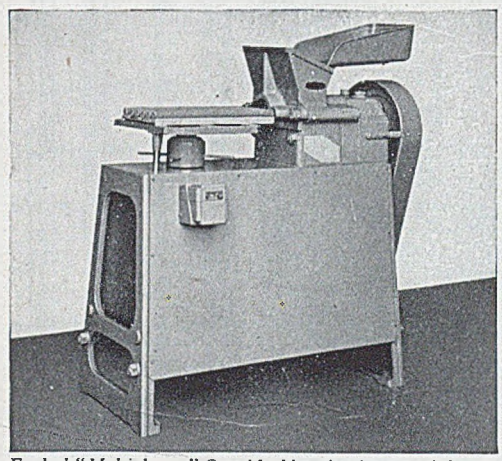
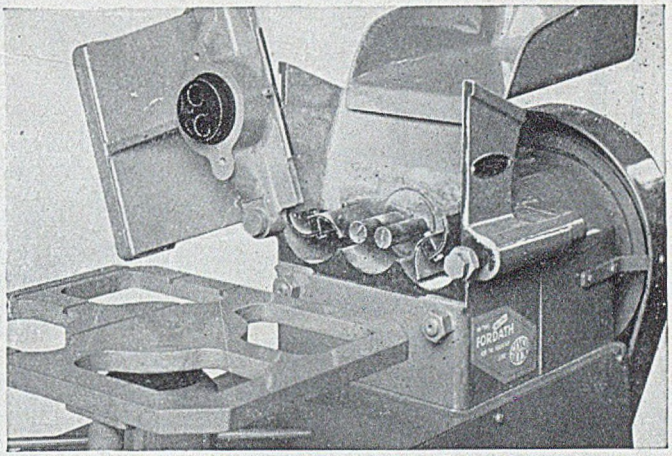


Fordath "Multiplunger" Core Machine, showing extruded cores



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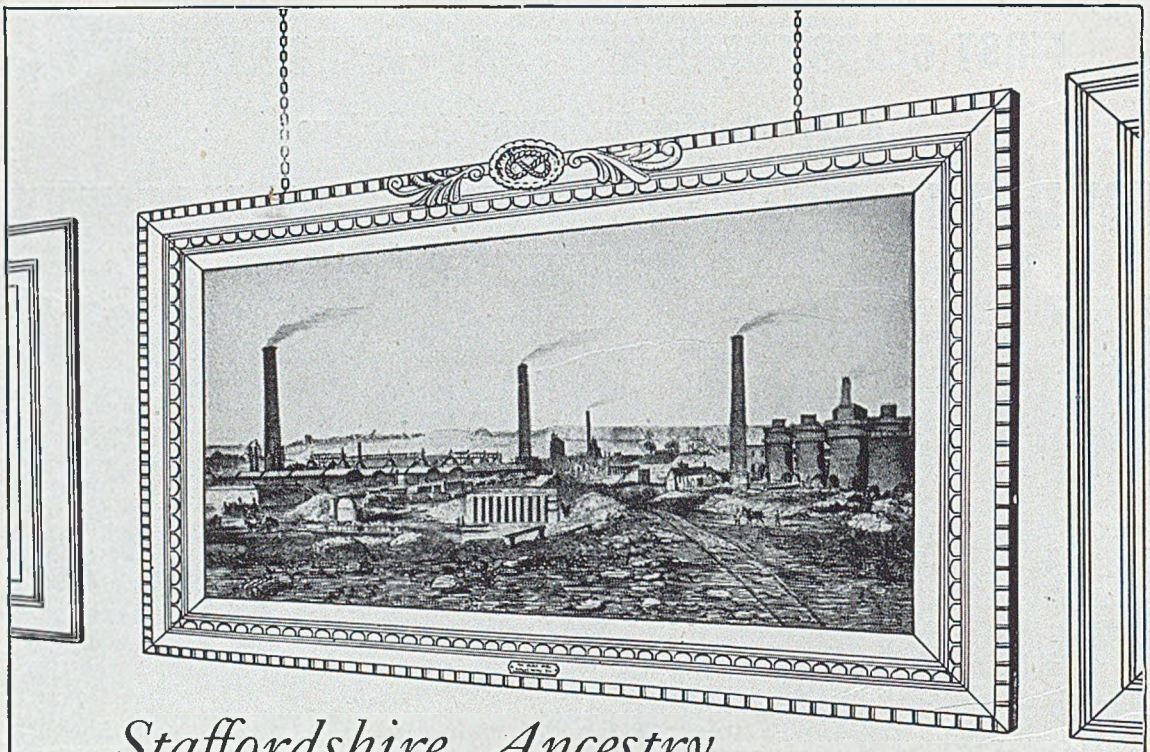

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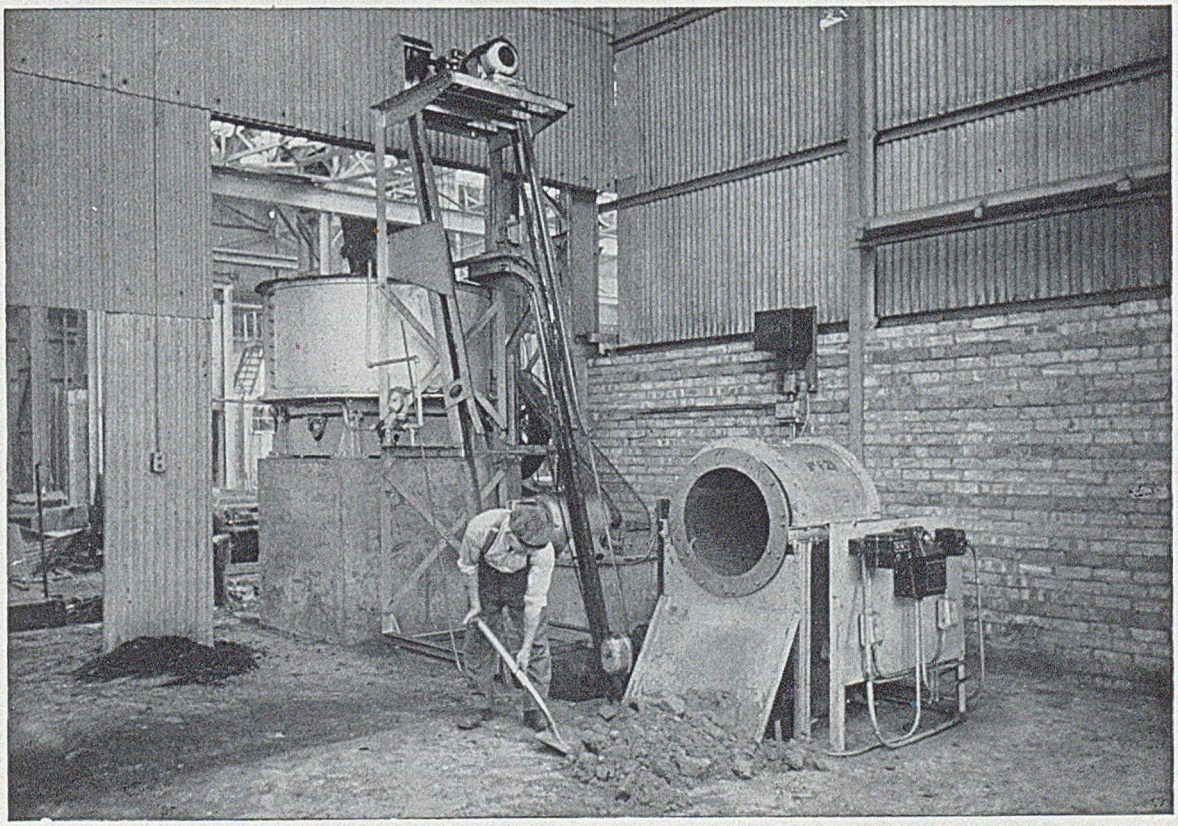

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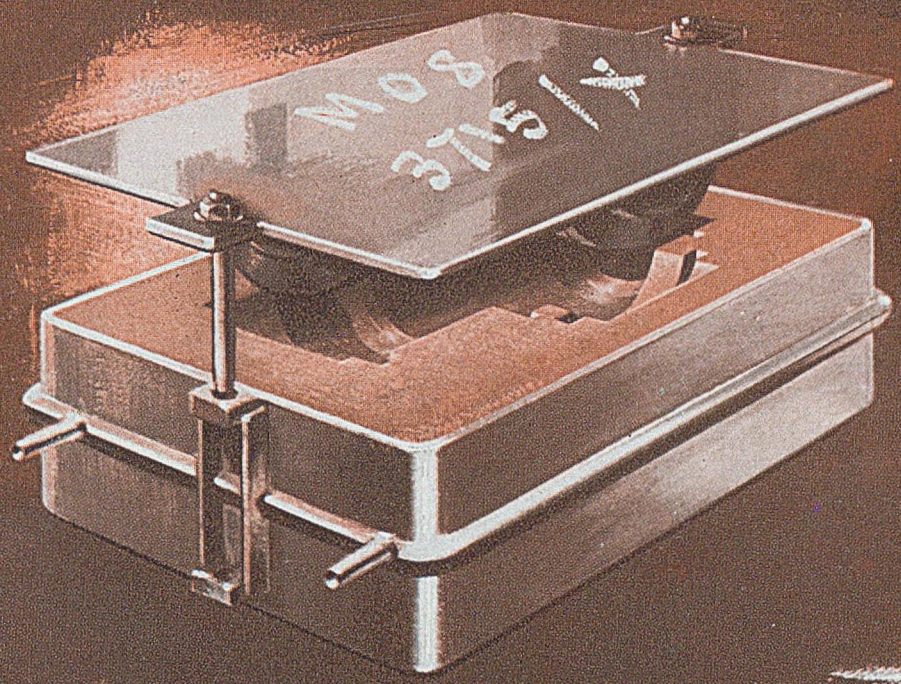

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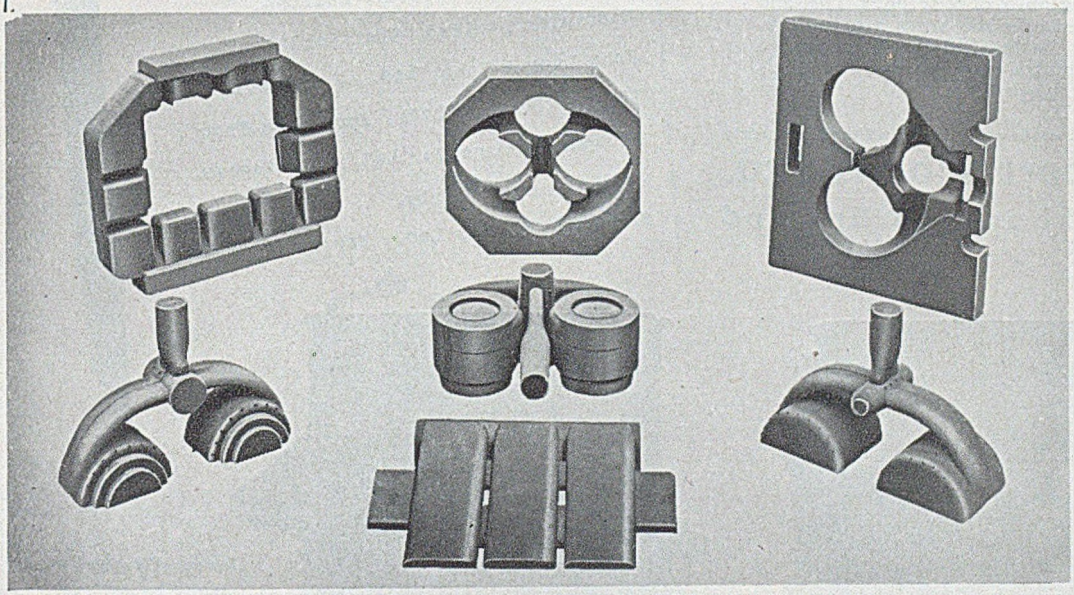
The photos reproduced on this page have been considerably reduced for reasons of space but they are typical of a much wider range employed in the most exacting conditions which core binders encounter. We are greatly indebted to the Management of Coltness Iron Co. Ltd. for permission to publish the photographs and for their kind co-operation in granting facilities for obtaining the pictures.



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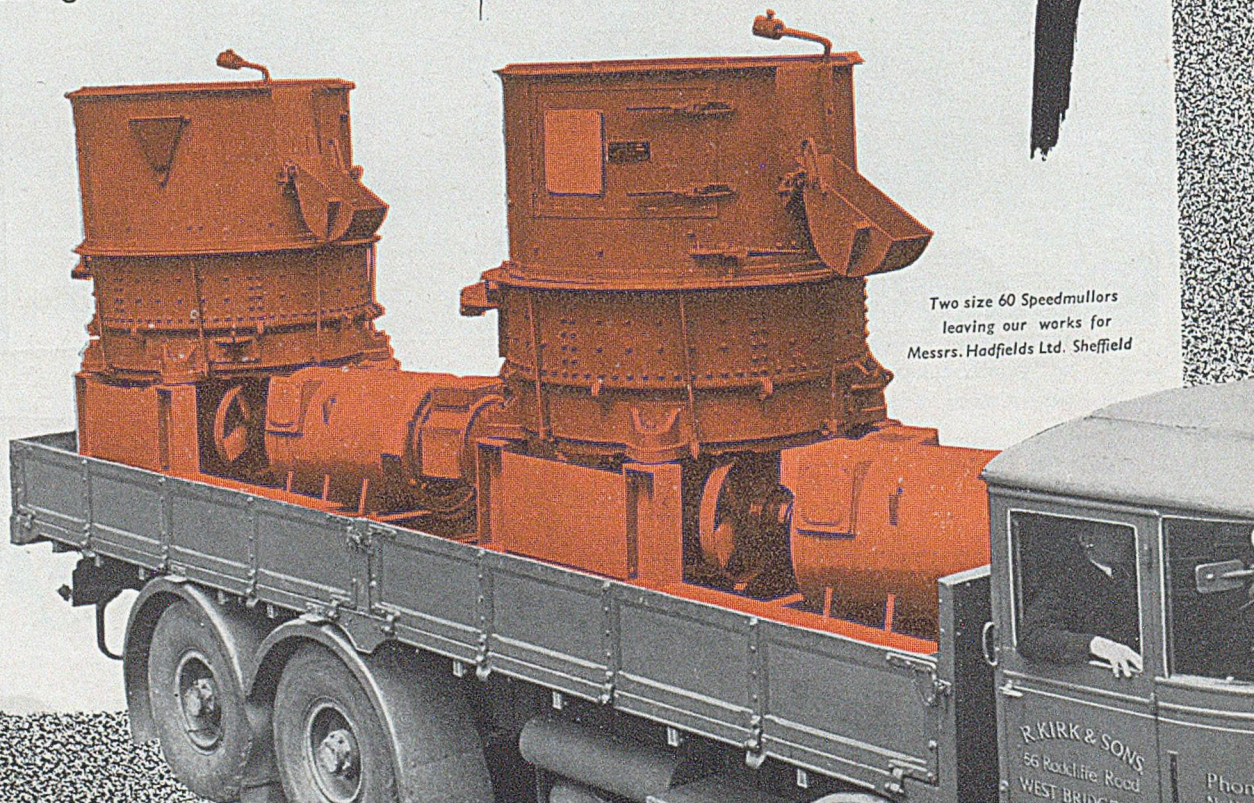

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Established 1903
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

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Give Them the Tools

Once upon a time there was a new foundry manager who was a great believer in the Victorian adage —"Take care of the pennies and the pounds will take care of themselves." Moreover, membership of half-a-dozen or so technical organisations covering the subject of management had taught him that the only way to keep track of these pennies was to install and operate a proper costing system. Thus, he laid down the precept that all loose plant and material and even cores must be drawn against dockets from stores. Now the system was quite simple. An example of its working is, if a moulder wants a few chaplets, all he has to do is to find the foreman, and follow him to his office, where the clerk makes out a requisition for the foreman to sign. Then the moulder toddles along to the stores, only stopping *en route* to hand his two shillings and a slip to a mate who assists the local bookmaker. Arriving at the stores, he finds it difficult not to butt into a conversation, especially when both participants have completely forgotten the fact that the team will be weakened as Jones will certainly be playing for Wales. Subsequently presenting his docket, he receives his handful of chaplets from which, in trying to count and walk at the same time, he loses one or two in the sand. Being a conscientious individual, he works hard for the rest of the morning and is quite worried why his production is an odd mould or two short.

The new foundry manager had organised his paper work so well, that at the end of the year he received the congratulations of the chief cost accountant, but somehow or other there had been no conversion of pennies into pounds. He had a full account of exactly how many chaplets had been drawn from the stores, and the stocks had balanced exactly, but the bills from the makers totted up to a bit more than in earlier years. This obviously called for a more careful scrutiny of the requisitions. By correlating needs exactly with the job in hand waste should be eliminated, even though it involved extra trips to the stores. Congestion at the stores was beginning to show up, but, after all, the men were well schooled in orderly queuing.

The costing system was such an outstanding success and the manager's contribution to it became so renowned that he set himself up in business as a consultant. Then a second new manager was appointed. He, however, had a strange bee in his bonnet—that moulders should mould and not be errand boys. So every morning, he made out his requisitions and sent a boy to collect everything remotely likely to be used and created stocks right at the moulders' elbows. This most reprehensible action somehow or other did produce more moulds each day and it is recorded that the district representative of the chaplet manufacturer called round to see why fewer were being used. The cost accountant does not think too highly of this second manager, but admits that at least he produces results. He is now worrying how it is, when making 1,000 castings each carrying a dozen studs that 12,250 are used, yet the invoiced cost is lower than formerly. Now he is wondering how he can adapt the costing system to take care of what really happens.

E

Correspondence

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

NOSE BREATHERS AND SILICOSIS

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—In the editorial of your issue of January 4 a comment is made to the effect that when silicosis and similar diseases are being studied, some reference should be made to mouth breathers, and that correlation in this direction might bring to light evidence which may lead to a reduction of lung diseases. The inference to be drawn from this statement is that, in diseases caused by the inhalation of dust, there might be some difference in susceptibility as between nose and mouth breathers.

It should, I think, be pointed out that a good deal of work has already been done by various workers to show how the retention of dust by the respiratory system is dependent on the method of breathing. The results of this work have recently been reviewed by Davies,* from which the conclusion can be drawn that the very fine dust particles which give rise to silicosis penetrate the nose quite freely. Those particles which are large enough to be retained in the nose would, in the case of a mouth breather, be deposited in the higher regions of the respiratory tract and subsequently eliminated.

Whilst every possible avenue of approach to the dust problem in foundries should be explored, it would appear that there is very little hope for any significant reduction in the incidence of silicosis in the direction indicated.

Yours, etc.,
W. A. BLOOR
(Senior Investigator, Silicosis Project)
British Iron and Steel Research Association

* "Inhalation Risk and Particle Size in Dust and Mist," C. N. Davies. *Brit. Jour. Ind. Med.*, Vol. 6, No. 4, page 245 (1949).

1950 Illustrated

Issued by Dorman, Long & Company, Limited, Middlesbrough, this publication tells, quite often pictorially, the progress achieved by the company during the last year. That made by the company in the direction of fuel economy is most commendable. A comparison is made between 1946 and 1949. Whereas 100 per cent. of the electric current used was formerly taken from the grid, now only 20 per cent. is taken from that source. There was a 10 per cent. reduction in the boiler fuel used and a 20 per cent. increase in production. Though prepared for the employees, this brochure makes very interesting reading for the general public. If and when the works become a State monopoly, it is conjectural if such details of operation will then be available.

Institution of Metallurgists

The next examinations for the licentiateship and associateship of The Institution of Metallurgists will be held from August 27 to September 3, 1951. Candidates must submit their applications for permission to enter the examinations before May 1. Each application must be made on a form to be obtained from the registrar-secretary, The Institution of Metallurgists, 4, Grosvenor Gardens, London, S.W.1.

New Catalogue

Steel Pallets.—Fisher and Ludlow, Limited, of Bordesley Works, Birmingham, 12, in their pamphlet No. 501 on "Flow stack" steel pallets have by means of a series of clear photographs shown the complete manufacture of these—nowadays—almost essential pieces of plant. The reviewer followed with interest the creation and assembly of the components which enter into the making of a pallet, and was just a little disappointed to see only one application in industry—that of handling coils of wire. However, is does not need much stretch of the imagination mentally to replace coils of wire by cores or castings. A minimum of letterpress has been used, but it is so nicely worded that the invitation to consult the firm on handling problems will in many cases be accepted. For many of their manufactures the portmanteau word Fisholow is used, so converting two essentially English names into quasi-Polish one. Then if one is prone to slurring one's diction, the word "slow" creeps in. This is purely a personal view and the word may react quite differently with the mass of the population. The managing director of the material-handling division has offered to send a copy of this booklet to any of our readers interested in increased productivity. They must, of course, write to the works in Birmingham.

Film Review

POWER

An impression of the organisation, activities and products of the Brush Associated British Oil Engines group of companies is given in a film, "Power," recently produced for the group by the Film Producers' Guild, Limited. It is essentially an advertising medium, although not a straightforward "sales" film. It was made to appeal to overseas engineers, indicating the historical background, technical ability and power developments associated with the Brush-A.B.O.E. group. In this, it is eminently successful. Four famous names in Diesel manufacture—Mirrlees, Bickerton & Day, J. & H. McLaren, Petters & Henry Meadows—are associated with the Brush Company, and the manufacturing processes and products of all the factories are shown, from the smallest Petter engines to the 2,800-h.p., 16-cylinder Diesels made by Mirrlees. The film is available from the group in 35 mm. and 16 mm. sizes. It runs for 30 minutes, and the commentary can be in English, French, Spanish, or Portuguese at choice.

T. B.

Publication Received

Equilibrium Data for Tin Alloys. Published by the Tin Research Institute, Fraser Road, Greenford, Middlesex. Price 2s. 6d. post free.

This publication is intended as a reference book for metallurgists and scientific workers. For the more important tin-containing binary metallic systems, existing data on thermal equilibria are presented in diagram form, a single diagram being used for each system. To facilitate interpretation of the diagrams, temperature and composition co-ordinates have been inserted in colour. Supplementary explanatory notes are appended to many of the diagrams and, where available, information on crystal structure is given. For ternary alloys, a bibliography of publications contains references to all the systems that have been fully or partly investigated and indicates the extent of the information available where an investigation is incomplete.

Modern Heat-treatment Furnaces*

By L. G. A. Leonard

After outlining the simple laws of heating and heat transmission, the Author describes the development of refractories and insulation, burners and recuperation, and finally gives details of commercial gas-fired furnaces. In this latter section, box-oven, bogie, portable-cover and removable-roof furnaces are among the "fixed" types dealt with. Next, continuous furnaces are considered, and under this heading the inclined hearth, pusher-operated, roller-hearth, belt-conveyor, and monorail applications are described. Finally, there is a brief note on melting furnaces of the hemispherical-bath and rotary types.

FOR AN UNDERSTANDING of furnaces and their application it is necessary to appreciate the principles of heat transmission and have a wide knowledge of materials which may be heated by furnaces or used in their construction. Heat is transmitted by conduction, convection and radiation, but the manner in which it is transferred is so complex that it is often difficult to separate the contribution of the different processes in the total effect.

In conduction, heat moves from one part of a body to another in proportion to the area and the fall in temperature along the length of travel. Transmission by convection is more complicated, but it is dependent upon a temperature difference which results in motion due to variation of density with temperature. The transmission is influenced by the nature of the flow, whether laminar, turbulent or impinging and by the properties of the heating fluid.

Radiation takes place without material contact between the body emitting and that receiving the heat, the rate being proportional to the difference in the fourth powers of the temperatures of the two bodies Radiation between the surfaces of solids involves not only the emissivity of the materials, but also geometrical problems. Gases can radiate by themselves, such as H_2O, CO, and CO_2, which absorb and radiate heat rays according to the wave length. In addition, radiation can take place from particles of soot in luminous flames. Because radiation follows the fourth power law, it is the most important method of heat transfer in all types of industrial furnaces. These fundamental considerations are associated with furnace performance and operation and materially affect the thermal efficiency.

The combustion of the fuel is primarily the source of heat, but there are some processes involving exothermic reactions which also make a contribution.

Combustion Furnaces

The heat developed by the combustion of the fuel may be used for satisfying the following operations:—

(1) Heating the charge.

(2) Loss by conduction through the walls and by dissipation to the surroundings by convection and radiation.

(3) Loss by conduction into the floor on which the furnace is placed.

(4) Loss by incomplete combustion due to incorrect burner settings or to the maintenance of a special atmosphere within the heating chamber. (This may be oxidising or reducing.)

(5) Loss by radiation through openings or from exposed surfaces of melting furnaces.

(6) Loss by the heating of work carriers, conveyors or skid bars, etc.

(7) Loss by leakage into or out of the furnace.

(8) Loss in hot outgoing flue gases.

The above losses hold good for continuous and batch-operated furnaces which have reached a state of thermal equilibrium. The great majority of furnaces, however, are intermittently operated and consequently never reach this steady state. The heat flow into the charge and walls is variable during a considerable portion of the cycle, and it is therefore necessary to consider the quantity of heat stored by the walls as this is often much greater than that transmitted into the charge.

Prior to 1920, furnaces were built of firebrick or silica, and in order to obtain a reasonably low temperature of the outer-wall surface, a considerable thickness of brickwork was employed. This was fairly satisfactory for continuously-operated furnaces, but resulted in great losses when intermittent processes required walls to be heated again and again for each successive charge. In furnaces of good design, the waste gases passed through ports in the walls so that heat loss was mainly from the hot gases already exhausted from the actual heating chambers. In furnaces fired by hot producer-gas, the working chambers were frequently wrapped in the hot-gas ports, or alternatively, the air ports were made to serve the same purpose. These old ideas were basically sound, and although the need for them is not now so great, they are frequently employed.

Insulation

The introduction of diatomaceous insulation enabled much thinner walls to be used with a lower external surface temperature and heat loss. Originally it was the practice to use no more than 2½ in. of insulation, but gradually the thickness increased until to-day it is quite common to find continuously operated furnaces with as much as from 9 to 13½ in. of insulation between the firebrick linings and the steel casings. The savings in the wall losses made possible by the use of diatomaceous insulation as a backing material for firebrick vary from about 40 to 80 per cent. with continuous operation, and from 15 to 35 per cent. for intermittent operation. It

* Abstracted from a Paper delivered to the Manchester Association of Engineers. The Author is on the staff of the Dowson & Mason Gas Plant Company, Limited.

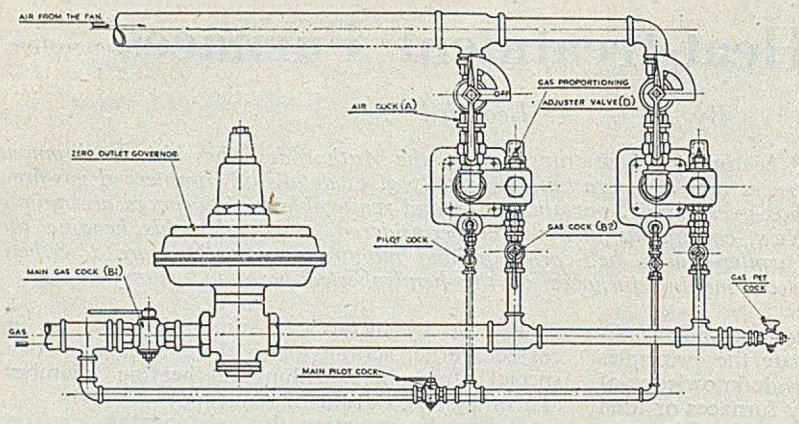


FIG. 1.—*Typical Arrangement of an Automatic Proportionating Burner System.*

will be appreciated that this saving is dependent upon the thickness and quality of the insulation used and upon the thickness of the firebrick wall.

Insulating Refractory

The next step in insulating technique occurred about 1935 with the introduction of lightweight insulating refractory instead of firebrick for the inner walls of furnaces operating at temperatures below 1,200 deg. C. The material is similar in its physical characteristics to normal firebrick, except that it is cellular and, consequently, its weight and thermal conductivity are much less than those of firebrick.

The "lightweight" or "hot-face insulating firebrick" is most economically employed in the construction of intermittent furnaces, as the amount of heat stored by walls is reduced as the weight of the brickwork is decreased. Some very large furnaces have been built of this material in which the rate of heating from cold is so fast that the walls are only flash heated when the operation is completed. Insulating refractories normally weigh about 40 to 45 lb. per cub. ft. which can be compared with firebrick weighing 130 lb. per cub. ft. Recently there have been introduced insulating refractories made from the micaceous mineral known as vermiculite. These are available in slab form with a density as low as 30 lb. per cub. ft., and a correspondingly low thermal conductivity. It is, therefore, now possible to build batch or intermittently-operated furnaces with thermal efficiency not much lower than that which can be achieved in continuous furnaces. The use of slabs instead of bricks reduces the loss of heat through joints and the possibility of leakage into or out of the furnace. Normal dense firebrick is superior in strength and resistance to mechanical or chemical attack, and is therefore used for the base of furnaces where heavy loads must be carried.

When insulating refractory is subjected to the scrubbing action of hot gases, it is covered on its hot face with a layer of high-temperature resisting cement applied in the form of a plaster. This gives effective protection, and by sealing the surface pores prevents leakage which might otherwise occur through porosity.

Burners

Many low-temperature gas-fired furnaces (Fig. 2) have "natural-draft" burners which rely upon the flue and the pressure of the gas to provide air for combustion. There are a multitude of types, but the most popular is the atmospheric injection burner. Because furnaces are employed at relatively high temperatures, the great majority employ air-blast burners which are manufactured in a number of types and applied in a variety of ways. The air and gas streams may be at comparatively low pressures and the mixing is slow enough to promote long luminous flames. Such combustion systems are used in steel-billet and slab-heating furnaces where the long luminous flames fire horizontally above the steel being heated, and are an advantage as they condition the steel for rolling by giving it a soft scale which breaks away in the rolls.

Another basic type is the tunnel burner firing through the side walls and so spaced that burners on one side fire between those on the opposite wall.

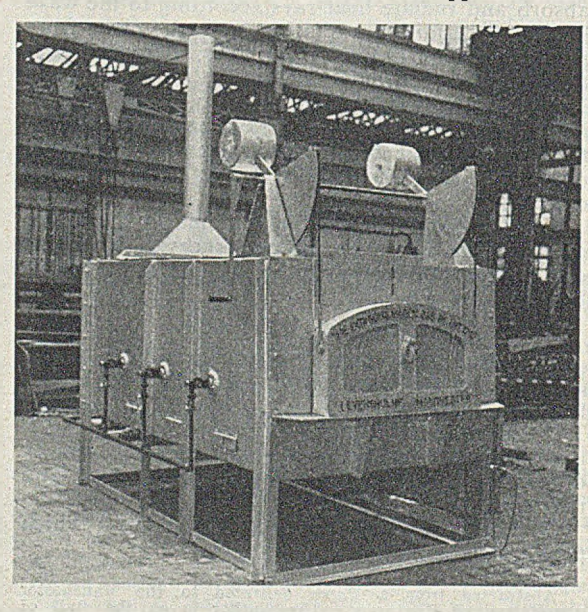


FIG. 2.—*Natural-draft Oven-type Gas-fired Furnace.*

They may be arranged to fire under the hearth or above the charge. In the simplest form, these burners are supplied with air and gas completely mixed by an automatic proportioning inspirator or by a mixing machine. Their limitation is the low turn-down ratio which is seldom more than four to one, but they have the great advantage of automatic proportioning of the air-gas mixture throughout the range of operation. The combustion is confined to the tunnels within the walls so that the furnace and its charge are heated by hot gases.

The nozzle-mixing burner with annular concentric air- and gas-pipes is a variety which can be designed to suit almost any pressure of air or gas. The air-gas ratio is dependent upon the judgment of the operator, but the burner cannot back-fire. Because the mixing only takes place at the nozzle, the combustion is not confined to the tunnel within the wall, and the flame projects into the furnace chamber.

An improved design is the combined-inspirator type (Fig. 1) which essentially consists of a venturi proportioning device built in the form of a burner. This has the wide turn down advantage of the nozzle-mixing type combined with automatic proportioning, but it is more expensive than an ordinary tunnel burner. The disadvantage is that each burner must be individually set and this operation can be somewhat tedious where large numbers are employed, as on large bogie-type annealing furnaces. Once set, the burners do not require further adjustment to maintain the correct air-gas ratio, and it is only necessary to adjust the air valve to alter the rate of burning. When correctly adjusted they prevent loss of heat by incomplete combustion.

Flues and Recuperators

Uniform heat distribution is assisted by the correct positioning of flues which preferably should be placed below the level of charge so that the furnace is completely filled with products of combustion. In oven furnaces, flues in the door openings tend to prevent the inrush of air into the working chambers when the doors are opened. They also ensure the gases of combustion pass longitudinally through the working chamber in addition to the circulation set up by burners firing through the side walls. This is of assistance in obtaining uniformity of temperature. In continuous furnaces the flues are usually arranged at the inlet end so that the gases of combustion are cooled by the incoming material, thereby improving the thermal efficiency. A portion of the heat lost in the flue gases may be salvaged by the use of a recuperator or regenerator for preheating the air for combustion. As the temperature of the furnace increases so does the operation become more profitable.

Towns-gas-fired furnaces must frequently make use of recuperators in preference to regenerators because there is less thermal storage, and the majority of gas-fired furnaces are intermittently operated. The recuperator elements may take the form of refractory or metallic tubes of round, square or rectangular section. Firebrick refractory elements suffer from the disadvantage of the low conductivity of the material and the possibility of leakage through joints or cracks.

Other methods of heat salvage from hot flue gases include the waste heat boiler and the use of the gases for some other low temperature operation, for instance, drying ovens heated by the waste gases from enamelling furnaces.

Types of Furnaces

Box-oven Furnace.—The simplest form of gas-fired furnace is the oven type (Fig. 2), having natural-draft burners. The most usual arrangement is for the work to rest on a refractory hearth, and the firing can be from underneath, along the

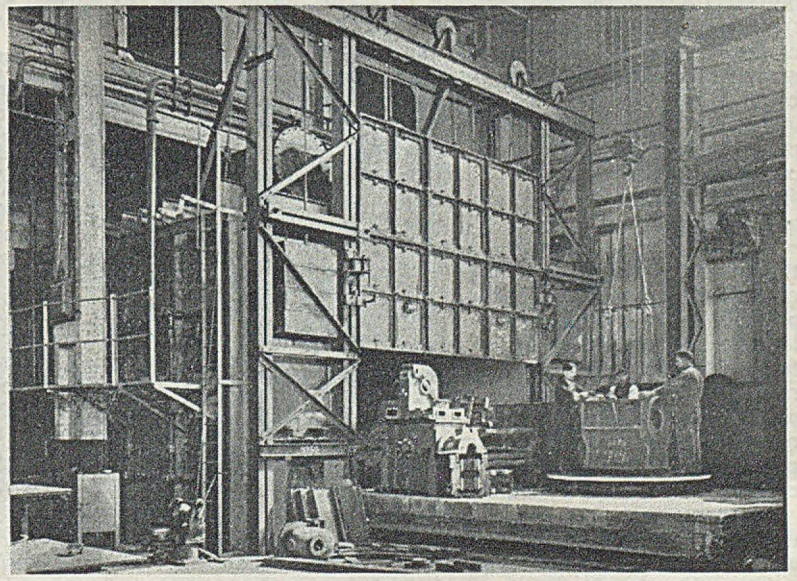


FIG. 3.—*Car-bottom-type Bogie Annealing Furnace as generally used for Large Castings.*

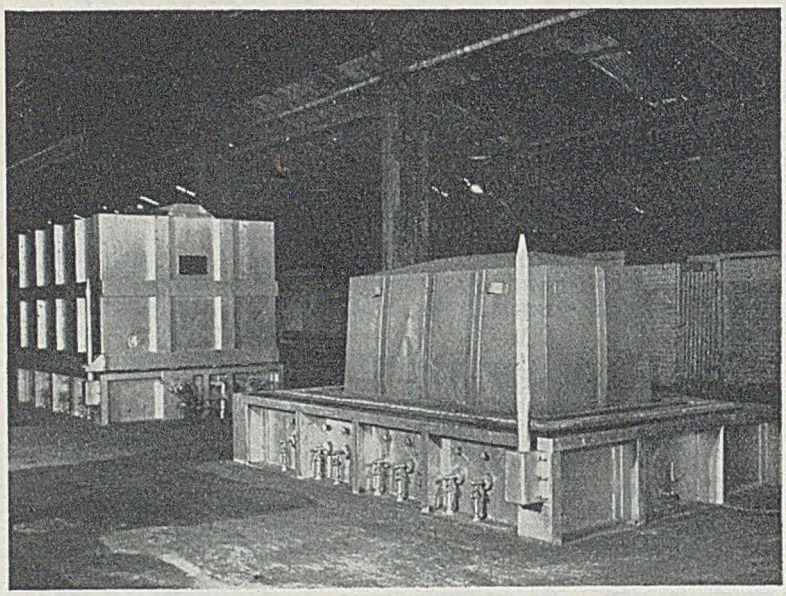


FIG. 4.—*Portable-cover-type Gas-fired Furnace. Two or More Hearths are usually arranged to Work with one Hood.*

sides, or above the charge. Side firing permits a very good thermal efficiency to be achieved as heat is transmitted directly to the charge by radiation from the luminous flames, and the gases of combustion can be taken off in the door opening, passed under the hearth and up the back wall. The oven type of furnace is often built to allow charging by means of arms or forks which can be slid under the load, projected into the chamber, and lowered until the work rests on the hearth. The arms can then be retracted and the door closed.

Bogie or Car-Bottom Furnace.—When the charge is bulky or very heavy it is not practicable to make use of the box-oven furnace, and a popular handling method makes use of a bogie or car to run into and out of the furnace (Fig. 3). The top of the bogie is built of refractory to form the bottom of the furnace and sand seals at the sides and ends prevent the escape of heat. In modern designs the bogie is mounted on ball or roller bearings. By increasing the length of the heating chamber and making use of a number of bogies a simple form of continuous furnace results. This finds its most frequent application as a kiln for firing of bricks and pottery.

Portable Cover Furnace.—A modern variation of the box or oven furnace is the so-called " top hat " or portable cover furnace (Fig. 4) which was made possible by the development of lightweight insulating refractory. The upper portion consists of a hood with sides, ends and top which is lifted by an overhead crane and placed on a base which has already been loaded with the furnace charge. Two or three bases are usually incorporated so that a charge can be heated on one base whilst another is cooled, and the third loaded or unloaded.

In many instances it is possible to arrange for the hood to be transferred from one base to another whilst at an appreciable temperature. This practice reduces the quantity of fuel required for heating the charge to temperature since the only brickwork to be heated is in the base. The furnace is now being introduced for the annealing of castings and rolls as well as for stress-relieving.

Removable-roof Furnace.—For many years, the pit furnace has been popular in the heavy industries for the soaking of ingots or annealing of large steel castings. These pit furnaces are usually built below ground level and are charged through the top by the removal of the roof. A recent modification consists of a pit furnace (Fig. 5) built above ground with an end door which can be placed in three alternative positions to reduce the effective length. The end door enables work much longer than the chamber to be heated, and therefore represents an advance over the normal pit furnace design.

Continuous Furnaces

The modern tendency towards continuous production has led to the development of industrial furnaces which are heat-treating machines, automatic in every respect, and capable of satisfying a complicated time and temperature cycle. The choice of conveyor can be very wide, but the need for fuel economy is causing preference to be given to types which will not result in heat being carried out of the furnace.

Inclined-hearth Furnace.—The simplest form of continuous furnace consists of an inclined hearth down which the material can be rolled or, alternatively, pushed. The large steel-billet or slab-heating furnace is in this class. Water-cooled skid rails over which billets are pushed can be responsible for a loss of heat in the cooling water, and therefore refractory skid rails have been developed in materials such as silicon carbide or alumina firebrick which do not require cooling.

Roller-rail Pusher Furnace.—Another form of pusher furnace makes use of heat-resisting steel

rollers set in rails arranged longitudinally. In most instances this class of furnace makes use of heat-resisting steel trays or iron boxes for holding work which cannot be pushed, but the disadvantage is that substantial quantities of heat are subtracted from the furnace in the trays. This can be overcome to some extent in annealing furnaces when it is possible to feed the material and discharge at each end of the furnace. One row of work can then be pushed in a contra direction to the second row—the furnace being divided into preheating, heating, and cooling zones. Burners are only arranged in the centre zone and those on either side are used for heat interchange. Another disadvantage of the roller rail furnace is that it is not self-emptying. Consequently, when shutting down it is necessary to push empty trays into the furnace in order to discharge the remaining full trays. The roller-hearth furnace, Fig. 6, overcomes this disadvantage. Rollers of heat-resisting steel extend across the hearth and through the side walls so that the bearings and driving mechanism are kept at a comparatively low temperature outside the furnace. The rollers are continuously rotated so that the work moves continuously through the various zones of the furnace. It is unfortunate, however, that loss takes place by conduction along the rollers and by subsequent radiation from the stub ends. The furnace is very suitable for the annealing of pipes, which do not require trays or carriers.

Belt-conveyor Furnace.—Belt- and chain-conveyor furnaces have a number of variations depending upon the form of conveyor. For low temperatures the conveyor may consist of malleable-iron chains with nickel-chrome steel pins which run on rails in the furnace bottom. Sprockets at one end are used for driving and for tensioning at the other end. Woven wire belts are used for articles of relatively light weight and cast-steel plates hinged together are used for heavier material. It is often necessary with this form of conveyor to extend it far enough at each end to allow loading and unloading, which causes heat to be carried out of the furnace in addition to that removed by the work. This is a very efficient form of furnace.

Horizontal Rotary-drum Furnace

The horizontal rotary-drum furnace most frequently used in foundries is a refractory-lined steel barrel, fired from one end and employed for the melting of many kinds of metal. Heat is transferred to the charge being melted by radiation directly from the flame, but this is often very much curtailed by the scum or slag which lies on the surface. It is often desirable that this scum should not be disturbed since it protects the metal from oxidation. The flame gives its heat to the lining which by rotating passes under the metal, thereby giving up its heat again by conduction. This furnace is more efficient than the stationary open-hearth melting furnace.

Monorail Conveyor Furnace

A high-temperature application of the well-known oven used for the drying of lacquer, paint, etc., is frequently used for the vitreous-enamelling process, and sometimes for the annealing of castings or other objects which can be suspended from hooks. The strands of the conveyor chain are arranged parallel in a horizontal plane so that it is possible to preheat the incoming work with the outgoing material since they are moving in a counter direction to each other.

Metal and Liquid Heating

The heating of liquids and the melting of metals are accomplished over a very wide range of temperatures, and there is consequently wide variation in the type of equipment used. For low temperatures natural-draft bar burners or immersion tubes may be employed, the solution being contained in a simple steel tank. Higher temperatures require a vessel or pot suspended in a lining of refractory and these pots are most frequently hemispherical or cylindrical. Metals, such as lead alloys, are commonly melted in hemispherical cast-iron pots, a shape probably adopted years ago because they

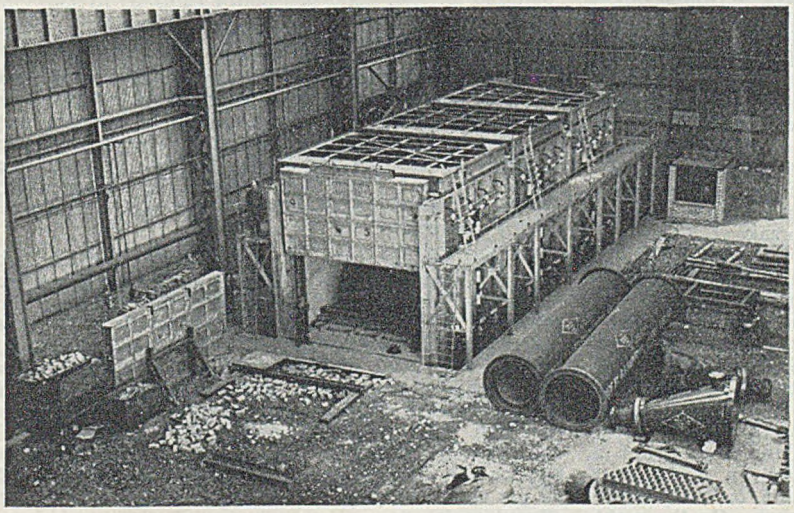


FIG. 5.—*Removable-roof Stress-relieving Furnace erected above Ground Level.*

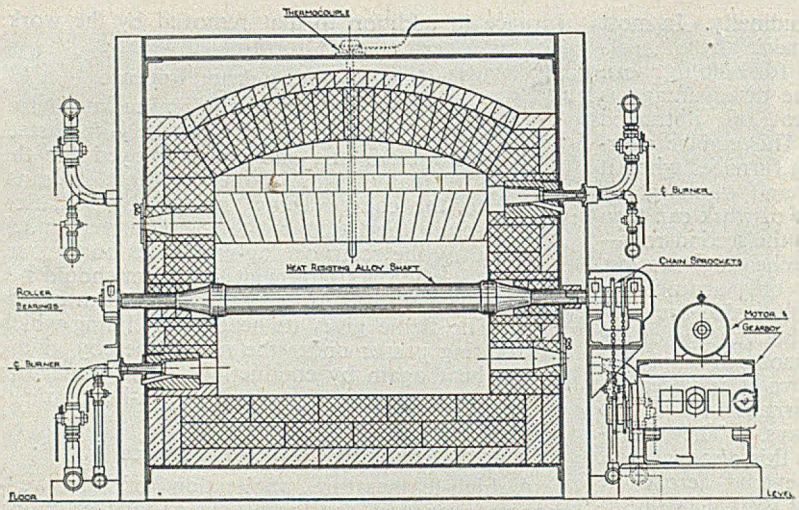


FIG. 6.—*Roller-hearth Furnace with Rollers extending through the Refractory Walls.*

were easy to cast and relatively free from stresses caused by unequal expansion. From the standpoint of heat transmission, these hemispherical pots are undesirable because a sphere encloses the largest volume in the smallest external area.

The hemisphere has also a large top surface area in proportion to the volume. The result is considerable heat loss from the surface which must be supplied by transmission through the pot walls. The use of rectangular baths with a small top surface can lead to much greater efficiency. Where large quantities of metal require melting, it is possible to make use of the open-hearth furnace in which a bath of metal is contained within the brickwork and heat is applied from above.

Conclusion

It will be appreciated that no attempt has been made to do more than describe some of the various types of burners and furnaces which are available. There are many other specialised furnaces with interesting features, designed to meet particular requirements, but these are so numerous as to make it impossible for a description to be given in the space available.

German Foundrymen's Association

The *Verein Deutscher Giessereifachleute*, of 167, Hansa Allee, Oberkassel, Dusseldorf, 22A, is organising a two-day conference to be held at the Robert Schumann Hall, Ehrenhof, Dusseldorf, to-morrow and Saturday. It is, however, to be repeated on February 16 and 17 at 18, Kienestrasse, Landesgewerbeamt, Stuttgart. An exhibition is being arranged to run concurrently with the congress and for some days afterwards. There are also to be visits to the works of Maschinenfabrik Esslingen, Esslingen-Mettingen; M. Streicher, Asperg steelfoundry, and Schwäbische Hüttenwerke, Wasseralfingen. The technical sessions for both events are the same. At 8.30 on the Friday morning the chair is to be taken by Mr. H. Baur, who will welcome the guests. At 8.45, Dr. W. Hartmann lectures on "Castings for Engineering Uses." At 9.45, Dr. Pfannenschmidt deals with grey-iron castings and, after a short break at 10.45, Dr. F. Roll covers the subject of malleable castings. Finally, at 11.30, Dr. W. Trommer gives a Paper on "Steel Castings." The afternoon is devoted to works visits. The Saturday morning session opens betimes and at 8.30 the chair will be taken by Mr. K. Deuring at Dusseldorf and by Mr. E. Debus at Stuttgart, when Prof. Opitz lectures on the machinability of castings. At 9.30 he is to be followed by Dr. P. A. Heller, who lectures on centrifugal castings. At 10 o'clock, Mr. Schneider deals with light alloys, and then, after a short interval, Dr. C. Adey lectures on non-ferrous die castings. At 11.45 the final lecture, on the pattern-shop, is to be given by Mr. F. Fischer. On the night of Thursday, February 15, there is to be a supper party at 8 p.m. at the Schlossgarten Restaurant, Stuttgart. Any of our readers who wish to participate in this second session may obtain some further particulars as to accommodation and the like by writing first to this office.

Home-grown Linseed

In 1947 there was a world shortage of linseed, and farmers were urged to grow as much as possible for sale to the Ministry of Food. The response was not as great as had been hoped, chiefly because of the difficulty of growing and harvesting this crop, but the efforts of those farmers who increased the acreage under linseed to nearly 86,000 in 1948 (the peak year) were greatly appreciated.

Linseed oil can now be readily obtained from soft currency areas overseas, and it is no longer necessary to call on home farmers to make special efforts. The Minister of Food has accordingly revoked as from January 21, 1951, the Home Grown Linseed (Control) Order, 1948, which controlled the sale of linseed so as to ensure that the largest possible quantity was sold to the Ministry of Food for crushing. Growers may now sell their linseed to whom they please. Until June 30, 1951, the Ministry of Food will continue to buy on the present basis of £55 per ton for seed of 90 per cent. purity linseed of the 1950 or earlier crops offered to it.

Reclamation of Castings

Discussion of Reports T.S.23 and T.S.26 of the Institute of British Foundrymen

THE NOVEMBER MEETING of the London branch of the Institute of British Foundrymen, with Mr. F. E. Tibbenham in the chair, considered and discussed the Reports T.S.23, "Repair and Reclamation of Grey-iron Castings by Welding and Allied Methods," and T.S.26 "Repair and Reclamation of Non-ferrous Castings."* Dr. A. B. Everest, B.SC., F.I.M., introduced the Report on grey-iron castings and Mr. R. W. Ruddle, M.A., A.I.M., that on non-ferrous castings.

Introduction

DR. A. B. EVEREST said that as they knew, the Reports which were before the meeting for discussion both represented many months of work; actually it was spread over more than two years and the Reports in their present form contained a volume of matter which represented only a very small percentage of the data which the committees had had to consider. The object in carrying out the work was because rising prices of materials and labour in recent years had all raised the intrinsic value of castings and had consequently made the rejection for defects and faults an increasingly serious matter. To-day there was every justification for taking steps to reclaim as many castings as possible and get them out into service.

Production and productivity were key words in industry to-day and waste had to be avoided. Reclamation was an outstanding aid in raising productivity in a foundry, but of even more importance was that reclamation methods, when properly applied had developed technically so much in recent years that they could now be used with every assurance of success. On the other hand he would say that in the past there had been a strong resistance on the part of engineers and inspectors to the acceptance of castings which had been welded, patched up or otherwise reclaimed. This attitude had in the past perhaps been justified since although reclaiming had gradually been put upon a sounder technical basis, the customer had no faith in reclaimed castings and would not accept castings unless they were perfect as coming from the foundry. The explanation was that reclamation had tended to be pushed into the corner of the foundry and was often carried out "under the counter" in very bad conditions in some place where there was not adequate lighting or ventilation, and where the equipment had to be camouflaged and concealed or put out of sight at a moments notice. It was impossible to make a good job under these conditions and consequently reclamation fell into disrepute.

It had been felt by the technical council of the Institute that the time had come to bring the whole of the reclamation business into the open and to teach engineers and inspectors that castings could be salvaged if proper methods were used. The Committees were charged therefore with airing the whole subject and preparing codes of practice which could be accepted by foundrymen and engineers. The codes aimed to show that reclamation was justifiable in many cases, and was capable of giving a good result. The two Reports had been prepared with the idea of bringing the whole subject into the open and getting a greater recognition for welding and other methods of reclamation. It was intended to persuade the foundrymen that it was perfectly legitimate to carry out reclamation provided that properly-controlled conditions were made available, and that under such conditions engineers and inspectors would accept reclaimed castings if both parties were technically aware of the facts and were honest with each other.

Difference in Scope

MR. R. W. RUDDLE endorsed Dr. Everest's remarks on the repair of castings in general, for they also represented the views of the T.S.26 Sub-committee which was set up to investigate the repair of non-ferrous castings with much the same general objects as the T.S.23. A difference was, however, that the T.S.26 Committee's terms of reference were simply "To investigate the methods of salvaging non-ferrous castings," no restrictions being placed on the methods to be considered, whereas the methods to be studied by the T.S.23 Committee were confined to welding and allied methods.

The object of the T.S.26 Committee—as with the T.S.23 Committee—was to put the repair of castings, in this case non-ferrous castings, on a proper basis with the hope that if an acknowledged code of procedure was produced and made known to inspecting authorities and users of castings, the present rather "hole-in-the-corner" methods of repairing castings could be avoided. It was the hope of the committee that the Report would provide such a code for the repair of non-ferrous castings.

In preparing the Report, the Committee's specific objects were, first, to provide details of the different methods which may be used to rectify castings in non-ferrous alloys and to indicate the scope of each method and, secondly, to indicate what type of defects could be repaired in order to reclaim a casting and render it suitable for the service normally required of a sound casting.

Although the Committee was primarily concerned with the reclamation of castings which were unacceptable as cast, many of the methods described in the Report were also acceptable to the salvaging of castings spoiled in machining, or worn or damaged in service.

* Both reports were presented at the Buxton Conference of the Institute and printed in the JOURNAL, August 24 and September 14, 1950, respectively.

Discussion—Reclamation of Castings

The following methods were discussed in the Report—burning, welding, brazing and soldering, the use of annealing for rendering bronze castings pressure-tight, impregnation, caulking and plugging, and finally plating and metal spraying. It was the Committee's object to cover the treatment of non-ferrous castings in general and, where appropriate, a distinction had been made between techniques suitable for the repair of copper-base alloys and those suitable for aluminium alloys. Magnesium-, nickel- and zinc-base alloys were not considered, as the manufacture of magnesium and nickel castings rarely comes within the scope of ordinary foundries, and is not usually economic to attempt to repair castings in zinc-base alloys. In considering the scope of different methods of salvaging castings, the Committee thought it particularly important to bear in mind the service conditions of the casting. A method suitable for repairing castings, the service conditions of which were not especially arduous, might be quite unsuitable for another casting intended for heavy duty. It was clear, therefore, that in attempting to systematise the repair of castings it was necessary to take into consideration the kind and magnitude of the stress to which the casting would be subjected in its working life, whether the casting must be pressure-tight, the corrosive environment in which the casting would find itself, the importance of the casting in the unit of which it was to become a part, and so on. This matter of service conditions was covered in the Report by adopting the classification given in B.S.1367, which divides castings into three groups:—

Class I. Castings the failure of which could cause serious breakdown of the mechanism or assembly, or which could give rise to danger.

Class II. Castings which do not fall within Class I, but which are required to withstand special service conditions.

Class III. Castings not otherwise included.

The Committee did not consider this classification entirely adequate, and had therefore divided castings into two further groups—those subjected to hydraulic or gas pressure, and those stressed in other ways. In the Report the Committee had endeavoured to indicate which methods of salvaging were applicable to the different groups of castings. Mr. Ruddle then summarised the Report.

DISCUSSION

MR. A. TALBOT said on reading the Report he now found that welding was acceptable, but he wondered if the Committee as well as convincing foundrymen that welding was acceptable could get the engineers to agree also.

Whilst the need of careful preparation was obvious, close inspection afterwards was also necessary. Caulking and plugging for non-ferrous work had not been universally successful, particularly if it was for pressure work. In the case of burning-on, the Report was not very illuminating especially in the case of aluminium. Could additional information be given?

DR. EVEREST said the measure of the success of the work done could be judged by the fact that after the Report was published the Committee had been asked for its presentation to nine branches for this session. That showed the interest in the subject.

The next difficulty was the engineers and inspectors. The Committee had that aspect very much in mind and hoped that the Report could be used to impress all concerned that reclamation, carried out properly, was legitimate and acceptable.

MR. RUDDLE pointed out that in the T.S.26 Report it was recommended that caulking or plugging should be confined to the repair of minor defects in castings of Classes II or III.

"Burning" of Aluminium Castings

Referring to the burning of aluminium castings, he said that it was not a difficult matter to burn castings in the low- and medium-strength alloys such as the 5 per cent. silicon, 3 per cent. copper alloy (D.T.D. 424), and the near-eutectic aluminium silicon alloy (L.33); castings in the latter alloy were especially easy to repair by burning, using a technique similar to that described in the Report for copper-base alloys. The main points were, to gouge out the defect thoroughly, to pre-heat the casting, to make the burn with hot, degassed metal and to make sure, by feeling the bottom of the liquid pool with a rod or by other means, that the parent metal of the casting had in fact melted. If this were done, a good burn was obtained without much difficulty. Burning of castings in certain of the high-strength alloys such as the 10 per cent magnesium alloy (D.T.D. 300) and the 4 per cent. copper alloy (D.T.D. 304) was less easy owing to the hot-shortness of these alloys, and the danger of oxidation. However, if care were taken a satisfactory repair could be made even with these materials.

MR. G. PIERCE asked if Dr. Everest could obtain from the Technical Committee a method for welding castings of $\frac{1}{8}$ to $\frac{3}{16}$ in. thick without any pre-heating that were subsequently to be vitreously enamelled. He hoped Dr. Everest would tell the Committee that in vitreous enamelling all stresses were relieved very quickly—so quickly as often to crack the castings.

With regard to the other parts of the Report he was enamoured with Mr. Ruddle's description of three classes of castings and the permissible types of repair which could be done on them. Presumably one could do anything one liked with a Class III casting. He hoped they might get a B.S. specification which said one could do exactly what one liked with the third class of castings. His experience taught him that they would do no good at all annealing castings in an attempt to cure porosity which might be inherent in the metal of the casting. He had seen it tried, he had read about it and he had tried it himself, but if the metal was porous originally he did not think they could do anything in the way of curing it by annealing. It seemed to be a waste of time.

There was one further point with regard to impregnation. This, he believed, was a successful

method of reclaiming castings, but there were limitations to it. In using that method, consideration should be given to the use to which the casting was likely to be put. If one were impregnating a valve casting, it would be just as well to be sure that it would not be used for a fluid which would disintegrate the Bakelite or whatever was used as a sealant.

DR. EVEREST said he hoped if anyone in the meeting had any experience on the welding of thin-section iron castings for vitreous enamelling or any similar problems they would bring forward their knowledge because he thought in that way the could help each other.

MR. PIERCE in this connection suggested the Committee should investigate the possibility of welding by the arc process. The castings which he had mentioned could be welded using non-ferrous electrodes—there were many on the market, and therefore a wide choice—the most generally popular were the high-nickel type.

MR. RUDDLE expressed regret if anything which he had said had given the impression that the T.S. 26 Committee thought that it was permissible to do anything one liked with class III castings; with any casting, whatever its class, the service conditions were the deciding factor in choosing a means of repair. He agreed that the classification used was by no means perfect but did not think that the Committee should be blamed. The Committee had made use of the B.S. classification as it was the only generally-accepted one in existence. He had been pleased to hear Mr. Pierce's remarks on the annealing of bronze castings for they fitted in with what he himself knew about it, although there were those who said they had successfully saved porous bronze castings by annealing them.

Choice of Sealant for Impregnation

Mr. Ruddle then referred to Mr. Pierce's remarks about impregnation and the danger that the sealant might be dissolved by liquids with which the casting might subsequently come into contact. He thought that this point had been covered, although perhaps not very explicitly, on page 10 of the Report, where the desirable properties of a sealing fluid had been mentioned, among them resistance to solution or attack by chemicals. The sealing fluid had always to be chosen with the service conditions of the casting very much in mind.

MR. A. WHILES pointed out that in the non-ferrous Report there was a reference to electroplating of castings for recovery. He had had a fair amount of experience in plating copper and nickel and had never filled in a hole properly, nor, so far as he knew, had anyone else.

MR. RUDDLE said it was not suggested in the Report that one could fill holes. Plating was regarded simply as useful for building up the worn surfaces of journal bearings and similar parts.

MR. MILLINGTON drew attention to a theory that welders were born and not made and recommended anyone who had to engage a man for welding just to give him a test-piece. If he could not weld a test-piece he would not weld a casting. Such a test, he thought, might usefully be incorporated in the Report.

He would like a little more clarification to appear in the Report on the question of hardening. That was one of the chief troubles experienced with welds. It would be very valuable if the primary causes were made known, and he thought a rather longer section on hardness should be given in the ferrous-castings Report.

It was rather unkind to the magnesium founders to exclude them from burning-on. This could satisfactorily be accomplished, and he had seen it done during the war with very good results.

A final point, of interest to the non-ferrous people, was that argon-arc welding seemed to him the best method now available. It was still relatively new, but it was definitely advantageous in that no flux was needed and one got a good weld even on rather thin sections, of which it was difficult normally to make clean jobs.

DR. EVEREST thanked Mr. Millington for his suggestions about trying out the welder on a test-piece. It was necessary to be careful in the selection of men to put on reclamation jobs; they had to be men who were properly trained.

Hardness of Cast-iron Welds

With regard to hardness in iron castings, the hard zones were to his mind the result not so much of alloying between the parent and weld metals, but due to the thermal effects induced in the parent cast iron. When one heated iron to a high temperature and cooled it quickly, carbon tended to go into the combined form and hard carbides resulted; furthermore, on quick cooling, pearlite formation might be suppressed and martensite produced. To avoid this, the welder should add an extra run on the top of the previous run, but taking particular care not to run on to the parent metal. The whole purpose of the final run was to heat the weld and parent metal, thus tempering down any hard zone. He was told that this tip worked and suggested that if any were troubled by hardness they might try it.

MR. RUDDLE said the burning-on of magnesium alloys had not been referred to in the Report because magnesium-base castings were not often made in the ordinary foundry.

He agreed that argon-arc welding was a most useful method and was likely to be extremely valuable as a means of repairing castings in the foundry. It had been mentioned in the Report, but the Committee had felt unable to recommend it at that stage as the method was so new. It should be remembered that the Report was prepared over a year ago and argon-arc welding techniques were less well-developed than now.

MR. MILLINGTON said he understood the Committee's feeling in the matter, but he did not want the idea spread that magnesium could not be handled like other metals, and by leaving it out of the Report there was a danger that that idea would gain currency.

MR. B. LEVY mentioned that in building up surfaces by welding the hardness question came up all too often irrespective of the way the welding

was carried out. He would point out that one had only to take a standard welding rod and melt it and when it had cooled it was harder to machine than before melting had taken place. They found that frequently with many kinds of welding rods. He suggested the metallurgists should concentrate on a low-temperature form of adhesion similar to that of a new aluminium solder, which amalgamated very easily with aluminium.

DR. EVEREST asked if it was when using cast-iron welding rods in gas welding that hardness was experienced, and MR. LEVY agreed that it was.

DR. EVEREST suggested the composition of the welding rod must have been wrong. There was no cause for hard welds given a proper pre- and post-heating and a proper rod.

MR. LEVY said that with melting the rod only and taking that metal it was harder to machine than the original rod.

DR. EVEREST pointed out that with gas welding it was important to use a proper pre-heating so that they did not get chilling of the metal as it dropped on to the casting.

MR. PIERCE said burning-on for aluminium castings was quite easy if one was careful. What the job was did not matter if they took the precaution to use the same alloy as the casting. There was a technique and perhaps the most valuable point of it was to see that the founders were getting the metal to the place where they had decided to amalgamate in sufficient quantity and that they were getting something like a homogeneous structure there.

MR. RUDDLE expressed entire agreement with Mr. Pierce's remarks. It was, of course, essential to make the burn with molten metal of similar composition to that of the casting. Furthermore, to secure a good burn it was necessary to use degassed metal of good quality. Use of metal of inferior quality would result in a weak joint, and the all too common practice of making burns with any metal which happened to be handy was strongly to be deprecated.

Requirements of the Engineers

MR. KENRICK agreed that the Sub-committee might consider more closely the requirements of the engineers responsible for accepting castings, and he thought they might send the code to one or two of those more important users who were very particular about welded castings. On page 10 of the non-ferrous Report there was a mention of synthetic resins containing a fine metal powder which were said to give promising results. Could more information be given? Did the main Committee frame the terms of reference of the two Sub-committees with any special motive, in that the cast iron committee were restricted to certain processes and did not investigate their reclamation methods such as impregnation?

MR. RUDDLE regretted he could not answer the first question concerning the synthetic medium containing a fine metal powder. He would, however, find out the manufacturer of this sealant and forward details to those interested.

Replying to the second question, he said that the terms of reference of the Committee had been fixed by the I.B.F. Technical Committee, for which he was unable to answer. The T.S. 26 Committee had been originally given terms of reference which did specify certain methods of repairing castings, but as it had been thought that these terms were too restrictive, the parent Committee had agreed to amend them so as to give the sub-committee a completely free hand.

DR. EVEREST said that as regards bringing the Report to the attention of the engineers, it was emphasised at the beginning of the Report that they had passed that document to some of the leading consulting engineers of the country and to Lloyd's Register, and Dr. Dorey himself had returned it with his blessing and said it would be useful if it could be taken further. They might have to consider further work on it, and possibly amplify the inspection and the properties clauses. That was a difficult subject and so far they had been unable to find much authentic information on the properties of welds. All that could be said was that if the weld was properly made one would get a stronger join than the parent metal.

With regard to the terms of reference, Dr. Everest said that when his Committee was formed he thought that welding was a sufficiently large subject in itself in relation to cast iron, and he was reluctant to include burning-on, but it was argued that burning-on was a type of welding and it was therefore included. His Committee had never considered other methods of reclamation.

He would stress the point that the two Committees on reclamation worked quite independently. There was no arrangement that the two Reports should be modelled on similar lines; they were entirely separate efforts.

Malleable and Steel Castings

MR. A. R. PARKES said he would like the Sub-committees to extend the work to embrace malleable cast iron, and then to deal with the welding of steel castings from the point of view that reclamation of steel castings *was accepted* by engineers. It was well known that there was more welding in the steel foundry than in other sections of the industry, but at least it was generally accepted by customers and inspecting authorities with the proviso that it had to be done by an expert. During the war, orders were received for castings which specified that no welding whatever was to be done, and then subsequently it transpired that special reclamation centres had been set up where those same castings and even more important ones were reclaimed by welding!

DR. EVEREST said that with Mr. Parkes' permission he would put his name forward to study the further questions he had raised. The Committee realised that their work was limited in its scope, but what they had done had involved a great deal of effort and had meant the study of an enormous volume of data.

Dr. Everest then mentioned that they had with them Mr. Tibbenham senior, who had given a lot of help on the Committee. He was the father of their chairman and he asked that members should

accord him a welcome. He hoped he might have a few words to say.

MR. L. J. TIBBENHAM said it had given him great pleasure to be present and see his son in the chair. He had been connected with the foundry industry for 40 yrs. and if the present meeting had been held 40 yrs. ago welding would not have been discussed at all, only burning-on. He considered he had been an expert burner-on, but it was always done at night when there was no-one about.

Members had heard Dr. Everest say he was no welder, but he was the mainspring of the Committee, and he was a driver. He had driven him—the speaker—to Birmingham fifteen times to attend the committee meetings and he had kept them at it. He congratulated Dr. Everest on the way he had brought the whole thing to a conclusion. When they started he thought they would never do it, but now he was very proud of it, as he thought they all were. It would be a useful asset to the founding and welding industries.

He himself was one of the largest makers of cast-iron welding rods in the country, so he had been listening with great interest to the chairman. He was learning things, and was always willing to learn, but members would be surprised if they realised the vast amount of welding rods that were made. So much that a great amount of welding must be done nowadays, unless like mustard, more was wasted than was used!

MR. W. G. MOCHRIE said he was very pleased to hear what had been said about annealing bronze castings and he agreed that it was useless for sealing holes.

Standard Codes of Procedure

Three things he would like to mention. First, he would like to see the technical Reports adopted as British Standard Codes of Procedure, and to see them adopted in a very condensed form and in view of the world-wide repute of British Standards he would like to see these codes recognised as coming from the I.B.F. Technical Committee on its own strength, without the references made within the Reports. Could Dr. Everest tell them if it was the intention that those Reports should be further discussed or modified after they had been published.

DR. EVEREST said that the intention was that the Reports should be tabled and discussed at the various branches and the Committee would then have a final meeting and decide whether, arising from the discussions, there was any need for modification. Up to the present there had been nothing which called for major modification.

It had been suggested that they should then be submitted to the British Standards Institute and from what he knew of the British Standards procedure he expected that when they were submitted the Council would examine them and then appoint a committee on the welding of cast iron which would start with the Reports before them and he hoped they would find they contained much of which they could approve.

MR. A. R. WIZARD said while he was in full agreement with Mr. Ruddle on the non-ferrous Report ging, mentioned at the end of the Report, could sometimes be of use. If founders had no plant and were making an art casting, for instance, they merely cast a few extra runners in the same metal. Down these they ran a $\frac{1}{8}$ or a $\frac{1}{4}$ in. die. If a hole was found in the casting they put in a suitable tap, screwed in a length of the threaded runner, broke it off and, with the aid of a matting tool, an extremely good job was made which could be machined and would pass any inspection.

MR. PIERCE doubted if such a repair would be suitable, but Mr. Wizard mentioned various statues which had had a faulty place patched, and the repair had withstood some very rough treatment during the war without a sign of failing.

No Need for Subterfuge

MR. A. L. PENDREY thought engineers were always very doubtful of castings and seemed to be always on the lookout for blowholes which had been stopped, but when they were in trouble they always came back to the foundry. He thought the burning-on should be brought out into the open. There were cases in which something in the way of repair had to be done to complicated existing castings, such as pickling crates. Even in the case of a mixer in a paper mill, a most peculiar job, a successful burn-on had been made. It was taken out on a Friday night, yet was in work again on the Monday morning. Such jobs were necessary, and there was no need for all the hocus-pocus if there was a job that warranted burning-on. Where a big job was made on the foundry floor, it was often impossible to pre-heat such a casting before burning, and in such cases he thought the best thing to do was to give it a sufficient soak afterwards. It was not feasible to pre-heat this sort of job, or even to heat the area round the burn, because of the sand around the defect. An anneal after burning was far more important in such cases than pre-heating before burning.

MR. RUDDLE thanked Mr. Pendrey for his remarks about burning-on, and agreed with what he said about annealing the casting after burning if it proved impossible to pre-heat it thoroughly beforehand. He emphasised, however, that it was highly desirable to pre-heat the casting if it were at all possible. There were great dangers attached to burning a casting without any pre-heating, and it might be that on a large casting which could not be pre-heated it would be wiser not to attempt to burn-on. The possibility was that severe internal stresses set up by burning might cause a crack which perhaps would escape subsequent detection.

MR. WHILES asked if Mr. Ruddle had had any experience with aluminium cement. He had had some introduced to him some years ago and had tried it, but without success.

MR. RUDDLE said he was afraid he had had very little experience with this material, but he understood it was only useful for filling holes in unstressed castings.

Discussion—Reclamation of Castings

MR. HUGHES asked if anyone had had any experience with Thermit welding of cast iron and steel.

DR. EVEREST mentioned that it had been discussed by the Committee, and the Report made a passing reference to it. It was not rgarded as an economic process and should be used only in conditions where other methods were not available.

MR. BARNARD said they had used Thermit welding on several occasions, only on heavy castings, but had made quite a successful job of them.

DR. EVEREST said the point had been raised in the discussion of the Report by another branch, and he had made a note to see that a little more was included on the subject before the Report was finalised.

MR. BARNARD said he was a steel founder, and thought the problem of getting engineers to accept welding would be overcome when engineers were educated; this had been accomplished so far as steel castings were concerned. If the notions were properly explained to the engineers, he thought there would be no trouble at all with getting them to accept welding of cast iron and non-ferrous castings.

DR. EVEREST thought the last remarks underlined the whole purpose of writing the Report. If welding was brought out into the open and properly controlled then it would be accepted. But as long as foundrymen kept it a hole-in-the-corner business then they got bad work which naturally aroused suspicion.

MR. TALBOT referred to the Productivity Report figures given in America and in this country with reference to trimming and said they showed about the only favourable figure on our side, but talking to the members of the team which went over, he had found they did stress very forcibly that in every foundry they went into the welder was an essential part of the fettling. He wondered, if we accepted the welder as part of our fettling, whether the castings which he would reclaim would increase our productivity figures.

DR. EVEREST thought Mr. Talbot had opened up a very important and interesting subject. A visit to one of the leading motor-car factories where the foundry was highly mechanised would show that there, reclamation was regarded as a legitimate method of production. The castings at the shake-out were given a first inspection and any defective castings were directed either to the welding section or the scrap heap, according to the extent and nature of the defects.

Possible Consequences

Another point which must be stressed, however, was that if founders did include a welding section they would have to watch that the proportion of scrap from the foundry floor did not go up. In two or three cases it had been reported that the psychological effect of having a welding section was to make the moulders careless and the amount of scrap had increased in consequence. Methods to stop that would have to be devised.

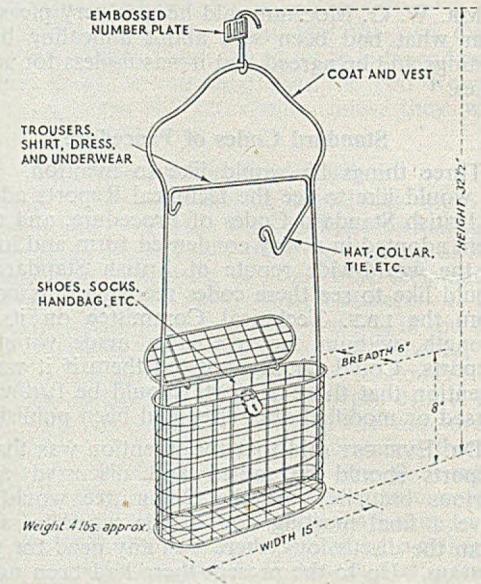
MR. TALBOT asked if it was an accepted fact that in America the engineer did not look with such suspicion on a welded casting as was the case in this country; in America they seemed to be much broader minded?

DR. EVEREST said they had evolved a stage further than here. Engineers were really more enlightened, and welding technique had made rapid progress.

MR. RUDDLE said that it had been suggested several times that inspecting authorities were unwilling to accept repaired castings, but he would point out that the Air Ministry approved several methods of repairing light-alloy castings. Burning-on, welding and impregnation were acceptable even for class I castings.

MR. HUGHES said, in his foundry they repaired quite a lot of castings by arc welding. If they got one that required welding they telephoned the inspector and asked if he would accept the job. If it was a machine part it was annealed afterwards.

The lecturers were cordially thanked on a proposal made by Mr. Wilson and seconded by Mr. Pierce and after replies by the lecturers, the chairman closed the meeting.



The "Sieber" Clothes-storage Hanger which in its original form has been on the market for some time now incorporates a locking basket, as shown above. Manufacturers are James Sieber Equipment Company, Limited, Africa House, Kingsway, London, W.C.2.

MR. J. H. C. E. HOWESON, who died on January 8, was a prominent figure in the tin-mining industry, having been chairman of many mining companies. He was 65.

Castings for Machine Tools

By A. G. Thomson

MURAD DEVELOPMENTS, LIMITED, specialise in the production of machine tools. Their principal lines are capstan and centre lathes, but special-purpose machines are occasionally supplied to a number of leading manufacturers. The company has also developed a dustless grinder, embodying a dust inhibitor which traps the dust in the base of the machine. These grinders are proving so popular that the demand outstrips supply. Two models are in production, the larger of which has found a ready market in the foundry industry, while the smaller is designed especially for the off-hand grinding of tools, etc.

In common with other machine-tool manufacturers, this firm was faced during the war years with considerable difficulty in obtaining the castings required, production being constantly disorganised by the very heavy commitments of the foundry industry. In order to overcome this difficulty an associate known as Technaloy, Limited, was brought into existence in 1940 to supply the parent company with both ferrous and non-ferrous castings, a development which has completely eliminated the bottleneck. Dependence on outside sources of supply was further reduced by the formation of British Bronson, Limited, to provide the motors and electrical switchgear, the purchase of which was another difficult problem. The organisation is therefore in the fortunate position of being able to build complete machine-tools virtually from pig-iron and steel bars, almost the only other requirement not produced on the premises being ball bearings and copper wire.

In 1947 the construction of new factory buildings was started on a site of about 23 acres at Stocklake, Aylesbury, Bucks, to which the entire establishment has been transferred from Watford. In planning the new premises, the organisation was in the unusual position of being able to lay out the works in accordance with the most modern principles, without being handicapped by having to modify an existing building. Advantage has been taken of this opportunity to provide a foundry which presents many outstanding features. A brick building (Fig. 1), with a total floor area of 22,000 sq. ft., houses the whole of the foundry, which comprises iron and non-ferrous shops, pattern shop, core shop, fettling shop, and changing rooms with shower baths for the men. A concrete floor has been provided throughout. Excellent lighting is afforded by the large windows and saw-toothed roof, but overhead lamps with 750-watt bulbs have been installed, the arrangement being such that at any point in the building, light equivalent to 18 foot-candles is provided at bench level.

Sand Recovery Scheme

A notable feature of the layout is the installation of ducts under the floor for sand conveyors, the intention being that at any point on the floor the sand could be got rid of merely by tipping it through grids on to conveyors underground, which would carry it to a sand-treatment plant located in the basement, the reconditioned sand being elevated to overhead bins. Unfortunately the completion of this scheme has had to be postponed on account of shortage of labour and the conveyors have not

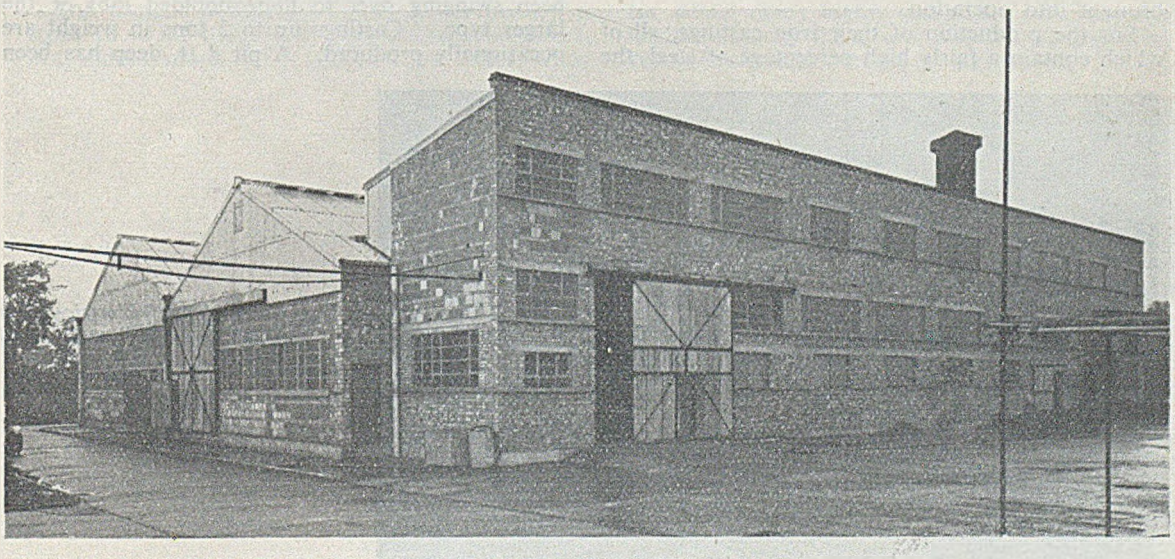


FIG. 1.—*Exterior View of the Foundry of Technaloy, Limited, Aylesbury.*

FIG. 2.—*Half-mould being produced from a Jolt-squeeze Moulding Machine.*

yet been installed, production being at present confined to straight floor and machine moulding. In Aylesbury, the available labour supply is confined to trainees and unskilled men, and the company is obliged to bring all its skilled men from Watford. Owing to the difficulty of obtaining skilled labour, plans are being made to increase the use of local labour by developing mass-production lines and the complete sand-handling scheme will then be brought into operation.

For the production of their iron castings, all of which contain a fairly high percentage of steel, the company use ordinary No. 3 pig-iron and refined irons. The sands employed include two grades of Erith, Mansfield sand is used for the stronger mixtures, and silica sands are obtained from two sources, one at Sheffield and the other at Bedford.

Melting

The melting equipment comprises two cupolas of 5 tons and 3 tons per hour capacity respectively, both being provided with volume and pressure controls. A good feature of the arrangements is that the charging floor is located on a gallery inside the building, so that the men are under cover. The charges are brought up by lift and weighed on the platform. Various methods are employed for controlling the metal. Briquetted ferro-silicon and ferro-manganese are used and, where necessary, the ladle of metal is also inoculated at the spout with nickel. In some cases where special irons are called for, inoculations with other materials such as ferro-silicon are also made. The laboratory is located on the gallery, so that the chemist is in close proximity to the cupolas.

Moulding

The sands are unloaded from lorries directly into their appropriate bins through shutters provided in the wall. All floor sand used in the foundry is constantly aerated by "Royer" machines. The whole foundry is covered by overhead runways and provision has been made for an overhead crane to be installed when required. In addition to green-sand moulding, a fair amount of dry-sand work is undertaken. The equipment therefore includes two coke-fired drying ovens, in each of which a system of air circulation has been incorporated, heated air being drawn off at the top of the furnace and recirculated along the floor. Two jolt-squeeze machines are in operation, Fig. 2 showing a half mould being produced. The proportion of repetition lines was fairly high, but lately the demand has been swinging over to floor-moulded jobs of the larger type. Castings up to 2 tons in weight are occasionally produced. A pit 8 ft. deep has been

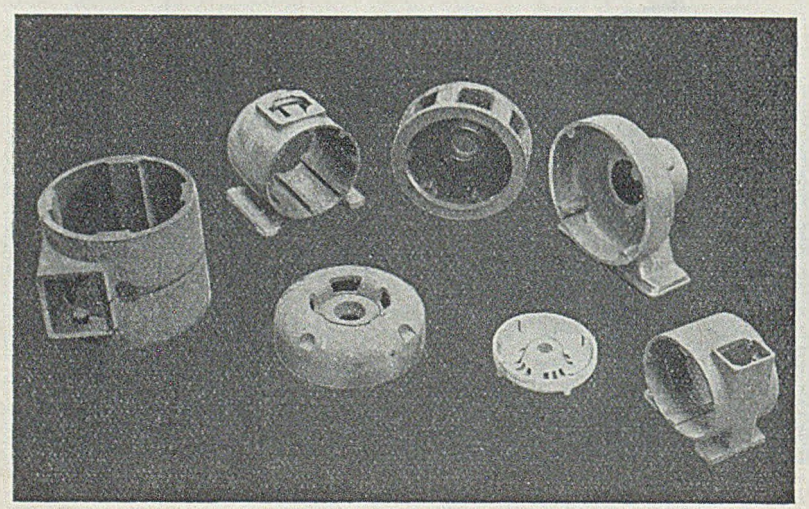


FIG. 3.—*Group of Electric-motor Castings in Iron and Light Alloys.*

provided for the larger work, permanent tie-bolts being bedded right down along the sides so that any bolting-down arrangements can quickly be put into operation. Incidentally, the general level of water on the site is only 5 ft. from the surface, but the whole area has been drained to a depth of 27 ft. Channels along gravel courses allow the water to drain into a sump from which it is drawn by a pump brought into action automatically.

Non-ferrous Foundry

A dwarf wall separates the non-ferrous section from the iron foundry. This section supplies all the bronze and light-alloy castings used on Murad machine tools, while electric motor end-shields are also an important product. The melting equipment includes both tilting and bale-out furnaces and all castings are produced from ingot metal. Mansfield sand is employed exclusively in this section. In the early days considerable trouble was experienced in obtaining satisfactory light-alloy castings. All the commonly adopted procedure was instituted, such as complete pyrometer control and protection of the molten metal against gas occlusions, but the quality of the castings remained unsatisfactory. Eventually a certain alloy containing a small percentage of magnesium was tried and the problem was immediately solved. The management has been unable to find any logical explanation either for their trouble or for the cure. Both ferrous and non-ferrous sections of the foundry are conspicuously tidy, good housekeeping being facilitated by the adequate floor space available for production.

Conveniently situated under the same roof are the fettling and pattern shops, the latter being provided with a gallery for the storage of patterns which are in constant use. An additional pattern store has been provided outside the main building. Wood is used for the majority of patterns, but metal patterns are employed for repetition jobs.

The present production of the iron foundry is from 10 to 12 tons of finished castings per week, but should reach 50 to 60 tons per week when developments now in hand come to fruition. The bulk of the output consists of general machine-tool castings in high-duty irons with tensile strengths in the vicinity of 16 to 17 tons per sq. in., good machineability being, of course, one of the most important qualities required. Many of these castings are extremely complex and a considerable amount of coring up is generally required.

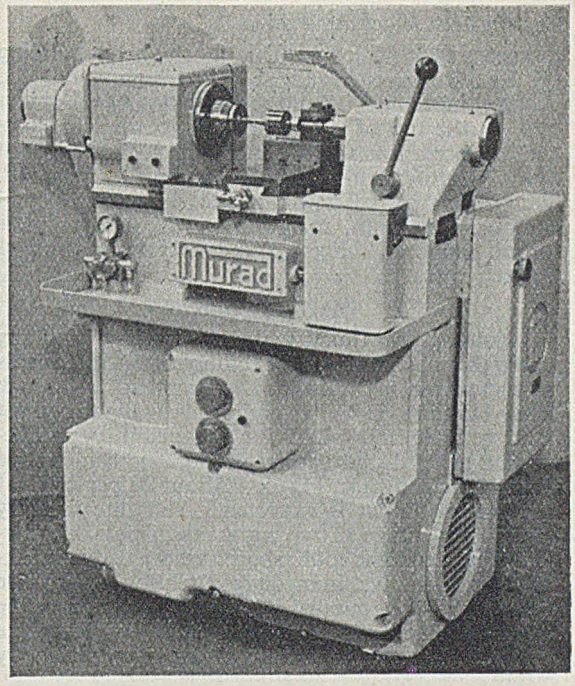


FIG. 5.—*Typical Machine Tool embodying Castings produced by Technaloy, Limited.*

Since the foundry was transferred to Aylesbury, the company has begun to cater for outside firms, for whom many highly specialised jobs are undertaken. Among them are pulleys for mine conveyor equipment ranging in size up to 3 ft. 6 in.

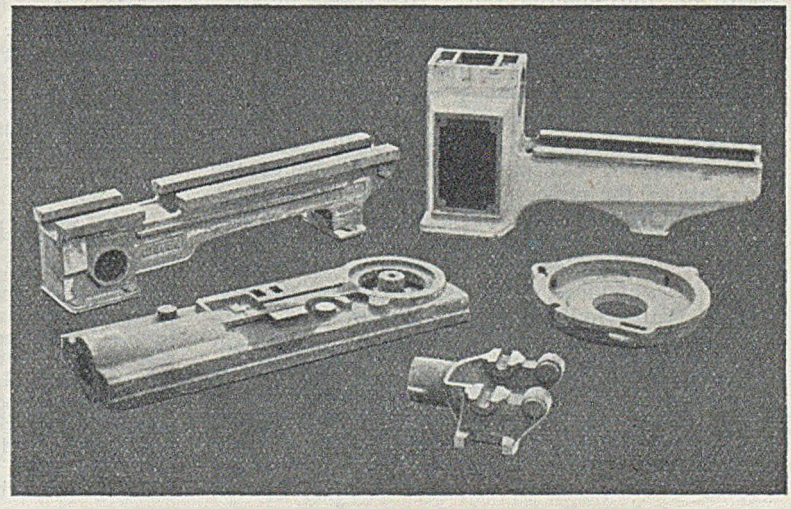


FIG. 4.—*Examples of some of the more-intricate Machine-tool Castings produced.*

Castings for Machine Tools

diameter by 4 ft. long. This job involves building up four cores each about 1 ft. high, and the slightest inaccuracy would result in an uneven thickness on the top of the pulley. Since these pulleys are balanced for smooth running, it is important that uniformity in thickness should be achieved. Other complex castings include cylinders for oil engines, gear rings, manifolds and cylinder liners for oil engines. Figs. 3 and 4 show groups of finished castings.

Machine Shop

Adjoining the foundry is a very large building where the machining and assembly of machine tools is undertaken by Murad Developments, Limited. This building is fully equipped with the most modern tools and plant for the quantity production of general and special-purpose machines, one of which is shown in Fig. 5. About 70 per cent. of the current output is exported. Thus the foundry has the advantage of having at its disposal a fully-equipped machine-tool shop, where any breakdown can receive immediate attention. On the other hand, the foundry has proved of inestimable value to the machine-tool factory. One advantage is that castings can be stored in the open until they have thoroughly seasoned. While in the factory, each casting goes through a roughing operation to remove the skin and then progresses through the works for a quite considerable period before being assembled in a machine. Investigation has shown that on an average nine months elapse between the time when a casting leaves the foundry and the time when it is dispatched from the factory in a finished machine tool. Thus the risk of distortion is eliminated by ageing over this period. The greatest advantage of the foundry, however, is the speed with which a new machine can be put into production. In the case of fixtures for the machine shop, for example, the finished casting can be delivered only two days after the pattern-shop has received the drawing, which is of tremendous importance to a machine-tool factory. Another important consideration is that, when putting a new machine into production, any necessary modifications can be put into effect without delay.

The organisation maintains a large fleet of lorries of all types for the collection of materials and the delivery of machines and castings. The latest acquisition to its transport fleet is a coach which will be used every day for transporting the skilled foundry workers to and from their homes in Watford.

U.K. Trade in 1950

Exports from the United Kingdom in December were valued provisionally at £188.7 million, bringing the provisional total for the year 1950 to £2,170.1 million, or 22 per cent. above the 1949 total of £1,785.4 million. It is estimated that the volume of exports in 1950 was about 15 per cent. higher than in 1949. Exports in the fourth quarter, valued provisionally at £603.2 million, were £60.3 million higher than in the third quarter and exceeded the January-September quarterly average by £80.9 million. The daily rate of exports during December (which contained 24 working days) fell slightly below the November peak, but was 13 per cent. above the third-quarter rate. Re-exports in December were valued provisionally at £7.3 million, making the total for the year £85.1 million, compared with £58.0 million in 1949.

The provisional value of U.K. exports to the United States in December was £11.5 million ($32.1 million). The daily rate of exports in the relatively short month of December fell slightly below the high rate of the previous two months. Exports to the United States in the fourth quarter were valued provisionally at $107.4 million, compared with a quarterly average of $69.7 million in the period January—September, 1950. Exports during the year totalled $316.4 million, compared with $205.4 million in 1949. Exports to Canada were £10.3 million (equivalent to U.S. $29.0 million), and brought the total for the fourth quarter provisionally to U.S. $103.3 million, compared with a quarterly average of $83.1 million during the first three quarters of the year. Exports during the year totalled $352.5 million, compared with $295.2 million in 1949. The combined figure of exports to North America in the fourth quarter reached $210.7 million, being 68 per cent. above the quarterly average in 1949 and 38 per cent. above that in the first nine months of 1950. Exports to North America in the year totalled $668.8 million (provisionally), or 34 per cent. above the 1949 figure of $500.6 million.

The provisional value of imports in December at £239.4 million brought the total for the year to £2,603.7 million, compared with £2,274.1 million in 1949, while exports and re-exports together were £2,255.1 million in 1950, compared with £1,843.4 million last year. The excess of imports (valued c.i.f.) over total exports (valued f.o.b.) in 1950 was therefore £348.6 million, compared with £430.7 million in 1949. The excess of imports over total exports rose in December to £43.4 million, the highest figure since June, and was £65.2 million in the fourth quarter, compared with £70.0 million, £149.7 million, and £63.7 million in the first, second, and third quarters of the year.

Diesel-electric Loco Sales

A new selling company has been formed to further Diesel-electric locomotive sales of the Brush-Aboe group and of its associate company, W. G. Bagnall, Limited. The name of the new company is Brush Bagnall Traction, Limited, and its executive offices are at Falcon Works, Loughborough.

Directors of the new company are:—Mr. A. P. Good (chairman); the Hon. A. C. Geddes (managing director); Mr. J. W. C. Milligan; Mr. W. A. Smyth; Mr. Rex Bate; Mr. E. W. Marten; Mr. J. Calderwood; and Mr. J. T. Rymer. The sales manager is Mr. P. J. Martin.

The Canadian Market

Despite the heavy demands of the rearmament programme on industry, it remains vitally important that this country should maintain a high level of exports to dollar markets, thus earning the means to pay for imports of food and raw materials from those countries. As part of the services provided for exporters, the Board of Trade has recently issued a new publication entitled "Exporting to Canada," which concentrates on the more immediate and practical problems which confront the exporter.

The booklet, which costs 2s. 6d., endeavours to offer a brief but comprehensive outline of the main features and exigencies of this market. It includes information about Canadian Government restrictions, duties, taxes, standards, specifications, and details of Canadian methods and practices in the sale and distribution of goods, credit terms offered, advertising practices and sales methods, etc. It also deals with a wide range of other miscellaneous matters of interest to the exporter, including questions of shipment freights, packaging, samples, servicing, choice of agents, use of catalogues, Canadian exhibitions and fairs, and it includes a chapter on the facilities offered by the Export Credits Guarantee Department.

Record Level of Employment

The expansion and speeding up of the rearmament programme is reflected in the November employment figures, the principal increase in the manufacturing industries being in the metals, engineering and vehicles group, whose total labour force rose by 20,000 to 4,019,000. This was nearly half the total increase in manufacturing industries of 42,000, bringing employment in this section to 8,585,000.

The total number of people at work in Great Britain rose to a new record level of 23,558,000. As in the previous month, most of newly-employed persons were women—37,000, against 18,000 men. In September the Prime Minister indicated that some 250,000 more workers would be required in arms factories over the next three years, but the extent of the defence programme indicates that a substantial increase in the scope and speed of the programme will be needed. The National Joint Advisory Council, composed of both sides of industry, is meeting on January 31 to consider the question of the mobilisation of labour.

Petrol and Oil Prices Increased

Owing to increases in tanker freight rates, the price of petrol and oil has been increased as from Thursday, January 18. The increases (per gallon), announced by the Ministry of Fuel and Power, are as follow:—

Motor spirit, bulk and ex-pump, white spirit (London Zone), kerosene vaporising oil, fuel oil, and heavy fuel oil, ¼d.; Diesel oil for road vehicles (derv) and gas oil (Diesel oil), ⅜d.; kerosene (burning oil, paraffin oil—ordinary and superior grades) and aviation spirit (100 octane), ½d.

These increases refer to deliveries in inner zones, the increase in outer zones being ¼d. per gall. higher, and in general zones ½d. per gall. higher.

Meeting Postponed.—It has been found necessary to change the date for the annual general meeting of the Slough section of the London branch of the Institute of British Foundrymen from March 20 to March 13.

Personal

MR. W. C. F. HESSENBERG, M.A., F.I.M., head of the mechanical working division of the British Iron and Steel Research Association, has been made deputy director.

MR. JAMES CROWTHER, managing director of H. Crowther & Sons, Limited, manufacturers of pulleys and shafting, of Cleckheaton (Yorks), celebrated his golden wedding anniversary last Monday.

MR. E. SALMON has been appointed comptroller of Metropolitan-Vickers Electrical Company, Limited, and Mr. D. Thomson secretary as from January 1. Mr. W. D. Taylor has been appointed to succeed Mr. Lowe as secretary of Metropolitan-Vickers Electrical Export Company Limited as from the same date.

NEW RESPONSIBILITIES at K. & L. Steelfounders & Engineers, Limited, have made it impracticable for Mr. R. F. Ottignon to continue as managing director of Metalclad, Limited. He remains a director. Mr. Philip B. Levy, who has for some years served on the board of Metalclad, Limited, has been elected managing director with effect from December 8, 1950.

A Hiving-off Scheme Effective

Shareholders of Brown, Bayley's Steel Works, Limited, Sheffield, are informed by Mr. J. W. Garton, chairman, that legal formalities in connection with the hiving-off scheme have been completed. In accordance with the Iron and Steel Act, 1949, the Minister of Supply states that the securities of the company will not vest in the Iron and Steel Corporation of Great Britain by virtue of that Act.

The company has agreed that it will not serve a notice on the Minister in accordance with Section 21 (2) of the Act, and accordingly the notice served by the Minister became final and effective on Monday last.

World Metallurgical Congress

The sponsoring body of the World Metallurgical Congress—the American Society of Metals, 7301 Euclid Avenue, Cleveland 3, Ohio—has sent through H.M. Ambassador an invitation to the British Government to participate in this important meeting by sending a delegation of its best known scientists, the congress is to be held at Detroit, Michigan, from October 15 to 19. With it will be associated the usual pre-convention tours, whilst in addition there is to be an exhibition of scientific plant.

Steel Arbitration Rules

Rules regulating the procedure in any proceedings before the Arbitration Tribunal established under the Iron and Steel Act, 1949, other than proceedings which are to be treated as Scottish proceedings, have been published by the Stationery Office.

The members of the tribunal are Sir John C. Howard, Mr. E. C. Ellen and Sir Frederick J. Alban. The office of the tribunal is at present at Room 85, Queen Anne's Chambers, 28, Broadway, London, S.W.1.

Moulding Boxes

Sub-committee T.S.34, of the Technical Council of the Institute of British Foundrymen appointed to make recommendations regarding standardisation of moulding boxes has completed the draft report. This is now to be studied by the British Standards Institute to ascertain its suitability for the issue of standard specification.

Plea for Postponement of Steel Nationalisation

The hope that "at this time of real crisis" the Government might yet find it possible, without a sacrifice of principles, to postpone the vesting date under the Iron and Steel Act was expressed by Sir Robert Sinclair, president of the Federation of British Industries, in an address in Nottingham last Wednesday.

Pointing out that circumstances had materially changed since, in the early autumn, February 15 was fixed as the vesting date, Sir Robert said that if the Government was then thinking of a rearmament programme which could be executed over a period of three years, in the main "carried" by rising productivity and attended by no shortages of raw materials, the inevitable dislocation and distraction caused by the change-over might have seemed relatively unimportant. But surely that could not be so in the changed circumstances of to-day.

The steel industry was at this moment doing magnificently. Why disturb it in any way at this critical stage? If anyone should attempt to justify such a course by saying that if this opportunity were lost nationalisation of the steel industry would never happen, they were admitting that there was a fundamental weakness in the case for it. This was an opportunity for statesmanship—an act which would go a long way to remove any suspicions that might exist in some quarters abroad that there were those in this country who put political considerations before national interests.

Electricity Development on Tees-side

The view that the planning consultants who prepared the Pepler Macfarlane development plan for the north-east coast, considerably underestimated the future electricity requirements of Tees-side, is expressed in the sixth annual report of the Tees-side Industrial Development Board. The board is not disturbed because it is aware that the British Electricity Authority is erecting a station at North Tees which by 1953 will have an output of 480,000 kW. "It is more disturbed," says the report, "at the slow rate of bringing new capacity into production, and has presented its views to the Northern Regional Board for Industry, in the hope that additional pressure might assist in speeding up construction of the generating station."

On the question of public port facilities the board has agreed that "at the appropriate time it will lend all possible assistance to the Tees Conservancy Commission in any action it decides to take to ensure that the body to be established for the future management of the docks and river installations shall be given power compatible with the preservation of local autonomy."

Export of Copper Goods

From Monday, January 22, the export of copper goods under open general licence will only be permitted provided the value exceeds the value of the copper or copper-alloy content, calculated at £500 a ton for copper and £400 a ton for alloys mainly of copper.

This licence, the Board of Trade announces, applies to copper goods specified in Group 6 (2) of the First Schedule to the Export of Goods (Control) (Consolidation) Order, 1950. Under a previous similar licence, which is revoked, the values were, respectively, £200 and £160 a ton.

Shipwrights' Company Officers

At a meeting of the court of the Worshipful Company of Shipwrights on January 11, presided over by Sir Stanley Goodall, the Prime Warden, the following officers were elected for the year commencing May 1 next:—PRIME WARDEN: Mr. Geoffry Parsons; RENTER WARDEN: Sir Harold Flannery; SECOND WARDEN: Mr. Philip Runciman; THIRD WARDEN: Sir G. Leighton Seager. Sir W. Lacon Threlford was elected hon. treasurer, Mr. Gilbert Findlay, hon. clerk, and Mr. R. J. Lake was elected beadle for the ensuing year.

The following were elected to the company and will be admitted at a future meeting of the court: Mr. J. R. Adams, Mr. J. S. Baillie, Earl Beatty, Mr. V. L. Burke, Mr. R. B. Constant, Mr. W. J. A. Davies, Mr. J. W. Nicholson, and Mr. F. W. Talbot. Mr. R. G. S. Cayzer was admitted to the freedom of the company, and the following were admitted to the Livery, sworn in and welcomed: Mr. L. P. S. Bourne, Lieut-General Sir Richard N. Gale, Mr. T. C. Rolland, Mr. H. E. Skinner, and Mr. J. Wainwright.

Clydeside Plan to Avoid Power Cuts

Under an agreement between the Clyde Shipbuilders' Association and the Confederation of Shipbuilding and Engineering Unions, Clydeside shipyards are now spreading the 44-hr. week over four full days and two half days. This has been arranged in order to avoid electricity cuts. On one of the five weekdays each yard is working a 4¼-4½-hr. day between 10 a.m. and 2.30 p.m., so lightening the load at the peak early morning and late afternoon periods. Additional working on the other four weekdays will make up the 44-hr. week and Saturday morning working will remain unchanged.

By arrangement with the South-west Scotland Electricity Board each yard's shorter day, which will be the same each week, is to fall on the day when it is liable to power cuts under a local rota system.

U.S. Technicians for India

The Governments of India and the United States have signed a bilateral agreement which makes available to India technical assistance under President Truman's Point Four programme. The first allocation for the American fiscal year ending June 30 will be valued $1,200,000, and this is expected to be increased considerably in subsequent years.

India will obtain the services of up to 50 American technicians under the first year's programme, and can send up to 100 students for advanced technical training in the United States. It is felt that the limiting factor will be the number of suitable men available on each side rather than the amount of funds.

S. & L. Output Records

In topping the steel-ingot target allocated to the company by 26,000 tons, Stewarts and Lloyds, Limited, with an output in 1950 of approximately 1,141,000 tons, also overhauled the previous year's record output by 165,000 tons. A further record was achieved in respect of production of steel tubes, last year's tonnage of approximately 730,000 tons comparing with the previous best—again in 1949—of 705,500 tons.

Obituary

MR. GEORGE HANNA, late of Babcock & Wilcox, Limited, Renfrew, died last Tuesday.

MR. DONALD MCCALLUM, a well-known Stirling iron and steel merchant, has died at the age of 65.

MR. G. H. BAYLEY, a director and general sales manager of Guest Keen & Nettlefolds (Midlands), Limited, died on January 5.

DR. HENRY ROBERT WRIGHT, chairman and managing director of Siemens Bros. & Company, Limited, died recently at the age of 73.

MR. ERNEST ALLISON, who has died at the age of 56, was works manager for S. Dixon & Sons, Limited, engineers and founders, of Leeds.

MR. JOHN HENRY BAINES, who retired last year after 60 years as secretary of Burgon & Ball, Limited, the Sheffield toolmakers, died recently at the age of 86.

MR. ANDREW DICKIE, who died on January 11, was a director of William Dickie & Sons, Limited, agricultural engineers and ironfounders, of East Kilbride (Lanarkshire).

MR. WILLIAM NEILL, who died recently at the age of 76, was a retired delegate director of Cassel Cyanide Company, Limited, a subsidiary of Imperial Chemical Industries, Limited.

MR. ALFRED EDWARD RAYNER, who retired four years ago from the position of assistant secretary of the Institution of Electrical Engineers, died last Monday at the age of 63.

MR. G. W. BROWN, past-president of the Birmingham branch of the Institute of British Foundrymen, died recently. He was formerly a senior foundry executive at Austin Motor Company, Limited.

MR. A. CROWTHER, chief metallurgist at Peglers, Limited, brassfounders, Doncaster, and a director of the firm since 1937, died on January 15. He had been associated with the company for the past 30 years.

MR. JOHN METCALFE MAITLAND, retired marine engineer, who died on January 9 at the age of 69, was a director and assistant manager of Resistance Welders, Limited, Inverness, until his retirement in 1946.

MR. ARTHUR WADE MILLAR, who was secretary of the Bradford and District Amalgamated Brass Finishers' Union for over 50 years, has died at Harrogate at the age of 88. His father was a co-founder of Millar, Dennis & Company, brassfounders, etc., of Bradford.

MAJOR-GEN. SIR ERNEST SWINTON, who died last Monday at the age of 82, made an important contribution to the invention and use of the tank as a fighting weapon in the 1914-18 war. At the outbreak of that war he was appointed Deputy Director of Railway Transport.

Wills

CRANKSHAW, JAMES, ironfounder, of Bolton (Lancs) ... £25,513

DAVIES, T. F., late a director and general manager of Richard Thomas & Baldwins, Limited £46,626

MCCULLOCH, ANDREW, research engineer, of Pittsburgh Carnegie Institute, late Resident Engineer, University of Alberta, Canada, and Lecturer in Fuels, Manchester College of Technology, 1924-1947 ... ... £5,056

RITCHIE, P. M., managing director of William Dixon, Limited, pig-iron makers, of Glasgow, chairman of the Scottish Ironmasters' Association, past-chairman of the Lanarkshire Coal Masters' Association, and past-president of the West of Scotland Iron and Steel Institute £74,284

OSBORN, F. M., late chairman of Samuel Osborn & Company, Limited, the Anglo-Swiss Aluminium Company, Limited, George Turton, Platts & Company, Limited, and the Star Aluminium Company, Limited, Wolverhampton, and a director of High Speed Steel Alloys, Limited, Widnes (Lancs) ... £114,416

Board Changes

NOBLE & LUND, LIMITED—Mr. D. C. F. Lindsay has been co-opted to the board.

BRITISH OXYGEN COMPANY, LIMITED—Mr. A. C. Livesey has retired from the board.

ANGLO-METAL COMPANY, LIMITED—Sir William T. Griffiths has resigned from the board.

HILLS (WEST BROMWICH), LIMITED—Mr. L. S. Podmore has resigned from the board.

SKINNINGROVE IRON COMPANY, LIMITED—Mr. C. A. Reed, works manager since 1939, has been appointed a director.

EDISON SWAN ELECTRIC COMPANY, LIMITED—Mr. Tom Hands, director of manufacture, has retired because of ill-health.

OSBORN FOUNDRY & ENGINEERING COMPANY, LIMITED—Mr. W. T. Hill (commercial manager) has been appointed a director.

TITANIC STEEL COMPANY, LIMITED—Mr. E. Pasley (chief metallurgist) and Mr. H. Deakin (forge manager) have been appointed directors.

ENGLISH CHINA CLAYS, LIMITED—Mr. Robert Large has resigned from the board and Mr. R. W. C. Hobbs has been elected a director in his place.

NATIONAL GAS & OIL ENGINE COMPANY, LIMITED—Mr. A. E. Carodus, who has resigned his appointment of managing director, retains his seat on the board.

CLYDE ALLOY STEEL COMPANY, LIMITED—Mr. Stephen L. Robertson, sales manager, and Mr. James Montgomery, steelworks manager, have been appointed directors.

PRINCE-SMITH & STELLS, LIMITED—Mr. David Waterhouse, managing director, has retired, but will continue as chairman. Mr. F. D. N. Lean and Mr. R. Chiles have been appointed managing directors.

SANDERSON BROS. & NEWBOULD, LIMITED—Mr. J. R. A. Bull has been appointed sales manager with a seat on the board. Mr. E. O. Stubbings, a member of the board since 1938, assumes the position of London director.

SAMUEL OSBORN & COMPANY, LIMITED—Mr. F. May (secretary of the company), Mr. L. Halpin (sales manager), and Mr. John H. Osborn (elder son of the chairman of the company) have been appointed local directors.

ASSOCIATED AUTOMATIC MACHINE CORPORATION, LIMITED—Major R. D. K. Curling, chairman since 1929, has resigned from the board and Mr. T. M. Till has been appointed in his stead. Mr. W. T. James and Mr. B. M. Till have been appointed directors.

Record Installation of New Generating Plant

A record total of new generating plant was installed by the British Authority during 1950. It amounted to 1,034,000 kW., bringing the aggregate installed capacity of the power stations owned or operated by the authority to 14,557,000 kW. Corresponding figures of plant installed during 1948 and 1949 are 503,250 kW. and 826,250 kW. respectively. The highest pre-war installation of plant was in 1938 when 761,500 kW. of new capacity was added to the supply system.

The additional output obtained from the 1,034,000 kW. of new plant commissioned last year was 923,000 kW. (or over 1,236,000 h.p.). The difference is accounted for by limitations of boiler capacities and other causes. Altogether 23 new turbo-alternators and 45 new boilers were brought into operation.

News in Brief

C. MACKECHNIE JARVIS & PARTNERS, consulting engineers, have removed to 26, Victoria Street, Westminster, London, S.W.1.

THE ANNUAL DINNER AND DANCE of the Combustion Engineering Association will be held at the Dorchester Hotel on Thursday, March 15.

ORDERS from 33 countries for bulldozers and other earth-moving equipment valued at £50,000 were received during 1950 by the Birtley Company, Limited.

AIR CONTROL INSTALLATIONS, LIMITED, Ruislip, Middx, have opened a branch office at 70, Mosley Street, Manchester, 2 (telephone: Central 0679 and 0670). Mr. F. Wright is the manager.

TREASURY CONSENT has been received by Tweedales & Smalley (1920), Limited, textile-machinery manufacturers, of Castleton (Lancs), for the issue of bonus shares in the ratio of one for each ordinary share held.

STEEL PRODUCTION in 1950 by member-firms of the South Wales Siemens Steel Association totalled 1,649,500 ingot tons—the highest output for 13 years. The record of 1,676,633 tons was produced at the works in 1937.

IMPORTS OF iron and steel and manufactures (excluding cutlery and machinery) into the Republic of Ireland last September were valued at £590,484 (£592,111 in September, 1949), making £5,516,931 (£4,954,788) for the nine months.

THE NUMBER of new companies registered in Great Britain during 1950 totalled 13,726, representing a total nominal capital of £73,046,000. This compared with 14,290 registrations in 1949, representing total nominal capital of £79,827,000.

THE MILLIONTH VEHICLE produced by Vauxhall Motors, Limited, in the last 20 years came off the assembly lines in the Luton factory on January 11. The first half-million Vauxhall-built vehicles took 12 years to produce; the second half-million only eight years.

AS PART of the campaign to obtain 1,000,000 tons of waste paper this year, the Waste Paper Recovery Association appeals for the co-operation of all trade and professional associations and chambers of commerce in increasing the commercial collections of used paper and board.

THE FORMATION is announced of Lancashire Dynamo & Crypto (Mfg), Limited, which will ultimately acquire the manufacturing business at present operated as Lancashire Dynamo & Crypto, Limited. The latter company will change its name to Lancashire Dynamo Holdings, Limited.

A TWO-FOR-THREE scrip bonus in ordinary shares to ordinary shareholders registered on January 10 is announced by the directors of Thomas Robinson & Sons, Limited, ironfounders, etc., of Rochdale. The issue will capitalise £49,364 from share premium and profit and loss accounts.

LAST FRIDAY, the whole of the staff of Industrial Newspapers, Limited (proprietors of the FOUNDRY TRADE JOURNAL), were the guests of the directors at a theatre party, followed by a supper at Simpson's in the Strand. The latter function was presided over by Mr. Barrington Hooper, C.B.E., the managing director.

AT AN EXTRAORDINARY GENERAL MEETING of Pease & Partners, Limited, on January 10 resolutions for the capital distribution to the shareholders of 7s. per ordinary share were duly passed. The distribution will accordingly be made on January 31 to the ordinary shareholders on the register at the close of business on January 12.

THE BRITISH STANDARDS INSTITUTION has just issued: a revised edition of B.S. 1133:1950, section 14 (adhesive closing and sealing tapes); a revised edition of B.S. 814:1950 (mild-steel drums for light duty with fixed ends); B.S. 1262:1950, part 2 (sizes of tins for paints and varnishes), and a new edition of section 8 of B.S. 1133:1950 (wooden containers).

WORK WAS RESUMED last Friday at the Falls Foundry of Combe, Barbour, textile engineers, of Belfast, by the 500 workers who went on strike on account of a wages dispute, and the dismissal of a worker, who is now to be reinstated. A further conference is to be held between workers and management concerning the interpretation of the wages agreement.

AT THE ANNUAL STAFF DINNER-DANCE of Priest Furnaces, Limited, Middlesbrough, it was disclosed that the company is engaged on a contract exceeding £1,000,000 in value for the erection of new steel plant in South Wales. The company has also received its first "dollar contract" for the design of new steel furnaces in the United States and similar work in Norway.

THE SCOTTISH FUEL EFFICIENCY COMMITTEE has been advised by the Minister of Fuel and Power that he has no power to deal with its demand for a ban on mid-week sporting fixtures arising from the fuel shortage. The committee has been told that its approach should have been to the Home Secretary or the Scottish Secretary. The committee is now seeking the support of Mr. Hector McNeil, Secretary for Scotland.

AN ANNOUNCEMENT to the effect that the Canadian Government is planning controls for non-ferrous metals, including nickel and copper, and the formation of a special non-ferrous division of the Trade Department, to be administered by Mr. Frank Hewlett, the war-time Metals Administration Officer, was made by Mr. C. D. Howe, the Trade Minister, at Ottawa recently. Mr. Hewlett will enjoy powers similar to those of Mr. Kenneth Harris, head of the new Steel Control Division.

THE BOARD OF TRADE have issued a certificate that all the official Festival of Britain Exhibitions are exhibitions for the purposes of section 51 (2) of the Patents Act, 1949, and of section 6 (2) of the Registered Designs Act, 1949. This means that the display or use of any new invention or design with the consent of the inventor or the proprietor of the design, or the publication of any description of the invention or design in consequence of such display or use, will not invalidate the grant of a patent or registration if an application is made to the Patent Office by the inventor or proprietor not later than six months after the opening date of the exhibition.

Movement of Wholesale Prices

The following table, taken from the "Board of Trade Journal," shows the movement of wholesale prices of industrial and building materials, expressed as percentage increases on the average for the year 1930 = 100.

Group.	1949.	1950.					
	Dec.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Coal ..	305.3	300.7	300.7	306.5	306.5	306.5	306.5
Iron and steel	257.8	261.3	261.5	262.0	262.6	265.1	265.4
Non-ferrous metals	277.2	326.0	336.8	366.3	384.5	*418.3	443.5
Chemicals and oils	196.5	212.3	212.9	215.3	216.5	*220.1	221.2
Building materials	225.2	230.7	232.5	236.3	236.9	238.0	237.7

* The figure published last month has been amended. Amendments made earlier are not marked, but wherever the figures given in earlier articles differ from those above the latter should be used.

Law Cases

Illegal Acquisition of £10,000 Worth of Steel

Illegal steel transactions between a Stoke-on-Trent toy-making company—said now to be in liquidation, with £65,000 debts—and three Midland suppliers, led to fines totalling £1,430 and costs of £157 10s. being imposed on Friday last on a Ministry of Supply prosecution in the Potteries Stipendiary's Court.

Henry Bernard Simmonds (43), general manager of the Teddy Toy Company, Stoke-on-Trent, was fined £440, with 50 guineas costs, on 20 summonses for unauthorised acquisition of steel and for furnishing false documents (two cases). Arthur Macnay (38), commercial manager of the company, was fined £500 and 50 guineas costs on 20 summonses for acquiring steel and five for issuing false documents. For unauthorised supply of steel, John Cashmore, Limited, Great Bridge, Tipton, was fined £120 with 10 guineas costs (four cases); Bescot Steels, Limited, Walsall, and Lewis Graham Firth, ex-director, £105 and 15 guineas costs each (six cases); and Daniel Wellings, trading as the Dudley Iron & Steel Company, and Arthur Griffiths, manager, £80 and 15 guineas costs each (two cases). All pleaded guilty.

Prosecuting counsel said that the Teddy Toy Company illegally acquired 249 tons of sheet steel and 83 tons of general steel worth more than £10,000 in 1949, of which amount 68 tons (£2,347 worth) was acquired by false forms. The three firms before the Court had supplied a total of 246 tons (£7,700 worth) to the Teddy Toy Company, without authority. The steel was acquired either without a permit, by false forms issued by Macnay, or on authorities which had expired. The Teddy Toy Company had authority to acquire at the time of the offence, 12 tons of sheet steel and 16 tons of general steel. Nothing above controlled price was paid for the steel acquired.

Counsel for Simmonds and Macnay said that Macnay acquired the steel to keep his firm on production and Simmonds was "dragged in" in that way. There was an abundance of general steel at the time and these two defendants were expecting the control to be taken off it, as in fact it was in May, 1950.

It was pleaded for the other defendants that the steel supplied was of low grade and that no profit was made on the deals, and that they relied on the Teddy firm supplying the permits. Mr. Firth and Mr. Welling had no personal knowledge of their firm's transactions.

Richard Crittall Director Loses Appeal

An appeal by Arthur Edward Patrick Hinds, a director of Richard Crittall & Company, Limited, against his conviction at the Old Bailey of offences under the Prevention of Fraud (Investments) Act, 1939, was dismissed last Monday by the Lord Chief Justice (Lord Goddard) in the Court of Criminal Appeal. Hinds had been sentenced to three years' imprisonment and granted bail pending the appeal.

At the material time he was joint managing director of the company and was alleged to have made recklessly misleading statements regarding profits in a prospectus inviting subscriptions to shares in the company.

With regard to criticism of the judge's summing-up, Lord Goddard said that in the opinion of the Court there was no misdirection at all.

MR. P. G. CAREW, assistant managing director, and Mr. Walter Hackett, junr., director, of Tube Investments, Limited, left England last Saturday for Brazil to consult with customers and study market opportunities.

Increases of Capital

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

WALKER (ENFIELD), LIMITED, manufacturers of plant, tools, etc., increased by £7,000, in £1 ordinary shares, beyond the registered capital of £1,000.

GRAVEL GATE FOUNDRY COMPANY, LIMITED, Hollinwood, near Manchester, increased by £2,000, in £1 shares, beyond the registered capital of £1,000.

SAMUEL JONES & COMPANY (ENGINEERING), LIMITED, London, E.C., increased by £99,625. in £1 ordinary shares, beyond the registered capital of £20,375.

CARRICK & FOSTER, LIMITED, iron and brass founders, etc., of Bingley (Yorks), increased by £40,000, in £1 ordinary shares, beyond the registered capital of £10,000.

WELLMAN SMITH OWEN ENGINEERING CORPORATION, LIMITED, 25, Wilton Road, London, S.W.1, increased by £45.000, in £1 ordinary shares, beyond the registered capital of £255.000.

STANDARD PISTON RING & ENGINEERING COMPANY, LIMITED, Bank Street, Sheffield, increased by £50,000 in £1 ordinary shares, beyond the registered capital of £25.000.

PETRONIC, LIMITED, engineers, etc., of Putney, London, S.W.5, increased by £15.000, in £1 shares, beyond the registered capital of £10.000. Petrenovic & Company, Limited, hold nearly all issued shares.

CRONITE FOUNDRY COMPANY, LIMITED, Victoria Street, London, S.W.1, increased by £64.000, in 420,000 ordinary shares of 1s. and 172.000 ordinary shares of 5s. each, beyond the registered capital of £36,000.

JOHN ALLEN & SONS (OXFORD), LIMITED, engineers, etc., of Cowley (Oxon), increased by £20,000, in £1 6 per cent. non-cumulative redeemable second preference shares, beyond the registered capital of £80,000.

DORR-OLIVER COMPANY, LIMITED, engineers, etc., of London, S.W.1, increased by £15.000, in £1 ordinary shares, beyond the registered capital of £25,000. At November 3, 1950, the Dorr Company of USA held a majority of the issued share capital.

C. & C. MARSHALL, LIMITED, ironmasters, etc., of Oakleigh Road North, London, N.20, increased by £7,500, in 1,500 ordinary and 2,000 6 per cent. preference shares of £1, and 80,000 founders' shares of 1s., beyond the registered capital of £5,000

J. RUSSELL (LIMEHOUSE), LIMITED, iron, steel, and hardware merchants, etc., of Commercial Road, London, E.14, increased by £15.000, in 5,000 ordinary and 10,000 5 per cent. non-cumulative preference shares of £1 each, beyond the registered capital of £15.000.

ZINC ALLOY RUST-PROOFING COMPANY, LIMITED, Rochdale, increased by £48,000, in 960,000 ordinary shares of 1s., beyond the registered capital of £17,000. Each of the £1 ordinary shares in the original capital have been subdivided into 20 ordinary shares of 1s. Petrie & McNaught, Limited, hold a majority of the issued shares.

Contracts Open

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

AYLESBURY, February 5—Iron castings, for the Bucks County Council. The County Surveyor, County Offices, Aylesbury.

BACUP, February 13—Manhole covers, gully gratings, etc., for the Town Council. The Borough Engineer, Municipal Offices, Bacup.

CANNOCK, February 17—Castings, for the Urban District Council. Mr. E. Lomax, engineer and surveyor, Council House, The Green, Cannock.

CONSETT, February 3—Manhole covers and gullies, for the Urban District Council. The Costing and Ordering Department, Council Offices, Medomsley Road, Consett.

DUBLIN, February 5—Special castings, branches, bends, etc., cast-iron water pipes, sluice valves, hydrants, etc., steel reinforcements, for the City Council. The City Manager's Department, City Hall, Dublin. (Fee, 1s.)

FRIMLEY AND CAMBERLEY, February 12—Cast-iron goods, for the Urban District Council. The Engineer and Surveyor, Municipal Buildings, London Road, Camberley.

HEREFORD, February 26—Iron castings, for the City Council. Mr. F. Margerison, city surveyor, Town Hall, Hereford.

WARRINGTON, February 5—Cast-iron manhole covers and frames, etc., for the Borough Council. The Borough Engineer and Surveyor, Town Hall, Warrington.

WIGAN, February 2—Gully grates, frames, manhole covers, etc., for the Borough Council. The Borough and Water Engineer, Municipal Buildings, Library Street, Wigan.

Raw Material Markets

Iron and Steel

Pig-iron makers find themselves hampered by the shrinkage in the arrivals of foreign ore, and still more by the fuel shortage. Coke stocks are very slender indeed, and in some instances the lack of adequate supplies of fuel has already reduced pig-iron production. Ore tonnage is not now so scarce and the intake of foreign ore may soon improve, but freight charges are still high. Demand for all grades of pig-iron is strong, requirements of the engineering foundries being particularly heavy. High-phosphorus iron is more readily obtainable than the low- and medium-phosphorus grades, but all producers are disposing of their outputs and are unable to take on additional commitments.

The scarcity of steel semis is mainly accounted for by the sharp decline in the deliveries from the Continent. These have dwindled almost to vanishing point, and re-rollers are finding it difficult to obtain sufficient material to keep their plant fully occupied. The scarcity of small square and flat billets is most marked. There are no serious complaints from the sheetmakers, who appear to be reasonably well supplied with sheet bars and slabs, but more billets are urgently needed and buyers are not unwilling to accept defective material, although primes, of course, are more eagerly sought.

The voluntary restriction of steel exports during the three months which terminate on February 28, is intended to give the rolling mills an opportunity of overtaking the heavy arrears in their deliveries to home consumers. In any event, shipments this month must be on a smaller scale, because tonnage space is not available. Rearmament will impose heavy demands upon the steel industry, and the export drive is only temporarily halted. Hence, the feverish demand from home consumers for maximum deliveries of material in the brief interval before the priorities of the arms drive and the export trade are fully exercised. The difficulties of maintaining production on a restricted diet of raw materials have been sufficiently emphasised, but the problems of equitable distribution may be no less untractable. The needs of important home industries cannot be neglected without grave injury to the national economy, and this is a problem which demands unremitting attention. Short-time working has already been imposed in the motor industry because of the cut in sheet deliveries, and, owing to the scarcity of zinc, galvanising will also have to be curtailed. Plate mills are fully booked for the first half of the year, and rail and section mills have heavy commitments.

Non-ferrous Metals

The Copper Institute has published details of the United States copper production, etc., for the month of December. Production of blister copper was 90,643 short tons, compared with 90,148 tons in November, while the output of refined copper at 109,464 tons showed a rise of some 8,000 tons over the November figures of 101,410 tons. Deliveries to domestic consumers jumped very sharply from 113,715 tons in November to 121,954 tons in December, and it is not surprising that stocks of refined copper in producers' hands went down by nearly 3,000 tons to 49,040. The demand for copper in the United States continues unabated and stockpiling takes a big slice of what is available month by month. It will be noticed in the above figures that blister production fell short of deliveries by more than 30,000 tons, and the only way of filling that gap is, of course, by importing foreign copper.

On this side of the Atlantic, fabricators are operating on the basis of their ration, which is on the basis of about a 10 per cent. cut. Rumours have been heard that the supply situation may deteriorate further, but there does not seem to be any real reason for this pessimism unless it is based on the threat of a strike in the Northern Rhodesian copper belt.

Tin was a fairly firm market last week, but the backwardation widened to something like £35. The market continues to be short of spot metal. In metal circles last week there was rather more optimism due to the Government's decision to postpone operation of the ban on certain articles until March 1. This, coupled with the extension of time allowed for using up stocks of process material, goes some way towards mitigating hardship, for it gives the manufacturers more breathing space. But it looks as if the outlook for zinc is still gloomy over the rest of the year, although, for one reason and another, the second half may show some improvement. Prices are unchanged both here and in the United States, where the Government is to cease stockpiling for a period of some six months. It may even prove to be longer.

London Metal Exchange official tin quotations were as follow:—

Cash—Thursday, £1,225 to £1,230; Friday, £1,240 to £1,245; Monday, £1,235 to £1,240; Tuesday, £1,250 to £1,260; Wednesday, £1,235 to £1,240.

Three Months—Thursday, £1,210 to £1,215; Friday, £1,205 to £1,210; Monday, £1,200 to £1,205; Tuesday, £1,210 to £1,215; Wednesday, £1,215 to £1,220.

Latest Foundry Statistics

The December Bulletin of the British Iron and Steel Federation reports that on November 4, 1950, there were 147,394 people engaged in iron foundries, an increase of 393 over the October figure. Man-power rose by 436, associated with the loss of 43 females. The situation was reversed in the steel-founding industry, where the loss on the month—at 18,961—was 15, made up of 37 for males and a gain of a dozen females. The weekly average production of steel for castings during November was 9,200 tons, an increase of about 1,000 over the October figures. It is estimated that this industry produced during 1950 241,000 tons. This is a very good output when compared with the pre-war production, which was of the order 146,000 tons. It is, however, still not so good as 1945, when 285,000 tons was made. For some obscure reason the weekly average of production of steel castings was down to 4,200 tons—4,700 tons was the October average and 4,900 tons that of a year ago.

British Industries Fair

Mr. Barry Kay, Midland Regional Controller of the Board of Trade, dealing with the question whether firms at present proposing to exhibit at the B.I.F. should continue to do so if their products were affected by the restrictions on the use of non-ferrous metals, appealed to such firms not to cancel their exhibits forthwith but to await a Government announcement on arrangements for supplies of these metals for export purposes. There is no intention of cancelling the British Industries Fair as had seemed apparent from some reports of this speech.

MR. J. MUIL, A.M.I.E.E., who has been for the last five years with the Technical and Scientific Register of the Ministry of Labour has been appointed registrar and secretary of the Professional Engineers Appointments Bureau, 9, Victoria Street, Westminster, London, S.W.1, with effect from January 1, 1951, in succession to Mr. H. J. Nichols, C.I.E., D.SC., who has resigned.

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

(Delivered, unless otherwise stated)

January 24, 1951

PIG-IRON

Foundry Iron.—No. 3 Iron, Class 2:—Middlesbrough, £10 10s. 3d.; Birmingham, £10 5s. 6d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent P, £12 1s. 6d., 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 10s.; South Zone, £12 12s. 6d.

Scotch Iron.—No. 3 foundry, £12 0s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £13 2s. 6d.; South Zone, £13 5s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £13 12s. 6d.; South Zone, £13 15s.

Cold Blast.—South Staffs, £16 3s. 3d.

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 0s. 6d.; Scotland, £12 7s.; Sheffield, £12 15s. 6d.; Birmingham, £13 2s.; Wales (Welsh iron), £12 0s. 6d.

Spiegeleisen.—20 per cent. Mn, £17 16s.

Basic Pig-iron.—£10 11s. 6d., all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, basis 2-ton lots, d/d Sheffield works.)

Ferro-silicon (6-ton lots).—45/55 per cent., £37 15s.; 75/84 per cent., £52.

Ferro-vanadium.—35/60 per cent., 15s. per lb. of V.

Ferro-molybdenum.—70/75 per cent., carbon-free, 8s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £120; ditto, without copper, £142.

Ferro-tungsten.—80/85 per cent., 29s. 9d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 31s. 9d. per lb. of W.

Ferro-chrome.—4/6 per cent. C, £66; 6/8 per cent. C, £61; max. 2 per cent. C, 1s. 6¾d. lb.; max. 1 per cent. C, 1s. 7¼d. lb.; max. 0.15 per cent. C, 1s. 8d. lb.; max. 0.10 per cent. C, 1s. 8¼d. lb.

Cobalt.—98/99 per cent., 15s. 6d. per lb.

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

Ferro-manganese (blast-furnace). — 78 per cent., £30 5s. 11d.

Metallic Manganese.—96/98 per cent., carbon-free, 1s. 8d. per lb. (approx).

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—Basic: Soft, u.t., £16 16s. 6d.; tested, up to 0.25 per cent. C (100-ton lots), £17 1s. 6d.; hard (0.42 to 0.60 per cent. C), £18 16s. 6d.; silico-manganese, £23 19s.; free-cutting, £20 1s. 6d. Siemens Martin Acid: Up to 0.25 per cent. C, £22 4s.; case-hardening, £23 1s. 6d.; silico-manganese, £26 6s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £19 16s. 6d.; basic, hard, over 0.41 up to 0.60 per cent. C, £21 1s. 6d.; acid, up to 0.25 per cent. C, £23 1s. 6d.

Sheet and Tinplate Bars.—£16 16s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £20 14s. 6d.; boiler plates (N.-E. Coast), £22 2s.; chequer plates (N.-E. Coast), £22 19s. 6d.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £19 13s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £22 6s.; flats, 5 in. wide and under, £22 6s.; rails, heavy, f.o.t., £19 2s. 6d.; hoop and strip, £23 1s.; black sheets, 17/20 g., £28 16s.

Alloy Steel Bars.—1-in. dia. and up: Nickel, £37 7s. 3d.; nickel-chrome, £55; nickel-chrome-molybdenum, £61 13s.

Tinplates.—I.C. cokes, 20 × 14, per box, 40s. 11d., 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, £1,235 to £1,240; three months, £1,215 to £1,220; settlement, £1,235.

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., £250; quicksilver, ex warehouse, £73 10s. to £74; nickel, £406.

Brass.—Solid-drawn tubes, 21¼d. per lb.; rods, drawn, 29½d.; sheets to 10 w.g., 26⅜d.; wire, 27½d.; rolled metal, 25½d.

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), £255 to £265; BS. 1400—LG3—1 (86/7/5/2), £265 to £275; BS. 1400—G1—1 (88/10/2), £340 to £350; Admiralty GM (88/10/2), virgin quality, £340 to £350, per ton, delivered.

Phosphor-bronze Ingots.—P.B1, £350 to £360; L.P.B1, £270 to £285 per ton.

Phosphor Bronze.—Strip, 35d. per lb.; sheets to 10 w.g., 37⅛d.; wire, 39⅞d.; rods, 36½d.; tubes, 41½d.; chill cast bars: solids, 42d, cored, 43d. (C. Clifford & Son, Limited.)

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

Forthcoming Events

JANUARY 26

Institute of Vitreous Enamellers

Midland Section:—Annual dinner, at the Imperial Hotel, Temple Street, Birmingham, at 7 p.m.

JANUARY 29

Institute of British Foundrymen

Sheffield Branch:—Annual dinner, at the Royal Victoria Station Hotel, Sheffield, at 7 p.m.

Birmingham Students' Section:—"Cast Iron as an Engineering Material," by D. Marles, at Walsall Technical College, at 7.15 p.m.

JANUARY 30

Institution of Mechanical Engineers

Southern Graduates' Section:—"Administration in Engineering," by P. K. Digby, at the Municipal College, Portsmouth, at 7 p.m.

JANUARY 31

Institute of British Foundrymen

London Branch:—Films, "Flawless and British" and "And Now," at the Waldorf Hotel, Aldwych, London, W.C.2, at 7.30 p.m.

Manchester Metallurgical Society

"The Metallurgy of Titanium," by J. Preston, B.SC., at the Engineers' Club, Albert Square, Manchester at 6.30 p.m.

FEBRUARY 1

Institution of Production Engineers

London Section:—Annual dinner, at the Connaught Rooms, Great Queen Street, London, W.C.2, at 7 p.m.

Leeds Metallurgical Society

"Recent Developments in Metallurgy," by E. C. W. Perryman, B.A., at the Chemistry Department, Leeds University, at 7 p.m.

FEBRUARY 2

Institution of Mechanical Engineers

"Industrial Design and its Relation to Machine Design," by H. G. Conway, M.A., M.I.MECH.E., at Storey's Gate, St. James's Park, London, S.W.1, at 5.30 p.m.

Institute of Metals

The Institute of Metals has made the following awards of medals for 1951:—

Institute of Metals (Platinum) Medal: To Dr. R. W. Diamond, vice-president and general manager of the Consolidated Mining and Smelting Company of Canada, Limited, in recognition of his outstanding services to the non-ferrous metal industries in connection with researches on differential flotation as applied to the complex Sullivan ore, and as manager of the largest combined copper- and lead-producing concern in the world.

W. H. A. Robertson Medal: To Mr. C. Smith, chief metallurgist, James Booth & Company, Limited, Birmingham, for his Paper on "The Extrusion of Aluminium Alloys."

Walter Rosenhain Medal (first award): To Prof. G. V. Raynor, D.SC., D.PHIL., M.A., Professor of Metal Physics at the University of Birmingham, for his outstanding contributions in the field of physical metallurgy, in connection with our knowledge of the constitution and formation of alloys.

MR. R. L. ROGERSON, who has for many years been chairman of the Yorkshire Range Company, Limited, of Shipley, Yorks, has retired, and a new board has been formed. Mr. C. Leonard Wilson, formerly a director of Wilsons & Mathiesons, Limited, has been elected chairman and managing director. Mr. W. Nicholson, previously secretary and manager, is now a director and general manager, and Mr. B. E. Collins, secretary, and Mr. F. E. Holroyd have joined the board.

We regret that in our issue of January 18, the first lines of this announcement were omitted. The complete version is printed above, and we apologise for any misunderstandings arising from the original statement.

CLASSIFIED ADVERTISEMENTS

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

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

SITUATIONS WANTED

WORKS AND FOUNDRY MANAGER, experienced in fully mechanised or floor moulding up to 3 tons. Standard mass machine shop practice. Conversant with cupola and sand control.—Box 456, FOUNDRY TRADE JOURNAL.

MANAGING DIRECTORS.—Can you offer progressive executive position at home or abroad to frustrated Foundry Plant Development Engineer? Young, energetic, experienced in wide variety of plant. Present executive post cul-de-sac.—Box 542, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

FOUNDRY METALLURGIST required for Works situated 20 miles west of London. Good practical knowledge of Non-ferrous melting and Foundry work essential. Experience in H.F. melting and Steel Foundry practice an additional advantage. State standard of education, experience and salary required to Box M.175, WILLINGS, 362, Grays Inn Road, W.C.1.

FOUNDRY FOREMAN required for Aluminium Sand Castings. Must be able to control labour and do the necessary booking. Core Blowing experience an asset. This is a staff position, and permanency is insured for the right man. Good wages and canteen available.—Apply A. R. FORD, VOWLES ALUMINIUM FOUNDRY CO., LTD., Bank Street, West Bromwich.

FOUNDRY MANAGER wanted for Grey Iron Foundry producing 300 tons weekly Light and Medium Castings. Floor, semi-mechanised and fully mechanised methods employed. Please give full details of experience and salary required. Assistance with house accommodation will be arranged.—Box 526, FOUNDRY TRADE JOURNAL.

ENGINEER required by progressive Birmingham Non-ferrous Metal Manufacturers. Applicants should possess both practical and technical knowledge of Foundry Plant and be capable of layouts and installations of new projects and control of Maintenance Department and Stores, etc. Some metallurgical background would be an advantage. Excellent scope and prospects for capable and energetic engineer. Please state in confidence full details of experience, age, and salary required. Mark E/D for attention of Works Director.—Box 530, FOUNDRY TRADE JOURNAL.

LABORATORY ASSISTANT, man age 20-25, required for analysis of alloy steels in large light engineering company, West London area. Salary £400 to £450 per annum, progressive pensionable position.—Full details and age and experience to Box 536, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd*

WORKING CHARGEHAND required for small Ironfoundry. Excellent opportunity for first-class man.—GREATREX & SON, 232, Aston Road, Birmingham, 6.

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

WANTED.—ASSISTANT FOREMAN, experienced in jobbing and mechanised light and medium castings. South Wales area. State age, experience, and salary required.—Box 548, FOUNDRY TRADE JOURNAL.

2 GOOD FLOOR MOULDERS for small Iron Jobbing Foundry. Accommodation can be found for suitable applicants. Slough area.—Box 544, FOUNDRY TRADE JOURNAL.

CHEMIST (WORKS) required for laboratory of light engineering works, large manufacturing company, London (West) area. B.Sc. or equivalent qualification, with general experience, including metal finishes, an advantage. Age 25-30. Commencing salary £550 to £625. Pensions scheme.—Letters of application to Box 538, FOUNDRY TRADE JOURNAL.

ALUMINIUM MOULDER required. First-class man only. Excellent opportunity.—GREATREX & SON, 232, Aston Road, Birmingham, 6.

ASSISTANT FOUNDRY MANAGER required for Foundry in the South Wales area. Applicant must have good technical knowledge of Core Shop, Fettling, Jobbing and Mechanised Foundry Work. Single man preferred. Salary £500-£600, according to experience.—Apply, giving details of age, education, experience, etc., to Box 490, FOUNDRY TRADE JOURNAL.

ASSISTANT METALLURGICAL CHEMIST, age 21/25, required for Engineering and Foundry Laboratory in Lincolnshire. Experience of cast iron and non-ferrous analysis essential. Knowledge of foundry practice preferred. State standard of education, experience, and salary required.—Box 506, FOUNDRY TRADE JOURNAL.

CORE MAKER required for Ferrous, Non-ferrous and Aluminium Foundry. Must be fully experienced.—GREATREX & SON, 232, Aston Road, Birmingham, 6.

SITUATIONS VACANT—*Contd*

WORKING FOREMAN required for Sand Foundry in old-established business in Barnet area. Excellent prospects, wages and share of profits for right man.—Box 522, FOUNDRY TRADE JOURNAL.

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