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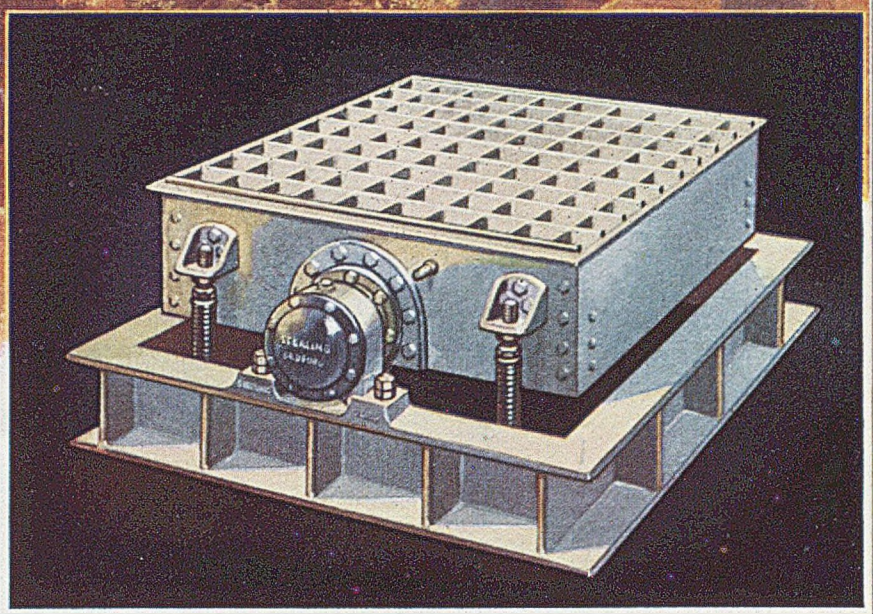

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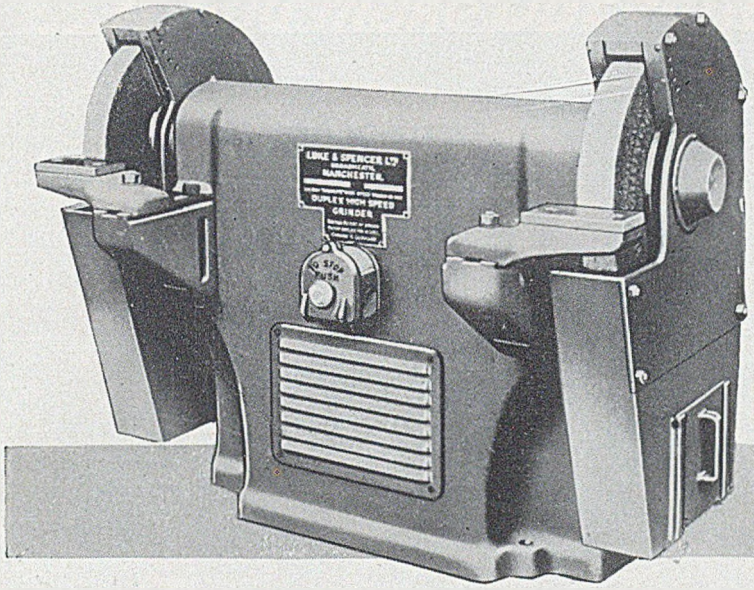

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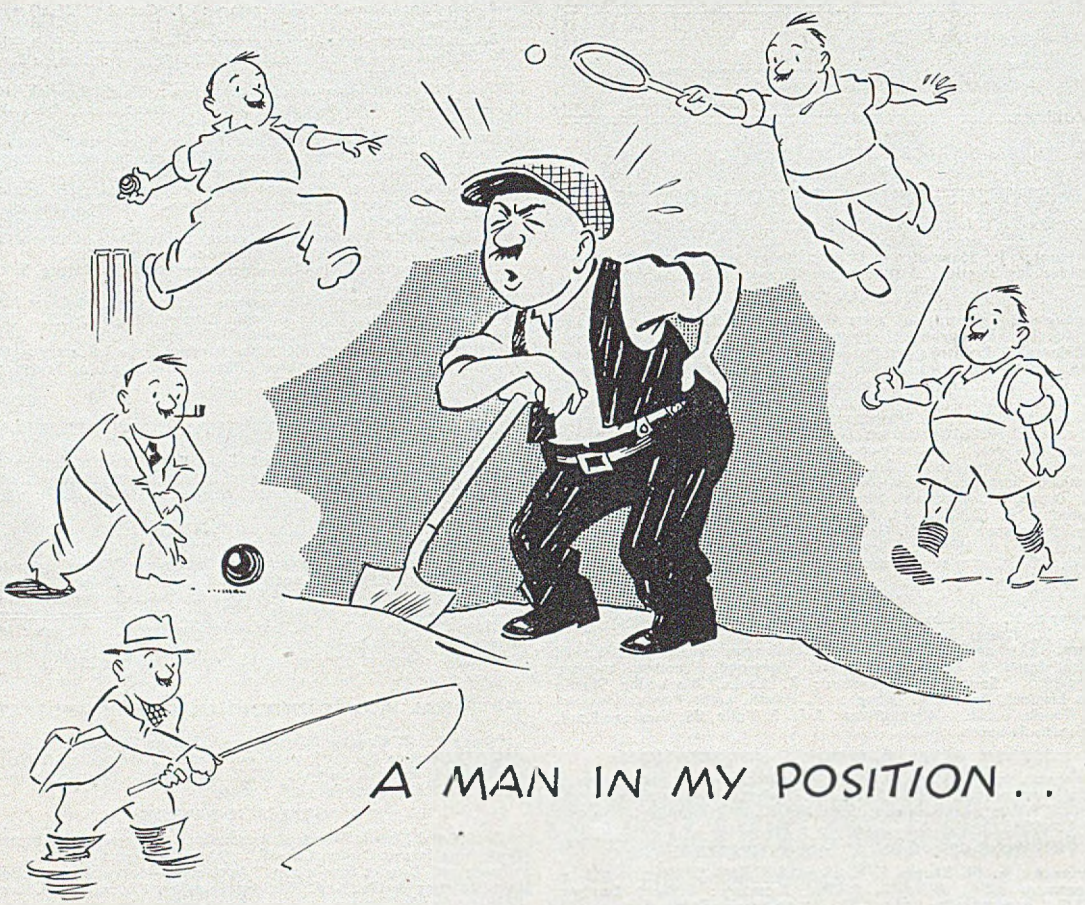

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American Technology—III, Steel and Sand

The papers presented to the Buffalo Meeting of the American Foundrymen's Society not so far covered by our two former articles are those dealing with steel, sand and diverse subjects. From the research foundry of the Crane Company, Chicago, comes a detailed research on the influence of vanadium on cast chromium-molybdenum steels. Apparently whilst it increases slightly the tensile strength associated with a corresponding lowering of ductility, vanadium tends to bring about a more pronounced dendritic structure and thus impairs impact resistance. Pre-coat materials for investment castings have been dealt with by Mr. W. F. Davenport. He used a wide range of refractories, but found that the most satisfactory was an alumina/silica composition, using a 62.5:37.5 mixture. A paper which could well have entered into the "heat transfer" section is "An Investigation of the Penetration of Steel into Moulding Sand" by Mr. Holger Pettersson, the Swedish official exchange paper. It is a nicely-balanced paper, as the experimental part—using sand cores in molten carbon steel—is the subject of not too dogmatic discussion. His broad conclusions covering high gas-pressure, soft ramming and fin formations are undoubtedly reliable. We also liked Mr. Clyde H. William's Paper on steelfoundry ladles. He experimented with the grain size of the ganister and finally was able to announce that he had increased the life of his ladles from an average of 40 to 60 heats up to 200 to 250.

We seem to remember during the discussion of our productivity team's report, that di-electric core baking was not much in evidence in the States. Thus we were a little surprised when we read the opening statement in Mr. J. Wesley Cable's paper on this subject, that "approximately 35 installations of equipment for baking foundry cores are in operation to-day." It is usual to adopt resin binders, and money is saved by using plastic carriers. Then the core sand is blown on to the carrier plate. This is a development worth following up in this country. In this section there is still one more paper on metal penetration regarded from the sand angle. It is by Mr. S. L. Gertsman and Mr. A. E. Murton and comes from Canada. There were many controlled variables in the experiments undertaken and no-one would quarrel with the dozen or more conclusions reached. All foundrymen should be interested in a Progress Report on the Scabbing Defect, especially as definite conclusions have been reached. The properties of non-scabbing sands are:—(1) The green compressive strength should exceed 10 lb. per sq in.; (2) the rammed density should be below 110 lb. per cub. ft.; (3) green deformation should be less than 0.021 in. per in.; (4) silt content should be less than 8 per cent.; (5) dry strength should be under 150 lb. per sq. in.; (6) hot deformation at 538 deg. C. should be greater than 0.009 in. per in. and (7) the permeability should be over 50. Another interesting paper in which important claims are made is one on the impact testing of sand by Mr. Wm. H. Moore of the Meehanite Metal Corporation. His work has already appeared in our columns. Finally in this section was a paper on the effect of sand grain distribution on casting finish by Mr. H. H. Fairfield and Mr. James MacConachie of William Kennedy & Sons of Canada. A major conclusion is that the sand with the lowest permeability and the highest grain fineness produced the best finish; over jolting produced a rougher surface. The papers submitted were of a high-grade character well up to the traditions of the A.F.S.

Notes from the Branches

London

The Annual General Meeting of the London branch of the Institute of British Foundrymen was held on Wednesday, April 25, at the Waldorf Hotel, London, W.C.2, with Mr. F. E. Tibbennam (branch president) in the chair.

The minutes of the preceding Annual General Meeting, held on April 26, 1950, were taken as read and were confirmed and signed. The accounts for the year 1950-1951 were then adopted. Mr. A. R. Wizard asked in this connection if there was any reason why the accounts should not be circulated to members before the Annual General Meeting. Mr. W. G. Mochrie (hon. secretary and treasurer) explained that, although it was customary procedure to prepare the accounts for audit at the end of February, they were not circulated to members because of the additional expense which would be involved. Mr. V. C. Faulkner said that the circulating of accounts to members would create unnecessary work and expense, and he hoped that members would not press for it.

Mr. W. G. Mochrie next presented his report for the year, which was accepted by the meeting without question.

Dr. A. B. Everest, in the absence of Mr. Hudson, presented the report of the representative from the branch on the work of the Technical Committee (which is shortly to be printed).

Election of Officers

The following officers and members of Council of the branch were elected:—as *president*, Mr. L. G. Beresford; as *senior vice-president*, Mr. D. Graham Bissett; as *junior vice-president*, Mr. B. Levy; as *hon. secretary* and *treasurer*, Mr. W. G. Mochrie; as *members of Council*, (for three years), Mr. F. Hudson, Mr. A. R. Parkes and Mr. James Burns; (for two years), Mr. F. C. Evans; as *hon. auditors*, Mr. V. Delport and Mr. Barrington Hooper, C.B.E.; as *stewards*, Mr. E. H. Browne, Mr. A. Whiles, Mr. R. Pipes, Mr. A. R. Wizard and Mr. G. Pierce; as *branch delegates to General Council*, Mr. E. M. Currie, Mr. V. Delport, Mr. C. H. Kain and Mr. F. Arnold Wilson; and as *representative to Technical Committee*, Mr. Frank Hudson.

When discussing other business Mr. A. Talbot asked if the programme committee would consider organising for next session a meeting to comprise short round-table discussions on matters of general everyday interest to the ordinary foundryman, such as patternmaking, the rôle of the inspector in the foundry, how to mould, how to cure blowholes, or any other problem which troubled members. Mr. B. Levy associated himself with the suggestion.

A talk by Mr. E. Raybould on aluminium-alloy foundry practice was then followed by a general discussion and the meeting was closed.

Visit to Ardennes Foundries

Leaving London on the afternoon of Thursday, May 24, a party of over 30 members of the London branch spent a long weekend in the French Ardennes for works visits to member firms of the *Syndicat des Fondeurs sur Modèles des Ardennes*, with headquarters at Charleville. An early disappointment awaited members at the Victoria Station, London, rendezvous, when it was learned that Mr. Mochrie, branch secretary, who had organised the visit, was indisposed and unable to accompany them. However, it says much for the thoroughness of Mr. Mochrie's arrangements that the whole of the programme for the travelling and visits was carried through without even the smallest hitch. At about 11.30 p.m. the party, on arrival at Charleville, was met by the secretary of the *Syndicat*, Mr. Durbecq, and after a short speech of welcome was conducted to the Hotel du Nord.

Of the duration of the stay, Friday, Saturday, and Monday were devoted to works visits, six establishments in all being visited as well as the communal laboratories of the *Syndicat*. On the Sunday, a motor-coach pleasure trip was arranged, first to Dinant in Belgium for luncheon and afterwards to the grottoes of Hans. The return to Charleville was made the same evening.

Social Events

On the Saturday evening, the visiting foundrymen were the guests of the *Syndicat des Fondeurs sur Modèles* at dinner in the Hotel du Nord. The party numbered about 60, and included at the high table Mr. Lebeau and Mr. Cury (president and vice-president respectively of the *Syndicat*); Mr. F. Tibbenham and Mr. B. Levy (president and junior vice-president elect of the London branch); as well as Mr. B. Faure, Mr. Renson, Mr. Monin, Mr. Meker, Mr. Daugenet, and Mr. Hubert among the French hosts, with Mr. Blandy, Mr. Hardy, Mr. Parkes, Mr. Wilson and Mr. Sanders of the British contingent. Interpreters, thoughtfully provided by the French from amongst their members, were much in demand, and, in fact, throughout the visits their presence added much of solid worth to the practical knowledge gained. On the last evening, before the early-Tuesday-morning departure, the British founders entertained their French hosts at a similar function, and Mr. F. Tibbenham suitably expressed the thanks of the visitors. On this occasion, 54 persons were present.

Works Visits

For the works visits, the British founders were divided into two parties, each party visiting five out of six of the establishments chosen, and each visit lasting a full morning or afternoon. The foundries visited were:—Fonderies des Ardennes (malleable foundry at Mezieres); Fonderies Deville & Cie (stove-plate foundry, Charleville); Aciéries Thomé (jobbing steel foundry, Nouzonville); Faure & Cie (stove-plate foundry, Revin); Gailly Frères (malleable foundry, Charleville) and Fonderie Nouvelle (mechanised jobbing iron foundry, Charleville). It is hoped to include short descriptions of these foundries in a forthcoming issue of the JOURNAL.

Latest Foundry Statistics

The April Bulletin of the British Iron and Steel Federation announces that the Iron and Steel Corporation of Great Britain has absorbed 10,561 ironfoundry employees and 5,345 from the steel foundries under the nationalisation scheme. The number of employees engaged in ironfounding on March 10 was 150,369, an increase of 417 over the previous month. The increase was made up of 289 males and 128 females. There has been a considerable increase in steelfoundry operatives during the month under review. The total rose to 19,070 from 18,682, an increase made up of 324 men and 64 women. The average weekly production of steel for steel castings during March was 8,800 tons, as compared with 9,300 tons in February. A year ago it was 9,000 tons. This reduction may have been due to power cuts. Deliveries, also, were lower at an average of 3,300 tons, as against 3,600 tons in February. Actually it was the lowest output since 1948.

Valve Tappet Castings*

By René Dulché

After first dealing with the general characteristics of the valve-tappet castings to be made, the method of manufacture adopted in a French foundry is described in detail, covering such sections as the requirements in the way of patterns, chills and moulding boxes; moulding coremaking; mould assembly and closure and metallurgy; finishing with fettling and control. Finally in an additional section a brief account is added of the foundry layout and organisation for valve-tappet production.

Characteristics

The motor-car valve tappets, the manufacture of which is to be described, must conform after machining to the shape and dimensions shown in Fig. 1 and pass inspection later. On each batch of rough castings a minimum of two samples, or at least 0.5 per cent. for quantities over 4,000, are taken for hardness tests. These samples must show the following results—(1) Maximum thickness of chilled face, centre 2 mm., and outside 3 mm.; (2) minimum Rockwell hardness on the working face, centre 40 and outside 50 C.

The production will be described of castings similar to those detailed in Fig. 2 which shows the rough-casting, and Fig. 3 which shows the heater collars intended to stop the chilling of the upper ends of the tappets.

Although at this stage there is no special test to pass, experience indicates that to get satisfactory machined tappets conforming with the foregoing tests the rough-castings must show the following results:—(1) Maximum thickness of chilled face, centre 3 mm. and outside 4 mm. and (2), minimum Rockwell hardness on the working face (after a light dressing on a stone to prevent diamond breakage), centre 50 and outside 50.

From the following remarks it will be seen that the control of casting tappets with a given thickness of chill must be kept within very close limits, (*a*) to allow for machining of the spherical cavity inside the tappet and (*b*) to obtain a sufficiently high Rockwell hardness on the working face.

Every founder knows the importance of the variations which can modify the depth of chill and consequently the hardness of the tappets in the course of manufacture. The object of the present Paper is simply to give some findings on diverse factors of which there are:—(*a*) Composition and moisture content of the moulding and core sands; (*b*) the ramming of the mould; (*c*) the composition of the iron, (*d*) pouring temperature, and (*e*) speed of pouring.

Method of Manufacture

The tappets are made in an iron capable of taking a chill in machine-moulded green-sand moulds. The sand moulds are set on prepared cast-iron plates which serve as chills (shown in Fig. 8). For convenience, the manufacture of these castings is done in cast-iron boxes 22 in. by 14 in. These flasks each contain two groups of 14 tappets making a total of 28. The foundry undertaking

* A Paper read before the London branch of the Institute of British Foundrymen by Mr. E. Harwood Brown, deputising for the Author, and with Mr. F. Tibbenham in the chair. The Author has charge of the Fonderie de Ste Genevieve-Gommecourt, France.

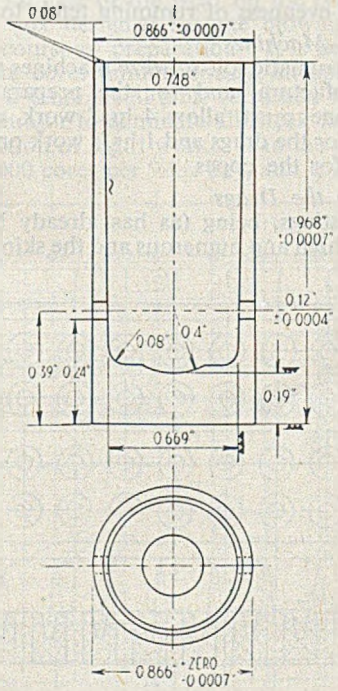

FIG. 1.—*Machine Drawing for a Cast Tappet showing the Tolerances which are worked to.*

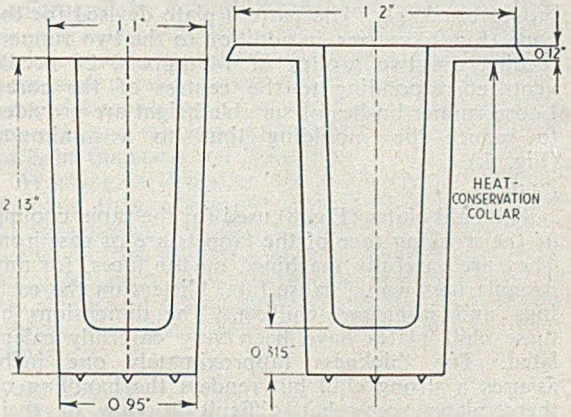

FIG. 2.—*As-cast Tappet as despatched from the Foundry.*

FIG. 3.—*As-cast Tappet before Removal of the Heat-retaining Collar.*

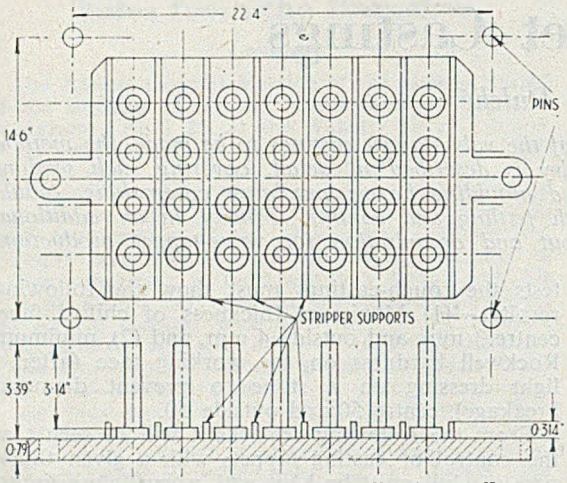

FIG. 4.—*Pattern Plate for Drag, allowing Sufficient Depth for the Superimposition of the Stripping Plate shown in* FIG. 5.

this work could cast 50 moulds at a time and produced normally 25,000 tappets per month, wasters included.

Equipment

Pattern Plates

The pattern plates have been studied with a view to the moulding of several hundred thousand castings; that is to say, very great care has been taken in their manufacture after a very exhaustive survey of ways and means. To the pattern plate developed for the moulding of the bottom half (Fig. 4) is added a stripping plate (Fig 5) with the object of aiding the stripping of the drag without the sand breakage rendered almost inevitable otherwise by the height of the castings and their close packing on the plate. This stripper rests on eight locators. Before each ramming operation, it is necessary to ensure that the stripper is resting securely on these supports and thus avoid any sand roughening or mould breakage. The pattern plate devised for the cope (Fig. 6) carries, in addition to the two runners feeding the two groups of 14 tappets, 28 needle vents corresponding to the centres of the cores. Loose runner bushes of suitable height are provided to reduce the moulding time to a minimum. (Fig. 7.)

Chill Plates

The chill plates (Fig. 8) used for the rapid cooling of the working face of the tappets are of cast iron. They are carefully machined on the faces, for any irregularities would cause fatal blisters on the castings and improper chilling. The dimensions of these chill plates have been very carefully calculated. The thickness (approximately one inch) assures a strong chill but renders the handling of these plates somewhat difficult in view of their weight (approximately 100 lb.). To ensure easy escape of the air contained in the mould at the moment of pouring, four series of three triangular section vents have been provided. These vents render possible the production of tappets with sharp edges free from porosity or blowholes.

Moulding Boxes

The boxes used for the manufacture of the tappets are of cast iron made in the foundry itself. (Fig. 9.) They are fully machined on the two faces to permit exact moulding and closing of the flasks. The lugs, carrying $\frac{7}{8}$ in. dia. holes are white-metal lined. In this type of production, the accuracy of closing of the mould has only a relative importance, the more important things being:—(*a*) That the lower faces of the tappets exactly match the vents in the chill plate to permit easy escape of the gas contained in the mould, and (*b*) that each set of longitudinal runners exactly match the 14 faces of the tappets leading to the cores.

Moulding

Moulding Sand

The sand used in the production of the tappets is drawn from the pits at Fontenay aux Roses, several miles south of Paris. These sands have a clay content of 14 per cent. and an A.F.S. screen-test result as shown in Fig. 10, the principal characteristics being:—Maximum moisture, 6 per cent.; A.F.S., permeability, 25; green compression strength, 11.4 lb. per sq. in., and A.F.S. Index, 151. If the composition of the sand used for the copes has only a relative importance, the reverse applies to that for the drags, which must be free of all imperfections and be homogeneous. The patterns, being relatively high and numerous, leave between each other and the box only very small gaps and the ramming must be sufficient and uniform if a satisfactory skin is to be produced. For these reasons it is preferable to work with a sand relatively dry, carrying a water content of between 4.5 and 5 per cent. Beyond this figure the evenness of ramming tends to fail.

Moulding Machines

Two pneumatic jolt-squeeze machines are used for the manufacture, and for the preparation of 50 moulds one must allow 4 hrs.' work on the first machine for the drags and 1 hr.'s work on the second machine for the copes.

Ramming the Drags

The castings, being (as has already been stated) relatively high and numerous and the skin of the cast-

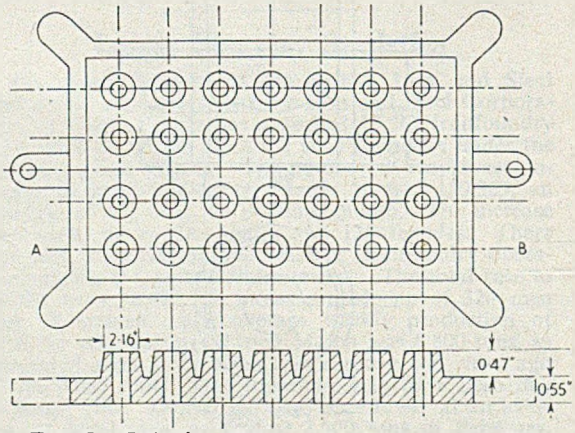

FIG. 5.—*Stripping Plate which fits over the Drag Pattern Plate* (FIG. 4).

ings required faultless, the filling of the drags is done solely with sand previously sifted on a screen of $\frac{1}{8}$-in. mesh. The ramming is done by hand, by successive air squeezes and by a small wooden rammer. The longest and most delicate operation is that which consists after ramming in strickling the tops of the moulds so that the upper faces of the tappets come to the face of the mould, but without disturbing the sand. This strickling is done with a wooden ruler a little longer than the width of the flask. This operation being completed, the mould is vibrated and stripped, then after turning over it is placed on a bench by the side of the moulding machine for the insertion of the cores. (Fig. 11.)

Moulding the Copes

The ramming of the copes presents no difficulty; the pattern plate carries the two runners and two automatic spring *coulées* protect the runner basins. The latter are raised above the mould; the runners are talced with a paint-brush to avoid any sand washing during the filling of the mould.

Cores

Coreboxes

The coreboxes are constructed, as shown in Fig. 12, in aluminium, and contain machined steel rings. These steel rings are inserted to permit easy and cheap replacement. The wear on the circumference of the small collar of the core is in practice very rapid on account of the number of blows (more than 1,000 per working day) necessary for stripping the cores. Periodically, the boxes are checked with the aid of a standard plug gauge (Fig. 13), which, according to the amount of side play, gives an idea of the wear on the box. At the moment a box designed for the blowing of these cores is in course of preparation. It is designed for blowing four cores simultaneously; stripping will be effected on a small metal table furnished with a low-powered vibrator to eliminate all shock in stripping. The production of a girl worker is in the neighbourhood of 1,000 cores per 9-hr. day, and it is expected

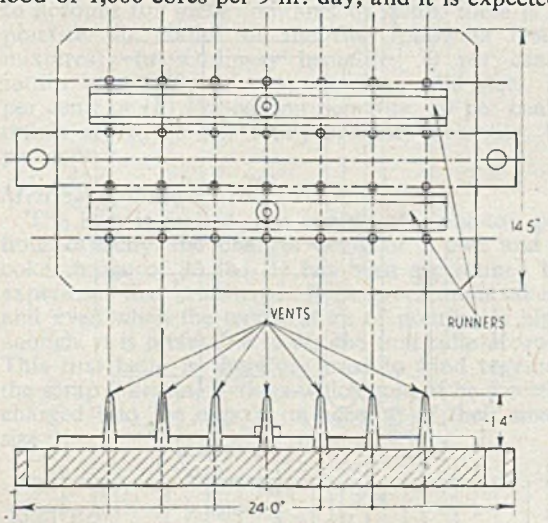

FIG. 6.—*Pattern Plate for the Cope Part of the Tappet Mould.*

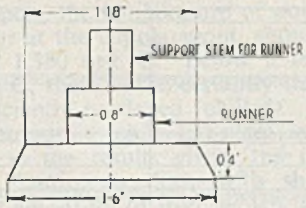

FIG. 7.—*Loose Runner and Bush Pattern, two of which are Inserted on the Cope Pattern.*

that blowing the cores will increase production 800 per cent. using two boxes simultaneously.

Core-sand

The sand used is a high silica sand supplied, like the moulding sand, from the pits of Fontenay aux Roses; it has a clay content in the region of 0.7 per cent. and a grain size as given in Fig. 14. Before use, the sand is dried in a stove to eliminate all traces of moisture; then it is passed through a sieve of $\frac{1}{64}$-in. mesh to free it of all extraneous matter. To the sand is added 4 per cent. of a British proprietary compound having a linseed-oil base.

The content of the compound is very important and must be strictly controlled. When under 4 per cent. is used, the centre part of the core cannot be completely glazed after stoving, giving to the faces of the tappet a roughened finish, preventing the mounting of the tappet on the jig for the operation of trimming and machining. The greatest failing of a too small content of binder is the lack of green-strength which shows itself in a slight sinkage of the cores after stripping or in the course of handling. With a lower content of binder than 4 per cent. it is worthwhile mentioning a tendency to the production at the bottom of the tappet of a small cavity with smooth surfaces, created by insufficient escape of gas, caused by a lower permeability in the sand.

Coremaking

The cores, being essentially simple (Fig. 15), are constructed by female labour, the ramming being done in a few seconds merely by finger pressure. A spring ensures the rigidity of the central pillar of the core and a needle vent allows the escape of gas created by pouring. The stripping is done by turning over and rapping on the small cast-iron supports of $\frac{5}{32}$-in. thickness and $2\frac{5}{8}$-in. dia.

Working in this way, the cores are not touched by hand, thus reducing the risk of flattening the base of the cores or the distortion of the central portion —two of the principal causes of rejection. After stripping, each plate carrying its core is placed on an aluminium drying plate $14\frac{1}{2}$ by $11\frac{3}{4}$ in., strongly ribbed, to receive 30 cores. The plates are then stoved.

Core Drying

The core-drying is carried out at a temperature between 210 and 230 deg. C. (405 to 445 deg. F.). for a period of approximately 30 min. and gives a very deep chocolate colour. The cores can then, after cooling, be handled without risk of damage. The cores are afterwards stacked in boxes where they are piled one on top of the other. If the

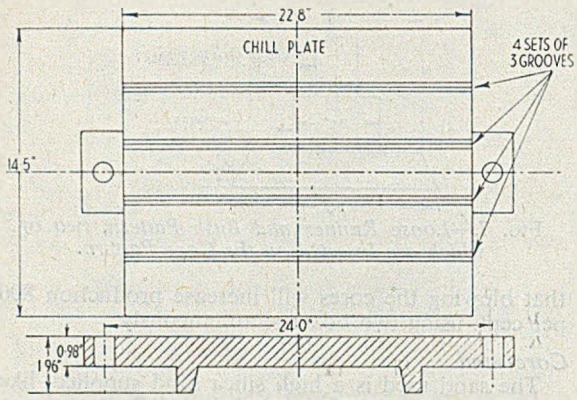

FIG. 8.—*Cast-iron Chill Plate which makes the Base of the Tappet Mould; it is Grooved for Venting.*

drying is complete, they can thus be stored for several months when sheltered from dampness.

Core Inspection

Before assembly in the mould, each core is checked with the aid of a jig resembling a core-box without the filling-aperture. In this method each core is inserted by simple finger pressure to get it to the bottom; if the pillar of the core is distorted, it will break up, generally at the bottom.

In spite of all these stringent precautions the principle causes of rejection of the cores are as follow:—(*a*) Cores broken on inspection (3 per cent.); (*b*) bad ramming (rough surface, 1 per cent.); (*c*) breakage due to stacking or an accidental blow (2 per cent.); (*d*) air hole showing on the core surface (2 per cent.), and (*e*) various other causes (2 per cent.).

It will be seen from these figures that the rejection of cores is in the neighbourhood of 10 per cent.; a figure which can only with difficulty be lowered. On the other hand, inspection must be very thorough, the rejection of the less-costly core being preferable to that of the tappet.

Mould Assembly

Core Positioning

It has been stated that, after ramming, the lower parts (drags) are turned over and put on a bench by the side of the machine. A workman then assembles all the 28 cores which the mould holds, taking care to place the runner inlets face to face, as shown in Fig. 16. A slight looseness of fit is of practically no importance, but a greater displacement has as its outcome a bad appearance of the casting or a "draw" at the runner.

The positioning of the cores requires a certain amount of practice, as these must be properly seated in their prints without chafing against the sides of the mould. It is for this reason that it is infinitely better to place the cores in the mould whilst on the bench rather than assemble them when the mould is placed on the chill plate. Actually, in the latter case, loose sand falls on the plate and inevitably causes the rejection of a tappet. It is as well to ensure by a light tap with the finger that the cores are properly bedded down in their prints before transferring the mould to the chill plates, core displacement being one of the principal causes of rejection.

Positioning of the Drags on the Chill Plates

The chill plates are lined up side by side on the foundry floor. As the latter is of concrete, these plates are necessarily level. The plates are then carefully brushed with a wire brush to remove all traces of sand remaining from previous casts and, above all, to rid them properly of anything causing gas, thus to ensure free venting. The preheating of the chill plates, which would be a delicate operation on account of their weight, is not necessary and has practically no effect, pouring often taking place several hours after the completion of the moulds.

Closing the Mould

The top boxes are placed on the drags by the aid of pins of $\frac{7}{8}$-in. dia., and Fig. 17 shows a section of a mould ready for pouring.

Metal

Composition of Iron for Tappets

It would appear after rigorous research up to the present time that the ideal composition of the cast iron which gives both a satisfactory hardness and consistency in the results obtained is of the order of: TC, 2.9 to 3.1; Mn, 0.8 to 1.0; Si, 2.0 to 2.2; P, less than 0.10, and S, less than 0.06 per cent. It is possible to secure this composition in two different ways:—

(*a*) Starting from an ordinary hematite iron of the following composition: C, 3.5 to 3.7; Si, 3.1 to 3.3; Mn, 0.8 to 1.0; P, 0.09, and S, 0.05 per cent., to which additions of pure iron are added (horseshoes for example). In this case the best charge would contain 66 per cent. of hematite iron and 14 per cent. of mild-steel or horseshoes.

(*b*) Starting from a low-carbon hematite, in this case there is no addition to be made. The method gives simplicity of charges, but it is very rare to

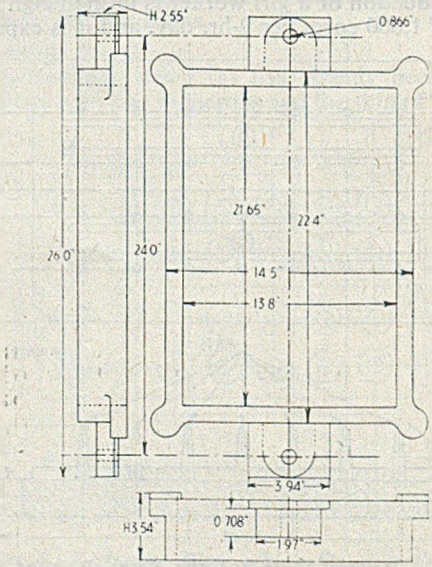

FIG. 9.—*Moulding Box Plan and Elevations showing Principal Dimensions*

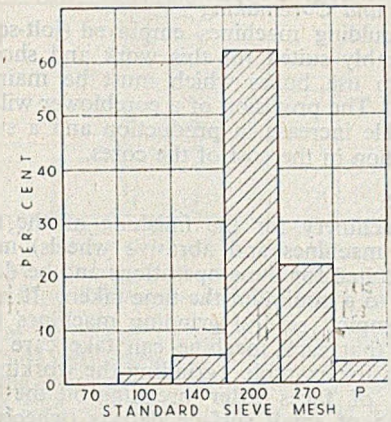

FIG. 10.—*Moulding Sand Grading: Clay* 14 *per cent., A.F.S. index* 151, *Moisture max.* 6 *per cent., Permeability approximately* 25, *Green Compression Strength about* 11.4 *lb. per sq. in.*

get a blast-furnace iron of low carbon corresponding exactly to the composition indicated. Again, the irregularities of composition of successive deliveries render necessary certain tests to correct the charges. Take, for example, the following iron:—TC, 3.09; Si, 1.93; Mn, 0.62; S, 0.034, and P, 0.08 per cent. This gives excellent results when so used, but is not satisfactory when return scrap (runners, rejects, etc.) is added. To make up for these additions of scrap, which are lower in silicon than the original irons, it is necessary to make large or small additions of ordinary hematite. For commercial reasons, it is obviously essential to remelt the runners, collars and wasters, etc. For this production, the yield of castings as compared with metal poured is a very important ratio and works out at 15½ lb. of iron poured in each mould for rather more than 7¼ lb. of castings. Being thus forced to modify the composition of the charges to account for these additions of scrap, there is in practice the choice of the two following metal mixtures:—(*a*) Ordinary hematite, 50 per cent.; return scrap, 40 per cent.; iron or mild steel, 10 per cent; or (*b*) low-carbon hematite, 50 per cent.; return scrap, 35 per cent.; ordinary hematite, 15 per cent.

Melting of Tappet Iron

The iron is melted in a cupola of a one-ton per hour capacity, the charges being of 2 cwt. and a coke charge of 33 lb. It has been ascertained by experience that in spite of all the precautions taken, and even when the temperature of pouring is high enough, it is preferable to pig the first ladle of iron. This first ladle is therefore used to bind together the scrap "heating" rings which cannot be directly charged into the cupola on account of their small size.

For tappets, the temperature of pouring taken in the ladle or at the cupola spout, should be between 1,340 and 1,380 deg. C. Below a temperature of 1,330 deg. C. there is the certainty that the tappets are insufficiently hardened (chilled). Before pouring the moulds, a chill test-piece is poured and according to the results given, the iron is pigged or used. Pouring is done with shanks holding approximately 90 lb. of iron, which is sufficient for pouring six moulds. These ladles are furnished with a sheet-iron skimmer for holding back the slag on the surface. Dirt inclusions, which usually only show up in the course of machining, are thus avoided.

Fettling and Hardness Testing

Stripping

After pouring, the groups of tappets are taken off the moulding line and transported to the knock-out where, with the aid of hammers, the castings are broken off and the greater part of the cores are eliminated. The castings are then placed in a sand tumbler where they are left for about one hour. It is not recommended that the heads and runners be put in the tumbler, for actually the latter can get caught up inside the tappets.

Breaking off the Collars

After fettling, the first inspection of the castings takes place, all castings showing major defects, short runs etc., being thrown out. This examination takes place in the course of breaking off the heat-conservation collars. At this stage each tappet is put into a support (Fig. 18) capable of holding 8 tappets. With the aid of a peg and a hammer the collars are broken off and the tappets fall into a box which is taken to the grinding machine.

Grinding and Finishing

After breaking off the collars the castings are passed on to the second inspection point where they are classified thus:—(*a*) Good castings; (*b*) castings showing slight superficial defects, and (*c*) wasters. The good castings are then forwarded to the first machine shop. The castings in category (*b*) are submitted to a suitable finishing treatment and then forwarded in their turn to the first machine shop.

First Machining

The first machining operation consists in trimming the working face on a grinding wheel. The tappets are mounted on a jig matching exactly the inside shape of the tappets, and the working faces of each tappet are polished until the relief lines caused by the chill plate and all the small sand pockets disappear. This operation has as its chief object the presentation of a satisfactory surface for the Rockwell test and thus avoiding both reading errors and fracture of the diamond.

Rockwell Test

The tappets are then tested in the centre. To simplify the location, the bed of the Rockwell machine is furnished with a special jig which

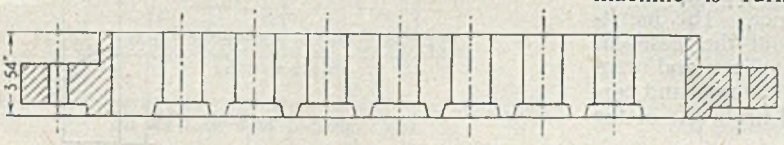

FIG. 11.—*Section through a Drag Mould after Removing the Stripping Plate.*

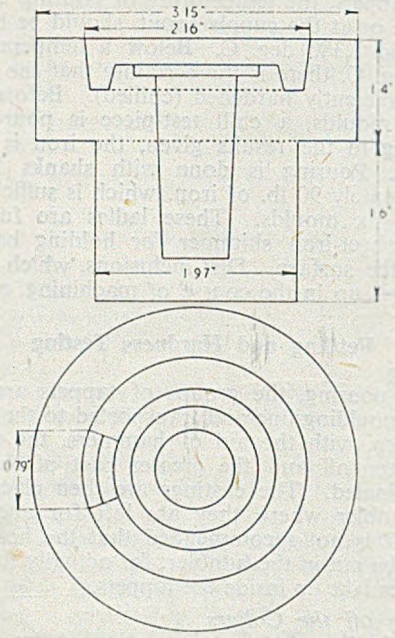

FIG. 12.—*Elevation and Plan View of the Corebox for Tappet Cores.*

automatically centres the tappet. It is essential to test the tappet at this central point.

In passing, it is worthwhile noting that on breaking the tappets the chilled zone proves to be concave with the minimum chill and, in consequence, the lowest hardness in the centre. Very frequently a tappet will give, for example, a diamond hardness of 52 or 53 near the sides but will only read 46 or 48 at the centre. According to their hardness the tappets are classified into groups:—(*a*) With hardness less than 50 (which are wasters), (*b*) with hardness of 50 in which case the tappets are subjected to a second hardness test at another point and according to the second reading the tappet is rejected or classified as good, and (*c*) with hardness greater than 50, representing satisfactory production.

Summary and Conclusion

From this brief summary the following points arise:—

Plant

This casting demands the use of foundry plant relatively of small importance and little used in ordinary foundries.

Melting

It would seem that an improvement over cupola melting would be the use of a small electric furnace of lower power and of a capacity between 5 and 10 cwt., which would be ideal for obtaining a homogeneous iron having a composition and physical properties easily determined in advance. The inevitable guesswork of the estimation of the losses of certain elements in cupola melting (silicon and manganese) and the increase of others (sulphur and carbon) could be thus eliminated and the work of the founder greatly eased.

Moulding and Coremaking

The moulding machines employed (jolt-squeeze) are admirably suited for this work and should be adapted to use boxes which must be maintained with care. The provision of a coreblower will allow considerable increase in production and a substantial reduction in the cost of the cores.

Trimming

The machinery for the finishing of the tappets (grinding machines and abrasive wheels) must be specially suited for these operations and be designed to reduce to a minimum the time taken. It is advisable to employ several grinding machines in two stages so that each machine can take care of one operation; for example: grinding the working face; treatment of faces after breaking off the collars; elimination of small surface defects (wheels 10-in. dia.), and grinding off the larger faults (wheels of 15-in. dia.).

Pattern Equipment

Much of the success of the production of tappets rests on the use of well-known tools perfectly handled and carefully adapted to the job in hand. The smallest defect in this equipment can be the cause of the rejection of an entire cast and the foundry staff must always maintain plant in good repair and make sure that there is no deterioration.

Raw Materials

The coke and the various sands used must be the object of strict control so as to reduce the risk of failures which could be attributed to them. Pig-irons must be the object of particular care; the least error in the preparation of the charges and in the mixture of several brands will certainly cause rejection of a whole cast.

To ensure regularity, the use of irons refined in the electric hearth is advised. Each batch is much more homogeneous and reduces considerably variations in composition of the various elements. Pig-iron so refined can be relied on and lots of to 20 and 40 tons, for example, tested on different samples, all give the same analysis. The composition given by the suppliers usually gives only a rough estimation of the composition of a given iron and check analyses must be made to give a sufficiently accurate idea of the precise value of the different elements.

FIG. 13.—*Plug-type Inspection Gauge for Assessing the Amount of Wear in a Corebox.*

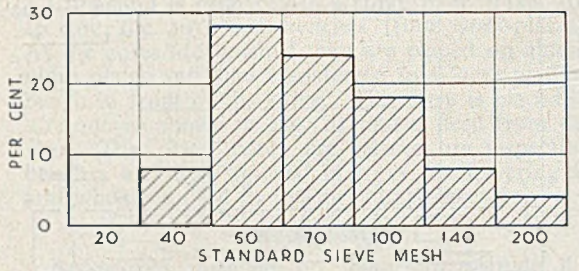

FIG. 14.—*Core-sand Grading for Tappet Cores. Clay, 0.7 per cent.; A.F.S. Index 58.*

Despite all these precautions, irregularities still appear, not only from one run to another, but also during the same cast. For instance, sensible differences of chill can be seen in the same mould, the tappets at the sides of the flask being generally, but not always, more chilled than those in the centre.

The manufacturer of automobile tappets uses only a simple established material, but each fresh design necessitates the use of production methods of extreme precision and perfectly controlled materials. It demands on the part of the manager close attention to all points, attention rendered all the more necessary when the workmen are only semi-skilled or are unused to this particular type of work. Such a production can only be considered in a foundry having other branches of production and having at its head a manager with a good share of optimism and much perseverance.

PLANT FOR CASTING TAPPETS

As can be seen from Figs. 19 and 20, the foundry given over to the manufacture of tappets (and also the casting of 1,000-1,200 other small and varied items in special irons) consists essentially of a double-storey building with annexes. Briefly, these are described as follows:—

On the ground floor there is a moulding and casting bay. In this two moulding machines are fed from hoppers for the backing sand and vibratory screens for the facing. Box parts are stored by the sides of the machines and a small bench capable of holding three moulds is placed close to each machine.

Metal melting is done by a fan-blown cupola and there is a pressure burner for cupola lighting and ladle heating. Local exhaust ducting is arranged to the outside of the building from the

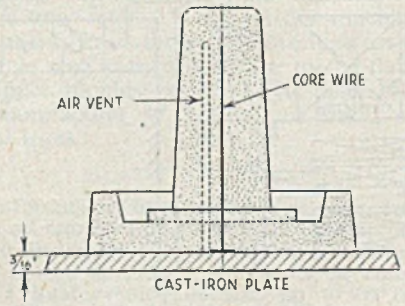

FIG. 15.—*Section through a Finished Core mounted on its Cast-iron Drying Plate.*

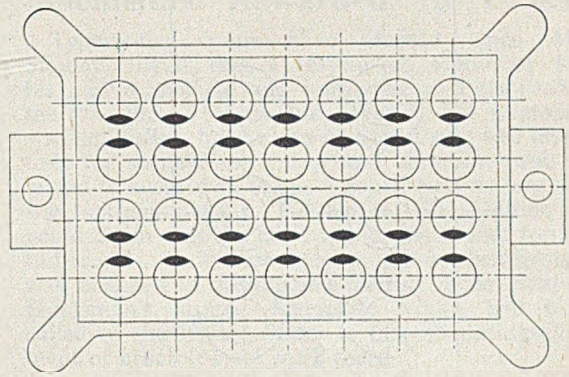

FIG. 16.—*Drag Part of the Mould after Assembly of the Cores so that the Runner Inlets are Face-to-face.*

knock-out, several of the fettling stations and the tumblers, the latter not being closed. Trimming is done mainly by two circular grinders and one surface grinder using wheels from 9 to 15 in. dia. Rockwell testing is carried out in an annex separate from the trimming bay so that the noise and vibrations of neighbouring machines do not disturb the girl employed on the tester. During working, all communication between the inspection and trimming is barred so as to avoid the introduction of dust from the grinders which would impair the machine which, in addition to the leather cover supplied by the makers, is housed in a glazed cabinet of a size convenient for the operator and opening only to the fresh air.

Owing to the numerous operations, the tappets are placed in trays in 1,000's. These trays are fitted with two handles and handling is thus greatly facilitated, as well as the counting of the tappets at each stage, which is done simply by counting the number of trays.

Stockyard

The stockyard space is divided principally into three sections partitioned off:—(*a*) Sands for moulding and coremaking which are classed by brand and texture; (*b*) coke, which is stored by size and grading; and (*c*) pig-iron. The small coke 1½ to 2½ in. mesh is reserved for heating stoves and the 3 to 5 in. for the cupola and making coke dust. Experience shows that coke larger than 3 to 5 in. is not particularly suitable in view of the small diameter of the cupola.

Pig-iron is stored in bins according to category, grade and supplier, *e.g.*, ordinary hematite, low-carbon hematite, and high-phosphorus iron. To eliminate as far as possible confusion and error,

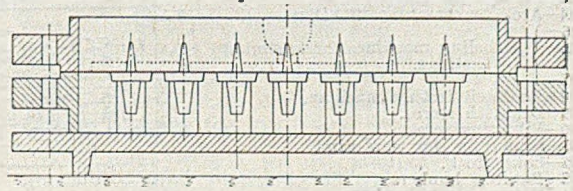

FIG. 17.—*Section through a Mould Assembled on the Chill Plate ready for Pouring.*

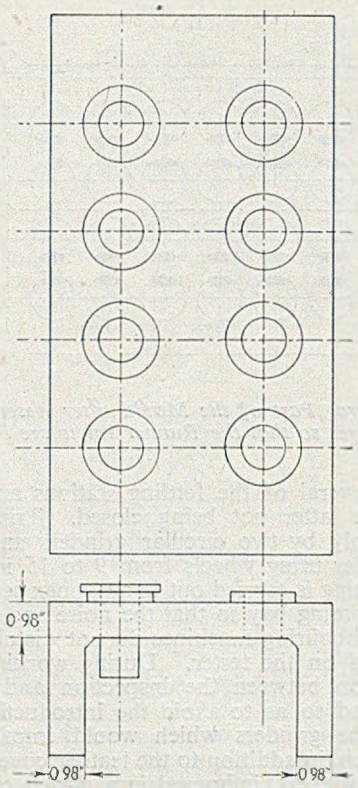

FIG. 18.—*Jig for Breaking-off the Heat-conservation Collars, showing one Tappet Casting in Position.*

rejects, runners, risers, etc., are classified by day (or by cast). According to the results obtained from the run, the iron is stored in separate bins (segregated into iron too deep in chill, too weak, etc.). For the utilisation of this scrap the manager alone has the power to determine the proportion to be added to the charge. Purchased scrap includes steel scrap, horseshoes, etc.

The charges are prepared in metal containers; coke is added on the platform, which is served by an electric hoist for charging the cupola.

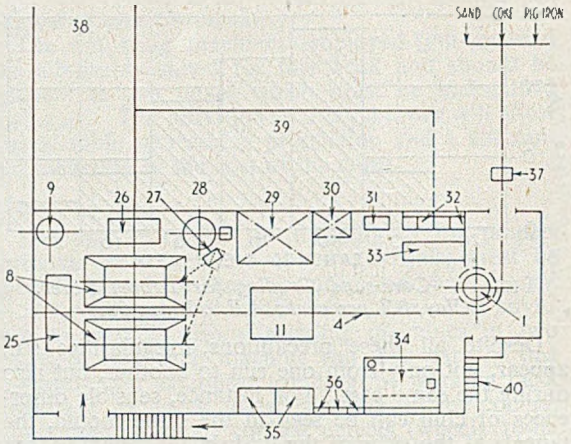

FIG. 20.—*First Floor Plan of the Tappet Foundry. Key to the numbered items:—*

25—Air compressor.
26—Water tank.
27—"Royer" machine.
28—Sand mill.
29—Moulding-sand store.
30—Core-sand store.
31—Sand mixer.
32—Core benches.
33—Cores awaiting stoving.
34—Core stove.
35—Inspection bench.
36—Shelves.
37—Half-ton hoist.
38—Trimming bay.
39—Delivery bay.
40—Staircase.

First-floor Layout

On the first floor (Fig. 20) all the complementary services of the foundry are situated, which makes this practically independent of the other buildings. Sand preparation is effected in a mill fitted with two rolls (one plain and one channelled). The prepared sand is taken from the mill and tipped into a mobile "Royer," being directed alternately towards one or other hopper of the moulding machines.

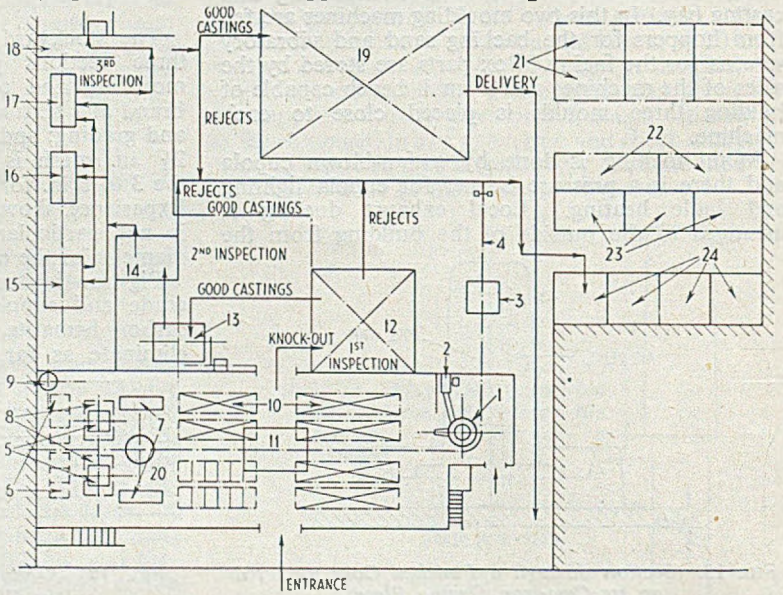

FIG. 19.—*Ground Floor Plan of the Foundry devoted to Casting Tappets; Key to the numbered items:—*

1—Cupola, 1 ton per hr. melting capacity.
2—Cupola blowing fan.
3—Weighing machine for cupola charges.
4—Half-ton hoist.
5—Moulding machine.
6—Moulding box part stores.
7—Moulding benches.
8—Sand pile.
9—Air receiver.
10—Casting bay.
11—Hatchway.
12—Knock-out.
13—Stillage for good castings.
14—Area for breaking-off collars.
15—, 16—, 17—Grinding machines for trimming castings.
18—Rockwell testing machine.
19—Despatch stores.
20—Vibrating screens.
21—Sand bins for new sand.
22—Coke stock.
23—Pig-iron bunkers.
24—Return scrap bunkers.

Core-sand is prepared in a small hand mixer for feeding the two core-benches (four work-places). As the cores are finished they are placed on aluminium plates and then transferred to a large waiting bench in front of the stove. The stove is placed in a corner as shown in Fig. 20, and is fired from the rear. The dried cores are placed on inspection benches and then stacked in trays for lowering as and when required to the moulding benches.

Miscellaneous

Accessories installed on this floor include the low-power compressor feeding a receiver of 120 cub. ft. capacity fixed on the ground floor; a 600-gall. water tank, allowing for the distribution of water under pressure to all points in the foundry, and pattern racks for the storage of pattern-plates and core-boxes.

Handling

The diverse handling of the foundry sand, pig-iron, etc., is done by electric hoist mounted on monorails and serving at the same time the foundry and the stockyard. New sands, taken from the bins in the stockyard, are placed in smaller bins between the Royer and the mill. From the knock-out, the floor sand is raised in ½-ton skips. Four skips are allotted to this work, and the speed of lift of the electric hoist (28 ft. per min.) makes this method quite adequate.

As already mentioned, charges are prepared and left in the stockyard; the skips here are specially designed to permit automatic charging of the cupola. To avoid stoppage in the foundry in case of prolonged delay, a certain number of charges corresponding to the daily production are stored on the cupola platform.

Personnel

Before concluding, it is germane to add a few notes on the staff employed in the manufacture of tappets. It should be realised at the outset that not a single craftsman is employed on this work, which is done wholly by semi-skilled labour. The total comprises a foreman and furnaceman, two machine moulders and female coremakers, one mould closer, one sand-preparation man, two trimmers and four labourers (two for the pouring bay, one for the stockyard and one generally). Finally, there is a girl inspector (for Rockwell testing) and one maintenance man.

Bearing in mind that the manufacture of the tappets only require 4 hrs. on one machine for the drag, and 1 hr. on the second machine for the copes, the same staff can (in addition to the daily cast of 50 tappet moulds—some 1,400 pieces) undertake the manufacture of 1,000 other small castings in special irons.

THE BRAZILIAN GOVERNMENT is planning an extension of the oil refinery to be erected at Cubatao, in the State of Sao Paulo, as well as similar installations in the States of Rio de Janeiro and Bahia, in order to bring Brazil's total refining capacity up to 160,000 barrels daily, which would cover the bulk of the country's requirements.

Sheffielder Rewarded in U.S.A.

Twenty-five years have elapsed since Mr. Stanley Ullyatt, then a 15-year-old schoolboy, left his native Sheffield and journeyed to Pittsburgh—the "Sheffield" of the New World. His schooling was unfinished, but he was equipped with two essentials for success—optimism and ambition—and he aimed to succeed in the new era of steelmaking that was springing up in Pittsburgh. In addition he could claim that the craft was in his blood, for his father, Mr. Lawrance Ullyatt, whose background was sketched in the crucible-melting department of Huntsman's historic Attercliffe works, had been called to the United States to help in the development of crucible-steel work there.

After three years at college, Mr. Stanley Ullyatt joined the Firth Sterling Steel & Carbide Corporation, an offshoot of Thos. Firth & John Brown, Limited, and rose from drill boy to departmental group leader, and today he is a carbide inspector. Mr. Ullyatt's success has been proved by his fellow workers, all Americans, who recently voted him the outstanding man of the month. The award, part of a personnel relations scheme used throughout the factory, was for proficiency, friendliness, and a "ready to help attitude," and took the form of a framed portrait of his wife, himself, and their two children.

As though to keep it within the county, the presentation was made by another Sheffield man, Mr. L. Gerald Firth, president of the corporation and son of Mr. Lewis Firth, who was for many years managing director of Thos. Firth & Sons, Sheffield. Mr. L. G. Firth first went to the United States in 1910 and settled there in 1918, representing the Firth interests.

Aluminium-alloy Aircraft Hangars

The first all-aluminium hangars ever built are now approaching completion at London Airport. The design was prepared by S.M.D., the construction company of Almin, Limited, in response to an invitation by the Ministry of Civil Aviation to tender for a three-bay hangar in aluminium alloy construction; the clear span of each bay to be 125 ft. and the length 110 ft., with a clear door height of 30 ft. The overall span width of each bay is 150 ft.

The structure is designed to withstand a superimposed load of 15 lb. per sq. ft. due to snow, and a wind load of 26 lb. per sq. ft. in addition to self-weight. The portal frames are hinged at the base to avoid complications of indeterminacy on the foundation blocks. These hinges are at 145-ft. 6-in. centres across the span and are formed by a high-tensile steel pin passing through an aluminium-alloy base casting which is bolted down to the foundation block, with an aluminium alloy gusset casting forming the lower end of the portal leg.

The total weight of the complete building is about 312 tons, including 95 tons in the structure, sheeting 7 tons, insulation (Asbestolux) 10 tons, doors 48 tons, glazing 52 tons and decking 100 tons.

Sheffield's Concern over Scrap Shortage

"A tragic state of affairs which bodes ill for employment in the Sheffield trades" was how Councillor Frederick Lloyd, who is a director of Ibbotson Bros. & Company, Limited, described the current shortage of scrap, when he addressed the annual meeting of the Sheffield Chamber of Commerce. Retiring from the presidency of the chamber, Councillor Lloyd advocated the salvage of shipping sunk in the English Channel during the war. It would be a means, he said, of securing valuable steel scrap and avoiding the spectre of unemployment. The idea occurred to him when reading an account of the loss of the submarine *Affray*, one of the newspapers having stated that the bed of the English Channel was strewn with the wrecks of shipping sunk during the war.

Councillor Lloyd told the meeting: "Although the raising of these sunken ships would be a tremendous task, it is my firm belief that modern radar, together with the vastly improved magnetic and other equipment now available, could be used both to locate and to lift many of these sunken wrecks which would make such a valuable contribution to our present day needs for scrap. I think if the means, collaboration, and skill that was mobilised in raising the sunken German fleet from the depths of Scapa Flow were applied to this problem, the result would be that thousands of tons of scrap would be made available for use."

Another speaker at the meeting was Mr. Colin Laycock, a former president of the chamber. He expressed the view that, while the scrap shortage was grave, industry's biggest problem today was the shortage of skilled labour. Mr. Laycock said that some of Sheffield's old staple trades would disappear unless the problem of skilled labour shortage was solved.

Iron and Steel Values

A further list of iron and steel securities for which values have been agreed with stockholders' representatives was published on May 30 by the Ministry of Supply.

Out of 146 securities, the number now agreed is 131, of which 55 are quoted and 76 unquoted. The remaining securities are all unquoted. The total compensation value of the agreed securities is approximately £231,700,000. The compensation value of the present batch of eight securities is approximately £2,200,000.

The new list is as follows:—

LOAN CAPITAL

Briton Ferry Steel 4% first mortgage debenture stock £100, £100 10s.

PREFERENCE STOCKS AND SHARES (£1)

Glamorgan Hematite Iron Ore 10% cumulative, 25s.

ORDINARY STOCKS AND SHARES (£1 UNLESS OTHERWISE STATED)

Byfield Ironstone, 120s.
Coleby Ironstone, 25s.
Cranford Ironstone, 15s.
Glamorgan Hematite Iron Ore, 30s.
Loddington Ironstone £5, £6 6s. 8d.
Round Oak Steel Works, 42s. 6d.

GASKELL & CHAMBERS, LIMITED—Mr. A. J. Chambers, grandson of the founder of the company and a son of the present managing director, has been appointed a director.

A NORTH WALES BRANCH of the Training Within Industry Association of Wales and Monmouthshire has been formed, with Mr. J. C. Dinsdale, of Monsanto Chemicals, Limited, Ruabon, as honorary secretary.

Promoting Trade with Canada

Regarded as the final step in the co-ordination of existing organisations that have been working together for the development of U.K.-Canadian two-way trade, the formation of a Canadian Association of British Manufacturers and Agencies with headquarters in the British Trade Centre, Toronto, was announced on May 28 by Sir Robert Sinclair, a member of the Dollar Exports Board and immediate past-president of the Federation of British Industries. The objects of the association are:—To promote trade between Canada and the U.K., to foster good relationships between British manufacturers and Canadian customers and consumers and to assist in resolving differences arising between the two, to secure uniformity in usage, customs, and trade conditions, in accordance with Canadian requirements and practice, to assist the work of local associations or other bodies engaged in similar activities, and to ascertain and publicise, where desirable, the views of its members in matters relating to trade and good relationship between Canada and the U.K.

Many British concerns, it is understood, have already applied for membership of the association, together with Canadian companies concerned in Anglo-Canadian trade. Three classes of membership are proposed:—Association members which will be trade associations concerned with promotion of U.K.-Canadian trade, British manufacturers concerned with the export of their products to Canada, and individuals or firms substantially concerned with promoting U.K. trade with Canada.

G.K.N. Compensation Surplus

Mr. J. H. Jolly, chairman of Guest, Keen & Nettlefolds, Limited, in his statement circulated with the accounts for 1950, refers to the capital profit arising from the excess of the compensation over the book values. "It has been suggested in some quarters," he says, "that a large proportion of the total compensation which has been received should be distributed to stockholders. When considering such matters it is necessary, in a large group of this kind, to take long views and to make sure that we have adequate financial resources to take advantage of the opportunities for expansion of your business at home and abroad which occur from time to time. Also it is important to realise the difficulties that beset companies if they require to raise new capital on favourable terms."

Funds continually required for modernisation of the plant and for expansion, Mr. Jolly adds, are non-existent unless recourse is had to the issue of new capital. The board, therefore, considers that it is acting in the best interests of its stockholders by being cautious in the degree to which it has made distribution from its enlarged liquid resources.

International Nickel's Earnings

The report of the International Nickel Company of Canada, Limited, and subsidiaries for the three months ended March 31, shows net earnings (U.S. currency) of $14,731,390 after all charges, depreciation, depletion, taxes, etc., equivalent, after preferred dividends, to 97 cents per share on the common stock. In the previous quarter net earnings were $14,845,506, equal to 98 cents a share on the common stock.

Net sales of $65,216,266 compared with $63,150,107 in the previous quarter. Costs were $36,718,083, against $36,973,019 for the December quarter. Other income expanded from $342,030 to $394,254.

Metallurgical Research at the N.P.L.

As part of its jubilee celebrations, the National Physical Laboratory held a series of "Open Days" at Teddington, terminating on May 29, in order that exhibits and demonstrations of current research work could be seen and discussed by technicians and the general public.

The National Physical Laboratory at Teddington has now occupied Bushy House and its pleasant surroundings for 50 years. It was originally proposed that the Laboratory should have as its *raison d'être* the responsibility for standardisation and verification of instruments, testing of materials and the determination of physical constants. The scope of its work however is now much broader than this, and includes fundamental research work, investigation of special problems for Government departments, research associations, technical institutions, industrial concerns and others. The research work of the Laboratory at present covers most branches of physics, including light, electricity and magnetism; radio-communication; engineering; mathematics; metallurgy; aeronautics; metrology; also ship design in relation to form and propulsion. Some of the research in progress of interest to readers is described below.

Metals at High Temperatures

As a piece of metal cools, it gives out heat. It is important to the foundry technician, for example, to know how much heat. If this is known, along with other information such as its thermal conductivity and its coefficient of expansion, it is possible to calculate the best cooling cycle for a casting by which it goes cold without internal strain or disintegration. For a large casting, many hours or even days can be saved by this knowledge.

Partly to give this information, and partly also to provide data on specific and latent heats for many pure substances at high temperatures, an elaborate calorimeter has been constructed at the Laboratory. The sample (perhaps a few pounds of specially pure iron) is placed in a pot of pure sintered alumina (one of the few substances which will stand these high temperatures without chemical attacks on the sample). It is surrounded by radiation screens of platinum, and by an outside enclosure heated electrically and maintained as closely as possible at the same temperature as the sample. Small known amounts of heat can be added to the sample, and the resulting rise in temperature measured by thermocouples. The whole apparatus is mounted in a large vacuum tank with elaborate provisions for control and measurement. The apparatus is expected to work up to a maximum temperature of 1650 deg. C.

Multiple-unit Fatigue-testing Machine

The N.P.L. has developed a new direct-stress fatigue-testing machine in which it is possible to test 24 pieces at the same time. The test-pieces are disposed round a circle with their axes vertical and their upper ends secured in a fixed head integral with the frame of the machine (Fig. 1). At its lower end each test-piece is secured to a loading rod (which is constrained to move only vertically) by flexible strips. The loading heads are prolonged downwards and pass through clearance holes in a swash plate which is carried on a gimbal mounting at the axis of the machine. A nut on the outer end of each loading head secures a spring which bears at its upper end on the underside of the swash plate. By a central screw adjustment, the centre of the swash plate may be raised or lowered relative to the frame of the machine. As the swash plate is pushed downwards it comes in contact with a runner rotating about the axis of the machine in a fixed horizontal plane; the plate is thereby tilted and the line of greatest slope rotates at the speed of operation, which is about 2,900 r.p.m. Each test-piece is thus subjected to a pulsating load of which the amplitude is determined by the product of the tilt of the swash plate and the stiffness of the stressing spring.

By using springs of different stiffnesses, a variety

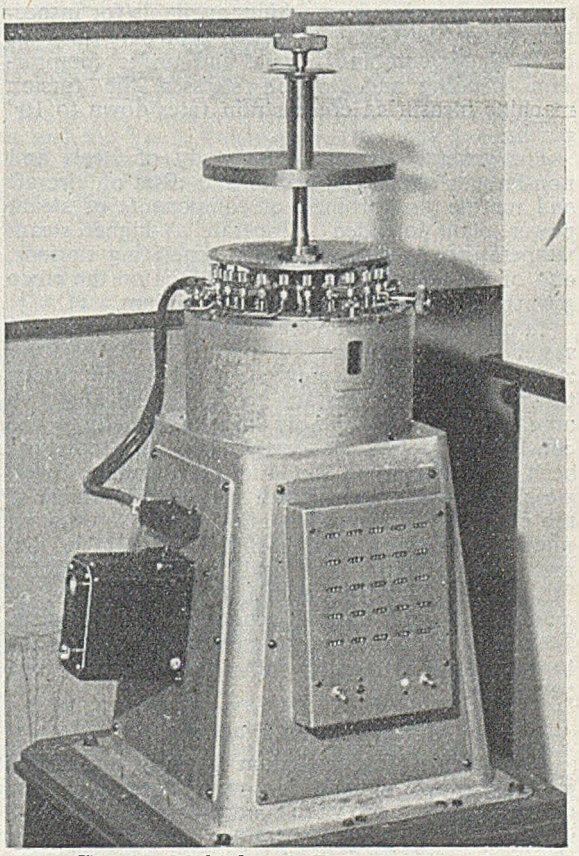

FIG. 1.—*Multiple-unit Fatigue-testing Machine.*

N.P.L. Metallurgical Research

of load ranges can be obtained at any one setting of the swash plate control. When a test-piece breaks, the loading head in falling closes an electrical contact which stops the corresponding counter. Thus the machine will run on until all the pieces have been broken and equally it may be operated with any number of pieces. The machine was originally designed and constructed for tests on small screws and provides load ranges up to 50 lb.

Creep of Metals

The study of the creep of metals at room and higher temperatures has been carried out in the Engineering Division for over 30 years, and has been of continuous assistance in the development of steam power plant, for ever higher temperatures as time proceeded, and in the choice of light alloys for reciprocating aircraft engines. It has also provided the information on high-temperature materials which was needed for the development of gas-turbines.

This laboratory was the first to begin a comprehensive study of creep and so has been able to give help and advice in the setting up of most of the other centres of creep research in Great Britain. The present creep laboratory was opened in 1940, and houses 79 sensitive tensile creep-testing machines of N.P.L. design which have been reproduced widely in this country and elsewhere. Several other special-purpose machines available for inspection have been built to study problems such as creep under combined stress, and under compression, bending and torsion stresses, the torsion machine measuring creep strain rates down to 10^{-9} per hr.

The general work involves study of steels and non-ferrous alloys for blades and discs of aircraft and marine gas turbines; of components of steam power plant intended to operate at higher steam temperatures in new electricity generating stations, and of the effect of alloying additions on the creep properties of magnesium and aluminium.

In order to study the creep properties of an alloy system under different conditions of temperature and heat-treatment using standard tensile creep test-pieces, it is necessary to make the alloys in amounts often undesirably large, especially if the constituent metals are costly. An apparatus has been developed in the Metallurgy Division, however, which enables a comparative survey to be made of the creep properties of an alloy system by testing under compression small cylinders of 0.125 in. dia. and 0.25 in. high. The fields most profitable for further study by the standard methods may be determined with great economy in materials. Tests may be made in air or *in vacuo* at temperatures up to 1,000 deg. C. with stresses up to 6 tons per sq. in.

Equilibrium Diagrams

A number of the equilibrium diagrams established in the Metallurgy Division were shown. These diagrams, which show the changes which take place in alloys when the temperature and composition change, are of fundamental importance in the interpretation of the behaviour of alloys. The necessary alloys are made from materials of the highest possible purity; in some cases it has been necessary for the Division to prepare these when metals of sufficient purity could not be purchased.

Production of Pure Iron

One of the very pure metals which have been prepared in Metallurgy Division is iron. Equipment was shown in which iron of high purity is produced in 25-lb. ingots. Iron of the highest purity available commercially is melted in an oxidising atmosphere to reduce some impurities and then in a vacuum furnace (Fig. 2) in which a slight pressure of hydrogen may be maintained to remove oxygen. Two high-frequency furnaces are used, one being a 75-lb. tilting furnace for melting under oxidising conditions and a 25-lb. unit for melting under hydrogen. They are operated by a 30-kw. motor generator set (5000 cs. per sec.). The 25-lb. unit, as shown in Fig. 2, is built into a steel tank which can be evacuated by a high-capacity rotary oil pump. The molten charge is cast into a mould by tilting the furnace by outside controls. The metal so prepared is used in the study of the mechanical properties of very pure iron, a subject on which little knowledge is available. This iron is brittle at low temperatures, the change from ductile to brittle fracture occurring over a very small range of temperature. The influence of small quantities of alloying elements on the onset of brittle fracture is being investigated.

Stability of Analytical Weights

To obtain information on the relative resistance to corrosion of analytical weights of the more suitable materials now available, a selection of 100-grm.

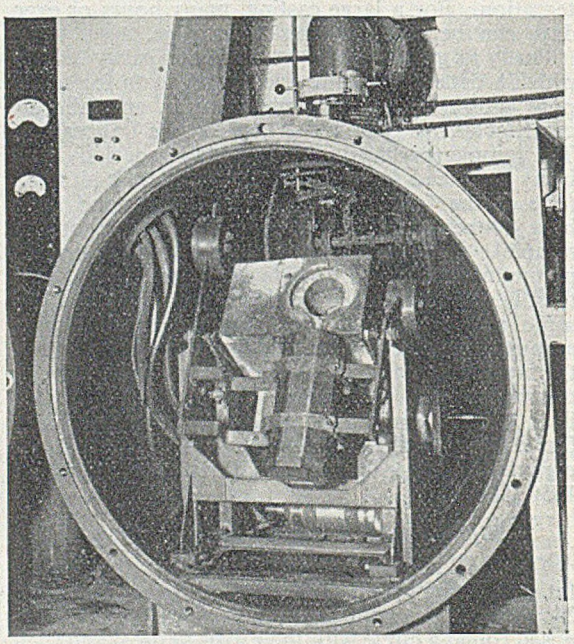

FIG. 2.—*A Vacuum Melting Furnace.*

weights has been subjected to accelerated corrosion, and stability tests in five representative chemical laboratories. The selection included a large number of plated types, as it was desired to find the effect of thickness of plating. As to stability of mass, there was little to choose between the weights of austenitic stainless steel (25 per cent. Cr, 20 per cent. Ni), non-magnetic nickel-chromium (80 per cent. Ni, 20 per cent. Cr), and the plated weights having a nominal thickness of plating of about 0.015 mm. (0.0006 in.) or more; some weights of specially highly-polished stainless steel seemed, however, slightly superior. Chromium-plated weights retained their appearance better than any except perhaps those of highly-polished stainless steel and nickel-chromium alloy, but they are open to the objection that the underlying nickel is slightly magnetic. No kind of weight appeared to be much more suited to one laboratory than to another. An incidental outcome of the tests was a clear demonstration that lead should not be used for the adjustment of screw-knob weights, whether they are likely to be exposed in corrosive atmospheres or not.

Other Research Work

Interesting work is in progress for studying high-melting-point metals, especially molybdenum. Powder metallurgy offers a convenient method for preparing small samples of such metals and alloys, although it is usually necessary to remove the porosity from sintered alloys by a forging process.

Research on constructional materials cannot be conducted effectively by laboratory experiment only, and equipment has accordingly been provided for the production and working of metals on a semi-industrial scale. Thus the various processes of casting, press and hammer forging, rolling, etc., can be carried out in conditions admitting of precise control of the factors affecting the ultimate product, and especially of the temperature and general heat-treatment. In the foundry and rolling mill are installed furnaces of various types, many of which have been designed and constructed in the Metallurgy Division.

The research on effect of alloying elements upon ferrite, already mentioned, and examination of problems connected with the presence of gases and non-metallic inclusions in steel utilise vacuum-fusion apparatus which has also been applied successfully to the determination of the oxygen content of a great variety of other metals, and to the study of weld metal. During the war, the investigation of the hardening of steels suitable for the penetration of armour, and of the problems of production of hard sintered tungsten carbide compacts occupied a prominent place. More recently, the investigation of the properties of steels suitable for the critical components of electric power plants, the detailed study by new microscopic methods of the changes that take place in metals when they deform slowly at high temperatures, and the study of metals with very high melting points, such as may be used in future gas turbines, have demanded much attention.

To assist the general work, a refractories section has studied the properties of special refractories for use at high temperatures, and its experience has been called on in a variety of problems such as the production of sintered alumina cutting tools, and the development of refractories to withstand load and corrosive attack at high temperatures. The Metallurgy Division co-operates with the Engineering Division in researches on fatigue phenomena, and in investigations of alloys at high temperature.

A chemical laboratory is occupied largely with the analysis required in the metallurgical work of the Laboratory. The study of the thermodynamics of metallurgical reactions is also undertaken. It should be made clear that the reason why there is less emphasis on cast iron as a material in work proceeding at the N.P.L. is because such applications are delegated to the British Cast Iron Research Association. Funds are made available by the Department of Industrial and Scientific Research for the B.C.I.R.A., with this in view.

Foundry Training Exhibit

The National Foundry Craft Training Centre Album showing the training at the Centre and the residential club, was a most popular exhibit at a stand sponsored by the Walsall Youth Employment Service during an Exhibition of Arts and Crafts as part of the Walsall Education Week and Festival Celebrations. Examples of foundry products were arranged round the Album.

The Youth Employment Service was publicising the Joint Recruitment and Training Committees within the Walsall area and as will be readily understood, the Walsall Foundry Committee has played a promiment part in the provision of day-time release to Technical College as well as attendance by its trainees to the National Craft Training Centre in its ambitious and working training scheme for the trade.

The foundry section at this Exhibition was outstanding and the Youth Employment Officer in attendance stated that intense interest was shown in the foundry industry by visitors. This augurs well for recruitment in this district.

Forty Years Ago

The June issue of the FOUNDRY TRADE JOURNAL for 1911 has quite a metallurgical flavour. Carpenter's classical research on the Growth of Cast Iron is reproduced in part—(continued from an earlier issue); then there is a Paper by Dr. Hatfield on the Influence of Vanadium on Cast Iron. In the latter case, however, the results were not very exciting. An article from an American source describes the casting of railway wheels into a rotary mould. A second one from the U.S.A. by Thomas D. West on "Gas Cavities, Shot and Chilled Iron and Iron Castings" is still worth re-reading. A third one from the same source is by Dr. Richard Moldenke on Coke in the Foundry. Cammell Laird & Company, Limited, report the making of 129 ton ingots in moulds weighing 110 tons. Amongst new companies registered appears the name of Duncan Stewart & Company, Limited.

WHAT HAS EVERY APPEARANCE of being an interesting exhibition is being staged at the Watford Town Hall from June 14 to 27. Amongst engineering and foundry concerns which have taken space are Blaw Knox, Limited, Watford Engineering Works, Limited, Watford Foundry Company, Limited, Wild Barfield Electric Furnaces, Limited, and Watford Electric & Manufacturing Company, Limited.

Scottish Industrial Development

Giving a reply to critics who argued that the policy of bringing new industry to Scotland had gone far enough and ought to be modified, Lord Bilsland, president of the Scottish Council (Development and Industry), claimed that the development of industry policy initiated by one Government and carried on by another had made a most constructive contribution to the restoration of the balance of our economy. He agreed that it would be wrong to continue a policy which was to the detriment of existing industry or to introduce further industry into an area which was fully employed.

Lord Bilsland, who was speaking at a luncheon meeting of the Glasgow Rotary Club, said that their first duty must be to consider the interests of Scotland's heavy and other industries which had been and would remain the mainstay of their economy. He did not believe that they had yet reached the point where it would be prudent to refuse new projects, but they should be more selective in the type accepted and be very careful where they put them.

On May 29, the wider distribution of industry became a major object of policy of the Scottish Council (Development and Industry). A new committee has been appointed to "recommend methods of promoting economic expansion along appropriate lines in many country towns, and country and mining areas, where more industrial employment is necessary and practicable." The committee is under the chairmanship of Prof. A. K. Cairncross, the first occupant of the Chair of Applied Economics at Glasgow University, the other members being Lord Greenhill, Mr. A. L. Bushnell, county clerk of Perthshire, and Mr. P. Hunter Gordon, secretary of Resistance Welders, Limited, Inverness. The secretary of the committee is Mr. Tom Burns, of the social science research centre of Edinburgh University.

Sheffield Trade Chamber Officials

President of the Sheffield Chamber of Commerce for the ensuing year is Mr. W. H. Higginbotham, who was senior vice-president in the previous year. An incorporated accountant, he joined Edgar Allen & Company, Limited, as secretary in 1930, becoming a member of the board three years later and chairman in 1945. Mr. W. G. Ibberson, formerly junior vice-president, has been elected senior vice-president, and Mr. G. M. Flather has become junior vice-president. Both are former presidents of Sheffield Junior Chamber of Commerce.

Lord Riverdale, chairman of Arthur Balfour & Company, Limited, has been re-elected honorary secretary of the chamber, of which he was president in 1919. President of the Association of British Chambers of Commerce in 1923, he was Master Cutler of Sheffield, 1911-12, and has served on numerous committees and organisations of both industrial bodies and Government departments.

A HIGH RATE OF PRODUCTION was maintained in all departments of Stewarts and Lloyds, Limited, last year. The chairman, Mr. A. G. Stewart, in his report for 1950 says that the production of steel tubes and of Stanton's spun-iron pipes showed an improvement over 1949 and were consequently record figures. Steel production at 1,127,300 tons passed the million-ton mark for the first time. Deliveries of steel tubes, also a record, amounted to 443,000 tons sold in the home trade and 306,000 tons in the export trade. Stanton exports remained steady.

Tin Research Laboratories

The newly-opened laboratories of the Tin Research Institute at Greenford which were last week available for inspection, provide a good example of the set-up where facilities for sponsored research are provided by an international marketing authority concerned with advancing the technical and hence the volume uses of their product. Both fundamental research and practical application work go hand in hand and it is in this happy collaboration that much of the value lies. The laboratories are extremely well equipped, cleanly and orderly maintained and different sections are adequately segregated. Work in progress and in the final stages certainly suggests that the present need of adaptation to rapidly changing conditions of availability of raw materials is a primary consideration. In this connection our representative was favourably impressed by the tin/nickel plating exhibit, the brilliant examples of which would certainly appear to rival chromium for lustre. Not so impressive, unfortunately, was the section devoted to dip tinning of cast iron. To the perhaps biased mind of our observer the two methods—T.R.I. Chloride and electro-steeling—were insufficiently documented and the examples shown were poor castings, bad tinning or a combination of both. Certainly these examples would not persuade the layman to extol the virtues of dip-tinned ware. This impression is placed on record mainly to draw attention to the need for manufacturers of such articles to ensure that those bearing their names when exhibited are worthy samples of their production—this viewpoint had obviously been well-considered in the display of tin/nickel plating!

Anglo-Swedish Trade

The Swedish Ambassador, Mr. G. Haggloff, presiding at the annual meeting of the Swedish Chamber of Commerce for the United Kingdom on Friday, said that it would not be possible to maintain exports to the United Kingdom of scarce commodities such as iron ore and timber if Great Britain was unable to provide the coal and coke urgently needed.

The sudden cutting down of Britain's traditional coal exports to Sweden to 500,000 tons a year was a most serious disappointment, and while bilateral trade in 1950 had reached an even higher level than had been foreseen, the composition of British exports had changed, some of the most important items such as coal and coke decreasing while others less essential to Swedish economy had increased.

Purchasing Commission's European Offices

Two of the four main European offices of the newly-formed European Purchasing Commission were opened on June 1 in Belgium and Germany. The directors of these offices and their addresses are:—Mr. Norman W. Doley, 107, Rue Belliard, Brussels, and Mr. A. S. Radford, 5, Mehlemer Strasse, Marienburg, Cologne. Mr. Doley is an ex-chairman of the British Chamber of Commerce in Belgium, and Mr. Radford was formerly a member of the staff of the economic adviser of the Control Commission for Germany.

The announcement of the setting up of the European Purchasing Commission was made by the Minister of Supply on May 8. Its object is to encourage the procurement in Europe of stores and equipment required for the United Kingdom defence programme. Chairman of the commission is Sir Donald Perrott.

Loam and Dry-sand Moulding for a Crane Barrel

By Terry Walton

What follows is a step-by-step factual account listing every item of procedure in the making of a large hollow barrel-shaped casting, which description gained for the Author the first prize in the short-paper competition recently organised by the Lancashire branch of the Institute of British Foundrymen. Coupled with the first prize this year was the award of the John Wilkinson Medal by the branch. The recipient at the time of writing the Paper was 19 yrs. old and an apprentice at Buckley & Taylor, Limited, of Oldham. Three other competitors were also awarded prizes.

To produce the hollow crane-barrel casting 3 ft. outside dia. and 11 ft. long shown in Fig. 1, a combination of dry-sand and loam moulding is employed and the detailed method is as follows:—

A flat plate is placed on a level bed and three mid-parts are bolted to it. A cross-spindle-base (Fig. 2) is then fastened to the centre of the flat plate. The spindle is inserted in the well-greased hole and checked for being perpendicular by means of a set square and spirit level. A straight-edge is then placed across the box edge and the depth of the sweep is marked on the spindle. Bushes are placed over the spindle to within an inch of the mark. A layer of sand is then rammed over the plate and a cinder bed is made. Straw is spread over the cinder bed and sand is rammed almost up to the level of the last bush.

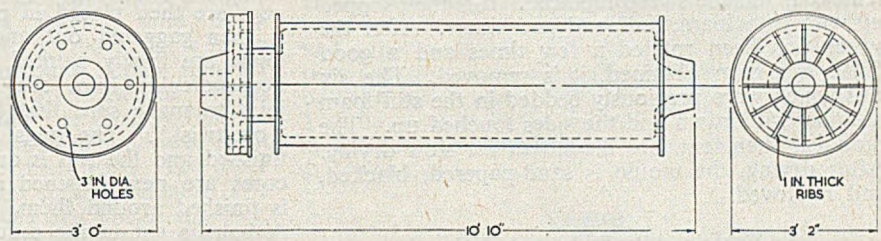

FIG. 1.—*Sectional View and End Elevations of the Crane Barrel Casting.*

Sweeping the Mould

The sweep (Fig. 3) is then placed over the spindle and set by means of a level, the diameter of the mould being checked by a diameter-checking strip. The two arm-locking nuts are next tightened and the sweep re-checked. Two layers of bricks are laid as a foundation of the mould and a loam brick wall is built-up around the circular movement of the sweep, allowing about one inch clearance between the bricks and the sweep. Loam is used as a mortar between the bricks. The outside of a runner core is tarred and then built into the brickwork. Following this, a second wall is built around the first, leaving a 3-in. cavity between. A 2-in. dia. downgate is placed against the entrance of the ingate core and black sand is rammed-up behind the second wall, and the joint is made level with

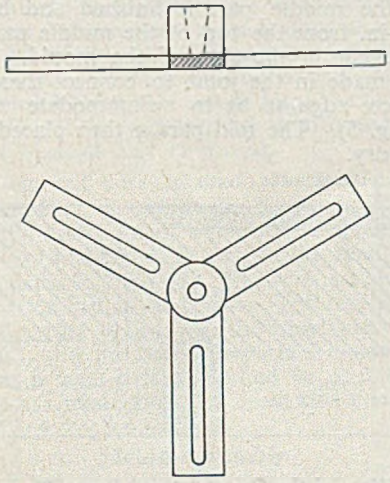

FIG. 2.—*Cross Spindle Base Forming the Seating for the Strickles.*

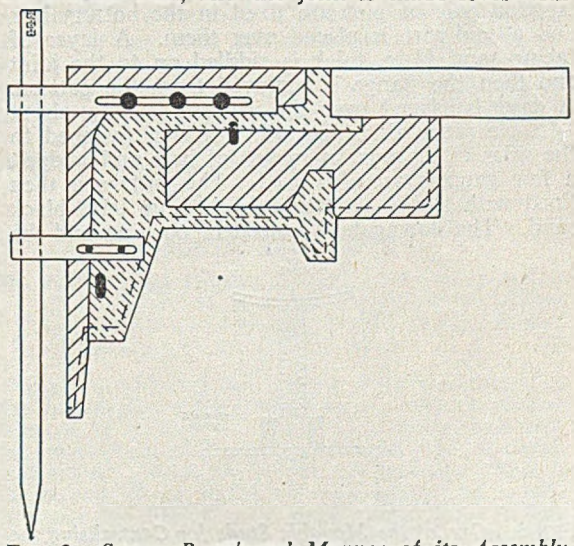

FIG. 3.—*Sweep Board and Manner of its Assembly.*

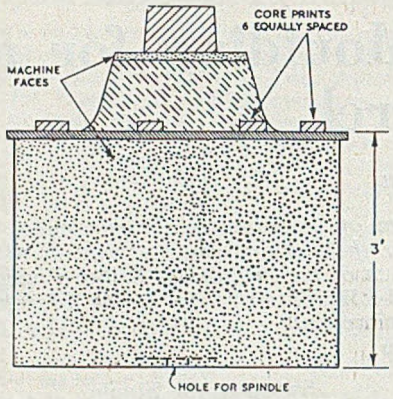

FIG. 4.—*Barrel Part of the Pattern Equipment for Forming the End Portion.*

the box edge. Stiff loam is then daubed against the clay-washed bricks, the excess loam being removed by rotating the sweep. The sweep is then removed, and a fire is placed in the mould. When the mould has stiffened up a little the fire is removed, and the sweep replaced. It is then slipped up with thin loam, red sand and water. After the sweep has been rotated a few times and a good finish has been obtained, it is removed. The six ribs which were previously bedded in the stiff loam are now withdrawn and the sides touched up. The mould is then sent into the stoves for slow drying. After drying, the mould is sand-papered, blacked, and re-stoved.

Forming the Ends and Body

Next, a level sand bed is made and the mould is placed on it. The spindle is inserted in the hole and a circular board placed over it. Sand is rammed over the board, and strickled-off level with the joint. A thick layer of parting sand is then spread on the joint and the barrel part of the pattern equipment (Fig. 4) is placed over the spindle. A good pair of pins are fixed in the bottom box and a mid-part is placed over them. A layer of facing sand 1½-in. thick is riddled on to the joint and then the flange is removed from the pattern. A grid is placed over the pattern leaving about ½-in. clearance all round. This grid is fastened to the sides of the box by means of bars and wedges, a few gaggers are also used. The pattern is then lined with facing sand and backed up with black sand. The downgate is placed in position and the

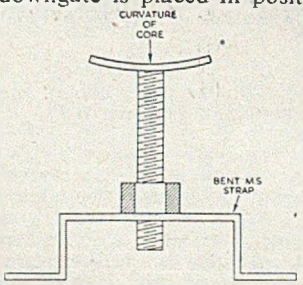

FIG. 5.—*One of the Movable Studs for Centralising the Core.*

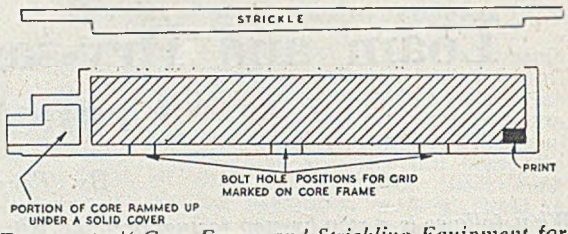

FIG. 6.—*Half Core Frame and Strickling Equipment for the Main Core.*

sand fully rammed. When the sand is finish rammed up to the top of the pattern, the pattern is drawn up and checked by a depth stick. Mid-parts are added and further ramming is continued until the sand is about 6-in. from the top of the pattern. The flange is then screwed on. Sand is next rammed under the flange and prods are "bedded in" for reinforcement. More sand is added and the joint is made. Parting sand is spread over the joint and a well-fitting pair of pins are fixed in the box. A mid-part is placed over the pins, an inch of sand is riddled on to the joint and a top part is bolted on. The runner and riser pegs are then placed in position and the top part is then gaggered out and rammed-up. The two joints are finally painted with heat-resisting paint. Perpendicular lines are then drawn across the joint to make sure that the box is replaced back "on twist". The pegs are removed, the edges finished and the top is drawn off. The six round cores are next fastened into position, the mould is finished around them, blacked and brushed up. A hole is cut in the mould above the large print to allow the core barrel to rise above the height of the bush. Horse-shoe nails are placed around the neck of the barrel; these serve adequately as mild denseners.

Pattern Draw

The pattern is withdrawn and the top half is finished. The mould is then parted and placed carefully on large weights for storage while the rest of the middle part is finished and blacked. About 6-in. from the top of the middle part, four holes are cut in the side of the mould. Holes are also made in the joint to connect these holes to the box edge so as to accommodate movable studs (Fig. 5). The mid part is then placed in the stove to dry.

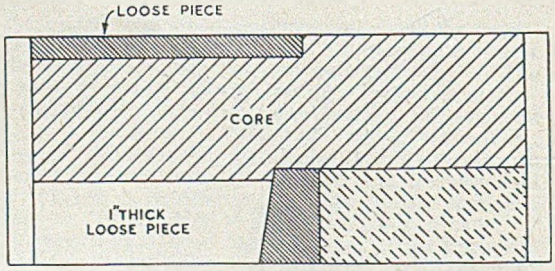

FIG. 7.—*View of the Core-box and Loose Pieces for the Segmental Brake-drum Cores, Six of which are required.*

Again, after drying the sand, board and spindle are removed, the hole is filled up and any part of the mould which has been damaged is mended, and it is then returned to the stove.

Making the Cores

A grid bed is prepared in the usual way. The core frame (Fig. 6) is placed on the bed, parting sand is spread inside the core frame and the outline of the core is marked out. The frame is removed and the grid stamped out. Prods are put on the grid and six bolt holes are cored out. Two grids are made and cast in this manner (the bolt holes being made to correspond). No metal sections must exceed 5 in. diameter, otherwise difficulties arise in fettling. Six wrought-iron hooks are cast into the grids and six smaller grids are cast separately for the segment cores of the brake drum.

For making the first half of the main core, 1 in. of core sand is spread inside the frame, on a long plate. One of the barrel grids is placed on the sand, the frame is placed over the grid and the bolt holes are marked on the frame. Facing sand 2 in. thick is then rammed over the grid and boards (weights are used to anchor the frame), sand being rammed against the boards. A cinder bed is made in the centre of the core and sand is then rammed over the cinders and the excess strickled off. Next, the frame is drawn off and the core is finished in the usual way, the excess sand being cleared from above the hooks; the core is then dried. The other half of the core is made in a similar manner. The two halves are finally blacked and bolted together, with iron packing between the two grids. The core is then stood on end in the stove; the bolt holes and joint being made up.

A 3-in. dia. core barrel is placed on two trestles and the strickle is set. Hay band is then wrapped around the barrel as it is rotated and fastened at the end, a clearance of about $\frac{1}{4}$ in. being left between the hay band and the strickle. Clay is daubed against the hay band and stiff loam is patted against the clay, leaving a clearance of about $\frac{1}{8}$ in. Thin loam is now spread along the strickle and the barrel is rotated, the core being finally slipped-up with sieved loam and water. This core is next dried, taking care not to burn the hay band. After drying it is sand-papered to size and shape, and then blacked and re-stoved.

Each segment core is made from a core-box, shown in Fig. 7, which is first placed on a small plate, and 1 in. of core-sand is spread inside the box, and the grid is placed on the sand, a hook being fastened to the grid. The core is rammed up with a cinder bed in its centre. The box is drawn off and the core is finished, the loose pieces being drawn out and the hanging parts " bedded out." This core is next dried, touched up and blacked. Six cores are made similarly from this core-box.

Mould Assembly

Commencing assembly of the mould, the bottom part is placed on a level bed in the casting pit. The six cores which form the brake-drum are first placed in their prints and checked. The body core is next centred in the print and wedged against the sides of the pit, a seal of oil-sand being placed around the joint. The middle part of the mould is then lowered over the core and the core held in position whilst the wedges are removed. After the middle part is tried, it is parted again to check for " crashes " and to prove the seal. The movable studs are placed in their holes and the middle is lowered on, the core being centred by means of these studs. Waste is packed around this core and the loam core is placed in position, making an iron-to-iron contact. Any cracks are sealed up and the joints blacked and dried.

Continuing the assembly, the top part is " blown out " and turned over into position. A large bush is placed on this top part and the runner and riser pegs are placed in position. Round bushes are placed around the loam barrel hole, and the outside is lined with sand. The riser is bushed-up separately, the outside of this also being lined with sand. The bush is then made up in the usual manner and the tops of the runners are shaped to take ball stoppers. An oil-sand seal is placed around the joint, and covered with papers. The top part is tried on, taken off again, and the waste and paper removed. The top is put on for the last time and the marks checked. The joints are finally bolted together and a bar is placed across the barrel. This bar is then bolted down with large hook-bolts and, finally, the two joints are stopped-in with sand and water.

Casting

The ladle is filled with high-duty iron from the cupola which is allowed to cool down to the casting temperature. The bush is first filled and the downgate stopper is removed. Enough metal is then allowed to flow in so that the brake-drum cores are covered before the other six stoppers are withdrawn.

The speed of running the casting is carefully controlled at a set rate. The metal is drop poured to prevent any solid patches forming half-way up. At no time is the depth of metal in the bush permitted to be lower than four times the diameter of the largest runner peg. After an adequate period, the mould is eased and the casting finally extracted ready for cleaning operations.

Book Review

The Nationalised Industries.—An analysis of Statutory Provisions by D. N. Chester, C.B.E. Published by George Allen and Unwin, Limited, Ruskin House, 40, Museum Street, London, W.C.1.

This is a matter-of-fact account of the constitution of the various nationalised industries and such an account is necessary as they vary considerably. Each phase such as emoluments, terms of appointment and dismissal, and similar phases, are all set out logically. This is the second edition and it has been enlarged to include iron and steel. We hope in the third edition the Author will be able to delete this. As a work of reference this booklet is of great value.

Publications Received

Welding, Joining and Cutting of Gray Iron. Published by the Gray Iron Founders' Society, Inc., and obtainable from the Penton Publishing Company. Limited, of 2, Caxton Street, London, S.W.1. Price 11s. post free.

Very great interest was aroused in the British foundry industry on the subject of welding cast products as a result of presentation to the last annual conference of the Institute of British Foundrymen of a committee report on the reclamation of castings by welding. Thus the appearance of this 40-page pamphlet from the Gray Iron Founders' Society is especially opportune. For one thing, it covers more than just reclamation, for illustrated examples are given of composite assemblies with aluminium. The 34 illustrations incorporated are alike clear and illuminating. Especially does the reviewer favour those showing the bonding of aluminium fins to grey-iron castings. The pamphlet opens up with an excellent description of the underlying principles governing the welding of cast iron by stressing the need for the reconstitution of the original properties. The first actual welding operation to be dealt with is that involving the use of oxygen and acetylene. It is described in considerable detail, and rod compositions and sizes for various duties are included. This is cited as being typical of the information disclosed. This section is followed by arc welding, using both nickel-base and mild-steel electrodes as well as the carbon-arc using a grey-iron filler rod. Then information is given on inert-gas tungsten-arc welding—a relatively new process. Next, there is an interesting section on arc-braze welding. The fifth section covers Thermit welding, soldering, flash welding, pressure welding and bi-metal casting. The final chapter is devoted to two methods of cutting cast iron—oxy-acetylene and arc. At the end there is a bibliography of purely American literature on the subject. It is a really good pamphlet, and when studied in conjunction with the T.S.23 report, a very complete insight into the subject of welding of cast iron will be obtained, for the two publications are complementary.

Productivity Team Report on the Wrought Non-ferrous Metals Industry. Published by the Anglo-American Council on Productivity, 21, Tothill Street, London, S.W.1. Price 4s. 6d., post free.

This report follows much the same pattern as earlier ones, except that but few references are made to the background conditions of British and American ways of living and their very pronounced effect on productivity. Thus the report is practically all technical. The reviewer was intrigued with a reference to "cupola patch," but he finds that this is a neutral refractory used for lining Ajax Wyatt furnaces, consisting to the extent of 75 to 80 per cent. of alumina. The report covers quite a number of activities and includes rolling, extrusion, wire, and tubes. A foundryman reading of these processes certainly receives the impression that these related industries are in much the same position as his own, and require a fundamental change in the taxation position before any real progress can be made.

RICHARD CRITTALL & COMPANY, LIMITED—Sir Leonard Dyer has accepted an invitation to join the board. He is chairman and managing director of British Automatic Refrigerators (1936), Limited, J.D. Insulating Company, Limited, and General Air Conditioning Industries, Limited.

T.U.C. Evidence on Taxation

In the evidence submitted by the General Council of the Trades Union Congress in the Royal Commission on Taxation of Profits and Income, published on May 25, the opinion is expressed that the disincentive effects of P.A.Y.E. have been exaggerated. All that could be justifiably claimed was that most individuals reach a certain point where their extra earnings were not sufficient to counter-balance the attractiveness of more leisure. There was a case, however, the council added, for a smoother graduation of taxation up to the point at which the standard rate applied and more should be done to let taxpayers know how P.A.Y.E. worked and how it affected them.

The maintenance of full employment, it was stated, should be the primary object of fiscal policy. The Government could and should undertake to provide risk capital for enterprise. Support is given to the principle of the profits tax on the grounds that the community as a whole is entitled to share in the additional profits which accrue to companies in conditions of full employment, which are regarded in part as "the result of exploiting conditions not created by the business community."

I.C.I. Director's Presidency

During the past three years since Sir Arthur Smout has been a vice-president of the Birmingham Chamber of Commerce, the chamber has met on Mondays—when he is in London at a committee meeting which takes place on that day. But for this, it is likely that Sir Arthur would have become president of the chamber before. However, on May 28 he was elected to the presidency, which he will take up on his return from America, where he is at present engaged on a trade mission.

A director of Imperial Chemical Industries, Limited, Murex, Limited, Murex Welding Processes, Limited, and Pyrotenax, Limited, Sir Arthur is president of the Institute of Metals and vice-president of the Institution of Mining and Metallurgy. He is a life governor and member of the council of Birmingham University and for three years during the war he was Director-General of Ammunition Production.

British Coke Ovens for U.S.

In competition with leading American and Continental firms, Simon-Carves, Limited, Cheadle Heath, Stockport, has secured a contract for over £1,000,000 of work in St. Louis, Missouri. The contract is for the building of a battery of 40 coke ovens for the Great Lakes Carbon Corporation, one of the largest American manufacturers of carbon electrodes for steel furnaces.

The ovens, which will carbonise 530 tons of coal a day for the manufacture of high-grade foundry coke, will be of entirely British design, and the materials, apart from bricks and cement, will mostly be shipped from Manchester, Liverpool, and Newcastle-upon-Tyne. The work will probably continue for 12 months, and will be carried out under British supervision.

INCREASED OUTPUT of all the main products was achieved in 1950 by the Imperial Smelting Corporation, Limited, says Mr. John R. Govett, chairman, in his annual statement. The output of zinc metal was considerably higher than in the previous year. Sulphuric acid production figures again exceeded all past records. Production of zinc dust was raised to a record level to meet urgent requirements of the dyestuffs industry.

Iron and Steel Institute Annual Meeting

Mr. Richard Mather Inducted as President

There was an excellent attendance at 4, Grosvenor Gardens, London, S.W.1, on May 30 to pay tribute to the new president, Mr. Richard Mather, who is chairman and managing director of the Skinningrove Iron Company, Limited. On the first morning of the three-day annual general meeting were held the formal business, presentation of prizes, induction of the president, delivery of his address and a discussion on the steelmaking converter process.

Bessemer Medal for 1951.—An announcement was made of the award of the Bessemer Medal for 1951 to MR. BENJAMIN FAIRLESS, president of the United States Steel Corporation, in recognition of his distinguished services to the iron and steel industry. His academic distinctions include a doctorate in engineering of the Stevens Institute of Technology obtained in 1943, and honorary degree of Kent State University and University of Pittsburgh. He is also vice-president of the American Iron and Steel Institute.

Sir Robert Hadfield Medal for 1951.—MR. W. BARR, chief metallurgist and executive director of Colvilles, Limited, and a director of Fullwood Foundry Company, Limited, received the Sir Robert Hadfield Medal for 1951. Mr. Barr is a founder fellow and member of council of the Institution of Metallurgists, and has been a member of council of the Iron and Steel Institute since 1948. He was elected president of the West of Scotland Iron and Steel Institute in 1949.

Andrew Carnegie Silver Medal for 1950.—The Andrew Carnegie Medal was awarded to MR. W. B. WINTERBOTTOM, reader in metallography at the Technical University of Norway for his Paper on "Optical Studies of the Oxidation of Iron at Temperatures in the Range, 20 to 265 deg. C." His work for the Paper was carried out at Trondheim. He graduated in applied chemistry (metallurgy) at Manchester University in 1924, going to Norway in 1934.

Williams Prize for 1950.—The Williams Prize was awarded jointly to MR. T. H. HARRIS, manager of the electric-melting shop at Brymbo Steelworks, Limited, Wrexham, and MR. W. H. EVERARD, manager of the steel-melting plants of Edgar Allen & Company, Limited, for their Paper, "Use of the Oxygen Lance in British Electric Furnace Practice." MR. D. J. O. BRANDT (B.I.S.R.A.), third co-author, was not eligible to receive the award, as he was not "actually engaged in steelmaking." It is regrettable he was not included, as he has spent a great deal of time in the melting shops mentioned on this work and worked hard to obtain data for the Paper.

Ablett Prize for 1950.—MR. D. A. WISE and DR. L. N. BRAMLEY received the Ablett Prize.

PRESIDENTIAL ADDRESS

After the prizes had been distributed, Mr. Richard Mather was inducted as the new president. Mr. Mather was educated at Sheffield, where he obtained an honours degree in metallurgy in 1907. Since then he has held the following offices:—Metallurgist to Cochrane & Company, Limited, ironfounders, Middlesbrough; metallurgist, Research Department, Woolwich; metallurgical inspector to the Government of India; technical adviser to the Indian Tariff Board; technical director, Tata Iron & Steel Company, Limited, Jamshedpur; director, Pease & Partners, Limited. In 1942 he took over his present position. From 1946-49, Mr. Mather was a member of the Iron and Steel Board of the Ministry of Supply. He was representative of British employers at meetings of the Iron and Steel Committee of the International Labour Organisation in the U.S.A. in 1946, Sweden 1947, Geneva 1949, and was elected chairman of the Employers' Group at the 1947 and 1949 meetings.

Nationalisation

At the outset of his address on "The Iron and Steel Institute and the Industry," the president recalled that, but a few months ago, the greater part of the iron and steel industry in Great Britain was nationalised, and the units affected brought under the ownership of the Government through the Iron and Steel Corporation of Great Britain. This concentration of so large a part of the industry, he said, was a change more far-reaching than any which the industry in Great Britain had yet experienced. It was, therefore, of interest to consider what effect it might have on the activities of the Iron and Steel Institute. By way of introduction the speaker briefly referred to the early history of the Institute, pointing out that it was established in 1869 on the initiative of a group of Northern ironmasters. Its purpose was to be the focus of discussions of current practice in the industry and of possible developments. It was not intended to be in any way a local organisation, or even a purely British one. Indeed, before the Institute had been in existence for a full year the first overseas member was admitted, a Mr. Thomas Blair, ironmaster, of Pittsburgh.

Early Members

Many of the first members of the Institute were actual proprietors of, or partners in, undertakings of the iron and steel industry, and the president drew attention to the initiative of these men in founding an Institute whose main objects were to break down technical secrecy and to encourage scientific study and discussion of the operations and possible developments of a great industry. The Institute thus began as an activity of the industry through many of its important members, who were principally owners or managers of the works then in existence.

From its beginning, the Institute attracted papers on new steel-making processes and, although few of

Iron and Steel Institute Annual Meeting

these survived, there was little doubt that the existence of the Institute as a focus of publication stimulated new ideas; its discussions in several cases shortened the time during which an over-sanguine inventor continued to spend time, energy, and money on an inherently unsound project. The Institute came into being too late for the earliest discussions on the Bessemer process or on the new regenerative furnace of Siemens, but Bessemer was a member of the Provisional Committee that established the Institute, and he became its second president. Siemens was elected a member of the Institute in its first year, attended some of its earliest meetings, and was elected president in 1877.

The most outstanding development, which received its first public discussion through the Institute, was the basic process, which Thomas and Gilchrist first announced in a Paper presented to the Institute in 1879 and a further one in 1881. If its first reception now seemed to have been lukewarm, it should be remembered that the Institute had in the few preceding years discussed several other attempts at dephosphorisation, all of which had been found to fail in practical trials. The first Paper by Thomas and Gilchrist, however, promptly led several manufacturers in Britain and the Continent to try the process in their works, with such success that the names of Thomas and Gilchrist were to-day among those most honoured in iron and steel circles throughout the world.

Possible Nationalisation

Referring to nationalisation, the president said that if the consolidation into one ownership of so preponderant a part of the British industry had followed the lines of some of the other measures of nationalisation, he would frankly be apprehensive of its effect on the vigour and future possibilities for good of the Institute. However, if the recent reorganisation of the British steel industry endured, it would be advisable for everyone to be more vigilant than had been necessary in the past, to ensure that there remained freedom from any restrictions (more particularly, perhaps, indirect restrictions) of their practice of full discussion of any of the technical matters which came within the scope of the Institute. Administrative practices could, in the long run, be of more influence than the nominal form of an organisation. These practices might, without any deliberate intention on the part of the administrators, and perhaps almost without recognition of their early effects, result in some loss of technical freedom by the individual. He might gradually find himself with fewer opportunities to express his views, or unable to advance new ideas. Concluding, the president said the future well-being of the industry would depend, as its past successes had depended, on the freest access to open discussion, on criticism of existing practices, and on the production of new ideas and their testing in practice. The members of the Institute, in their duty to their industry, should constantly ensure that these fruitful methods of its further growth remained available to themselves and to their successors.

Industrial Safety Exhibition

Foundrymen had a wealth of useful data for study in the Festival Exhibition organised by the Birmingham and District Industrial Safety Group and opened by the Lord Mayor of Birmingham at Bingley Hall on May 30. Not a trade show, but designed to illustrate how far industrial accident prevention has developed, the exhibition is the first of its kind in the country, covering such specific exhibits as a flame-trap recently developed by the Midland Gas Board and a pressure detector to test a potential transformer operating at 5,000 volts shown by the British Electricity authority, and I.C.I.'s mobile information unit, illustrating the intellectual approach to accident prevention in its analysis of Heinrich's theory of the basic philosophy of safety.

Colour in the foundry, turquoise, green, or grey for shops where there is heat, and quiet tones of monochromatic harmonies preferably in blue for the machine shops and any departments where there is noise, illustrated the experts' findings on this subject. Another development in safety technique—music during work—came up for equally authoritative verdict and, although it was stated that 80 per cent. of operatives wanted music, foundry workers were strongly among the 20 per cent. minority, moulders having a particular dislike of incidental noises off.

Machine-shop and die-casting specialists watched with keen interest the G.E.C. (Witton) exhibit of a photo-electric-cell mechanism serving as a guard to a press, but applicable to any machine where a wire guard is now used. This may well be described as revolutionary, because its acceptance by industry would make obsolete the present standard guard. Immediately an operator puts his hand into a danger area, an invisible ray is cut and the break in contact instantaneously stops the machine.

F.B.I. Training Scholarships

Four engineering graduates from Pakistan, selected jointly by the F.B.I. and the Pakistan Government, have arrived in this country for two years' training in British workshops under the overseas scholarships scheme. These graduates will receive their training at Glenfield & Kennedy Limited, English Steel Corporation Limited, British Electricity Authority, and B.S.A. Tools Limited respectively.

Twenty countries are taking part in the F.B.I. scheme through which it is hoped to award 100 scholarships every year. In the next few months, engineering graduates are expected from Australia, Ceylon, Iran, Kenya, Sudan and Uruguay. Under the scheme (with which U.K. government departments and industrial and educational organisations are associated) about sixty companies have offered vacancies for the first two years. The intention is to provide fully-trained technicians, urgently needed to assist the economic development of the participating countries and also to strengthen their trade with the United Kingdom and generally to promote mutual understanding and good will.

Nickel Price Increase

The International Nickel Company of Canada, Limited, and its associated company, the Mond Nickel Company, Limited, announce that, consequent upon the considerable and continued rise in costs, their prices for nickel have been increased with effect from June 1. The Mond Nickel Company is raising its price for refined nickel in the U.K. to £454 per ton delivered, and there are appropriate increases for other countries.

Pig-iron and Steel Production

Statistical Summary for March

The following particulars of pig-iron and steel produced in Great Britain have been extracted from the Statistical Bulletin for April, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in March, 1951, and number of furnaces in blast; Table II, production of steel ingots and castings in March, and Table III, deliveries of finished steel. Table IV summarises activities during the previous six months.

TABLE I.—*Weekly Average Production of Pig-iron and Ferro-alloys during March*, 1951. (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, Essex	24	—	17.1	21.6	1.3	—	40.0
Lancs. (excl. N.W. Coast), Denbigh, Flints, and Cheshire	6	—	8.4	—	—	1.2	9.6
Yorkshire (incl. Sheffield, excl. N.E. Coast)							
Lincolnshire	13	—	23.2	—	—	—	23.2
North-East Coast	23	7.6	35.3	0.3	—	1.4	44.6
Scotland	9	0.8	11.4	2.7	—	—	14.9
Staffs., Shrops., Worcs. and Warwick	9	—	8.9	1.5	—	—	10.4
S. Wales and Mon.	7	3.3	22.7	—	—	—	26.0
North-West Coast	8	14.2	—	0.1	—	1.1	15.4
Total	99	25.9	127.0	26.2	1.3	3.7	184.1
February, 1951	100	25.7	130.6	25.8	1.1	3.0	186.3†
March, 1950*	100	30.1	124.0	28.2	1.2	2.9	186.5†

† Includes 100 tons of direct castings.

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1949.	1950.	1950.	1951.	
			March*	Feb.	March
Non-alloy steel:					
Ingots, blooms, billets and slabs†	4.5	3.6	4.2	4.2	4.0
Heavy rails, sleepers, etc.	9.8	11.3	13.3	9.8	11.4
Plates ⅛ in. thick and over	39.2	40.0	42.6	44.4	43.8
Other heavy prod.	36.1	38.7	40.3	42.1	41.4
Light rolled prod.	46.4	47.6	49.2	51.4	52.3
Hot rolled strip	17.1	19.4	19.3	21.5	21.0
Wire rods	15.1	16.0	16.6	17.7	17.3
Cold rolled strip	4.9	5.5	5.7	5.9	5.6
Bright steel bars	5.8	6.5	6.3	7.6	7.2
Sheets, coated and uncoated	27.6	30.5	32.4	31.2	31.2
Tin, terne and blackplate	13.7	14.3	16.2	13.4	16.0
Tubes, pipes and fittings	18.5	20.0	21.2	23.8	21.1
Mild wire	11.8	12.3	12.6	13.2	12.4
Hard wire	3.2	3.5	3.9	4.2	4.1
Tyres, wheels and axles	4.1	3.5	3.4	2.9	3.0
Steel forgings (excl. drop)	2.4	2.2	2.6	2.4	2.3
Steel castings	3.6	3.5	3.7	3.6	3.3
Total	263.8	278.4	293.5	299.3	297.4
Alloy steel	10.4	10.6	10.8	12.4	12.3
Total deliveries from U.K. prod.‡	274.2	289.0	304.3	311.7	309.7
Add imported finished steel	9.5	3.8	5.2	3.2	3.7
	283.7	292.8	309.5	314.9	313.4
Deduct intra-industry conversion‖	51.0	53.4	57.5	62.6	61·0
Total deliveries	232.7	239.4	252.0	252.3	252.4

† Other than for conversion into any form of finished steel listed above.
‡ Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
‖ Material for conversion into other products also listed in this table.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in March*, 1951. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts, Northants and Essex	—	3.0	10.7 (basic)	1.3	0.2	14.6	0.6	15.2
Lancs. (excl. N.W. Coast), Denbigh, Flints., and Cheshire	0.8	22.4	—	1.5	0.4	24.2	0.9	25.1
Yorkshire (excl. N.E. Coast and Sheffield)	—	29.7	—	—	0.1	29.7	0.1	29.8
Lincolnshire	1.3	62.1	—	1.0	0.4	63.2	1.6	64.8
North-East Coast	4.5	40.6	—	1.7	0.7	45.6	1.9	47.5
Scotland	—	15.9	—	0.7	0.6	15.9	1.3	17.2
Staffs., Shrops., Worcs. and Warwick	10.6	50.9	5.7 (basic)	0.9	0.1	67.7	0.5	68.2
S. Wales and Monmouthshire	8.4	26.0	—	7.8	0.6	41.0	1.8	42.8
Sheffield (incl. small quantity in Manchester)	0.6	2.4	4.2 (acid)	0.3	0.1	7.5	0.1	7.6
North-West Coast	26.2	253.0	20.6	15.2	3.2	309.4	8.8	318.2
Total	28.4	256.0	21.7	16.4	3.5	316.7	9.3	326.0
February, 1951	24.6	264.8	22.0	15.0	3.4	320.8	9.0	329.8
March, 1950*								

TABLE IV.—*General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy).			
						Imports.‡	Output of ingots and castings.	Deliveries of finished steel.	Stocks.†
1949	258	169	199	183	188	17	299	233	1,071
1950	249	174	197	185	197	9	313	239	997
1950—October	266	183	201	194	202	5	328	251	1,097
November*	260	179	200	193	206	6	336	261	1,060
December	249	171	198	188	175	5	296	234	997
1951—January*	258	163	200	183	183	7	306	236	920
February	262	164	202	186	193	7	326	252	875
March	267	167	204	184	187	6	318	252	848

† Stocks at the end of the years and months shown. ‡ Weekly average of calendar month. * Five weeks (all tables).

Personal

DR. FRANZ KIND, a founder member, has been nominated as president of the North Western Fuel Luncheon Club for the 1951-52 session.

MR. E. HUNTER, technical director, Foundry and Engineering Division, Incandescent Heat Company, Limited, is sailing to-morrow in the Queen Mary on a business visit to the United States.

ADMIRAL LORD MOUNTEVANS, K.C.B., C.B., D.S.O., LL.D., has accepted the post of chairman of Parsons Engineering Company, Limited, the marine-engine manufacturers, of Southampton.

MR. I. A. R. STEDEFORD, chairman of Tube Investments, Limited, left Britain by air on June 3 for business consultations in Canada and the United States; he will return to Britain within about fourteen days.

MR. T. R. TAYLOR, of 51, Netherpark Avenue, Netherlee, Glasgow, S.4 (telephone: Merrylee 4213), has been appointed Scottish representative of Follsain-Wycliffe Foundries, Limited, and Varatio-Strateline Gears, Limited.

MR. JACK VEVERS, who for the past 20 years has been with Mitchell Engineering, Limited, both in London and Peterborough, left by air on May 17 to take up the post of chief engineer at the Johannesburg office of Simon-Carves, Limited.

MR. T. SARI WILLIAMS, managing director of Williams & Williams, Limited, manufacturers of metal windows and doors, of Chester, has been elected a member of the Chester City Council. He is a Freeman of the City of Chester.

LORD BILSLAND, chairman of the Scottish Council (Development and Industry), has been presented with his portrait in oils by shareholders of the Union Bank of Scotland, Limited, in recognition of his services as chairman, a position which he has held since 1935.

MR. W. KENNETH G. ALLEN, joint managing director of W. H. Allen, Sons & Company, Limited, mechanical and electrical engineers, of Bedford, has returned after a 32,000-mile business trip to Australia. MR. H. NORMAN G. ALLEN, the company's engineering director, is now making a business tour of Canada.

MR. H. W. G. HIGNETT has been elected president of the Birmingham Metallurgical Society, and MR. W. G. TUCKER, MR. G. PARKIN, MR. H. EVANS, and MR. J. O. HITCHCOCK have been elected vice-presidents. MR. A. C. CRAIG has been elected honorary treasurer, and MR. R. KING, MR. R. CHADWICK, MR. K. G. SUMNER, and MR. J. F. WALLACE have been elected to the council.

MR. CHARLES S. GILL, managing director of Davy and United Roll Foundry Limited, received a presentation of Sheffield Plate at the recent meeting of the Back-up Roll Makers' Association. Largely instrumental in the formation of the Association, he has been its chairman from its inception until his resignation took effect recently. The presentation was made by the new chairman, Dr. Dadswell, of the English Steel Corporation.

MR. H. NORMAN WRIGHT, managing director of Tonks (Birmingham), Limited, who has been elected president of the National Brassfoundry Association, has connections with the trade extending over more than 30 years. MR. GEORGE GUMMER, chairman and managing director of Gummers, Limited, Rotherham, has been elected senior vice-president, Major R. C. WATTS, proprietor of T. J. Cooke & Son, Wolverhampton, junior vice-president, and MR. R. P. ALLDAY, a director and secretary of P. G. Allday & Company, Limited, Birmingham, honorary treasurer. In recognition of his services to the industry, MR. E. C. B. ROWLEY, chairman of Harrison (Birmingham), Limited, has been elected an honorary vice-president.

Obituary

THE DEATH has occurred, at the age of 86, of Mr. Ernest Hill, chairman of Ernest H. Hill, Limited, brassfounders, of Sheffield.

MR. ARNOLD S. ROWNTREE, who died recently, was a director of Brayshaw Furnaces & Tools, Limited, Manchester. He was 78.

MR. WALTER IBBOTSON, for 23 years organising secretary of the Sheffield Amalgamated Union of File Trades until his retirement in 1945, died recently, aged 71. He was a member of Sheffield City Council for 12 years.

MR. EDLINGTON OLDFIELD, chairman and managing director of Nickel Blanks Company, Limited, spoon and fork blank manufacturers, of Sheffield, which he founded about 30 years ago, died recently at the age of 70.

COL. HENRY W. HILL, a noted military inventor who developed the first plotting instrument for the Royal Observer Corps in 1926 and was responsible for inventions for artillery and anti-aircraft purposes, has died at the age of 74.

MR. LEONARD HAFFNER, who died on May 20, was appointed private secretary to the late Sir Alfred Hickman at the age of 20, a post which he held for 15 years until Sir Alfred's death in 1910. He was then appointed to wind up the estate as one of the trustee joint staff of Alfred Hickman, Limited, and later became secretary of the company. On the amalgamation of the company with Stewarts and Lloyds, Limited, he was appointed joint sales manager for iron and steel, retiring due to ill health in 1935. He was 75.

Wills

WILSON, JOHN, a former works and mine manager for Bonnybridge Silica & Fireclay Company, Limited £3,885

PATRICK, G. W., a former manager of the mineral department of Dorman, Long & Company, Limited £6,110

WORTHINGTON, HARRY, a former managing director of Higginbottom & Company (Manchester), Limited, chemical and metal merchants £16,067

CAMPS, H. E. J., formerly of Camps & Company, Limited, consulting marine engineers, naval architects, and marine surveyors, of London, a former president of the Society of Consulting Marine Engineers and Ship Surveyors, and a Freeman of the City of London £38,576

NEWTON, MAJOR S. G., who was joint managing director of Brown, Bayley's Steel Works, Limited, Sheffield, Hoffmann Manufacturing Company, Limited, Chelmsford, and Taylor Rustless Fittings Company, Limited, Leeds, and a member of the executive of the British Iron and Steel Federation £63,279

WILLIAMS, E. A., managing director of the Clayton Tinplate Company, Limited, and a director of the Llanelly Steel Company (1907), Limited, and of Glasbrook Bros., Limited, former colliery owners, of Swansea, and vice-chairman of the joint industrial council executive of the Welsh Plate and Sheet Manufacturers' Association ... £86,287

HOWESON, J. H. C. E., who was once described as the virtual controller of the world tin market—he was the originator of the first international tin restriction scheme—a director of Tenaplas, Limited, extruded plastics manufacturers, etc., of London, and a member of other concerns, and who had been a director of many mining companies £197,841

MASON, G. E., who had the distinction of being the first apprentice of the Lancashire Dynamo & Motor Company, Limited (now Lancashire Dynamo & Crypto, Limited), joining the company in 1899, and who, in 1910, became the first president of the newly formed Lancashire Dynamo & Motor Company of Canada, Limited, and at the time of his retirement in 1945 was a director in charge of the north, east, and Midlands offices, at Leeds £10,379

News in Brief

FRY'S METAL FOUNDRIES LIMITED are planning extensions at Merton Abbey, S.W.19, at an estimated cost of £31,000.

THE REPUBLIC OF IRELAND imported 437 tons of pig-iron, valued at £6,303, in February last, as against 278 tons (£4,300) in February, 1950.

DURING the first four months of this year, five vessels of 53,890 gross tons were launched on the Tyne, against 10 ships of 70,439 tons last year.

HEAD WRIGHTSON & COMPANY, LIMITED, announce that they have taken a substantial interest in one of the oldest-established Australian engineering firms, Gibson Battle, merchants and manufacturers, of Sydney, N.S.W.

BRUSH ELECTRICAL ENGINEERING COMPANY, LIMITED, announce that the board have appointed Mr. Miles Beevor, at present chief secretary to the British Transport Commission, to be deputy managing director of the company.

MR. A. I. BAKER, chairman of Baker Perkins, Limited, manufacturing engineers and foundrymen, of Peterborough, states that the company's exports in 1950 were the highest ever achieved and accounted for about one-third of the turnover.

THE ATOMIC ENERGY RESEARCH ESTABLISHMENT, Harwell, is arranging an instructional course for physicists and engineers who need specialised knowledge of instruments used in nuclear physics, radio chemistry, and other work with radio isotopes.

FROM JUNE 1, 1951, the office of the United Kingdom Commercial Representative is established at 23, Bayenthalgurtal, Koln-Marienburg, B.A.O.R. 19. Telephone Number: Koln 31861. The Frankfurt office at 47 Zeppelin Allee is closed as from the same date.

INDUSTRIAL TRUCKS LIMITED, Essex Road, London, W.3, have produced a compact welded-steel bogie truck 18 in. square and light enough to be carried from place to place. Its working level is 2½ in. from the ground and four double-ball-bearing wheels mounted on two planes give complete turning control.

THE LARGEST SHIPBUILDING OUTPUT in the United Kingdom was again achieved by Harland & Wolff, Limited, according to the directors' report for 1950. The vessels launched totalled over 158,000 gross tons. Sixteen vessels were completed, comprising passenger and cargo vessels, refrigerated cargo vessels, and tankers.

LONG-SERVICE AWARDS were presented to 165 employees of Metropolitan-Vickers Electrical Company, Limited, who have completed 35 years' service, by the managing director, Mr. I. R. Cox, on May 22. It was the fourteenth annual presentation, and the company has now a total of 1,400 employees of 35 years' standing and over.

THE FIRST PUBLIC DEMONSTRATION of a gas-turbine engine of the type fitted to the Rover turbo-jet car which is on view at the Festival of Britain South Bank Exhibition was given to employees of Rover Company, Limited, and their families who visited the company's Solihull factory on May 26. Details of the engine's construction remain a close secret and the demonstration engine was totally encased.

EMPHASISING LOCAL INDUSTRIES, a new technical and industrial section was opened at Derby museum on May 26. Since the coming of the Midland Railway in 1844 and the first manufacture of locomotives in the town in 1851 transformed Derby into a modern industrial town, it is fitting that the main exhibit should be a 50-ft. working model of a typical stretch of English railway.

THE BOARD OF TRADE have made an Order, which came into effect on June 1, 1951, permitting increases in the maximum prices of all grades of ground sulphur. These increases of approximately 30 per cent. result mainly from the rise in freight rates since the start of the year. Copies of the Order, the Ground Sulphur (Prices) Order, 1951 (S.I. 1951 No. 934) can be obtained, price 2d., from the sales offices of H.M. Stationery Office.

THE RAILWAY EXECUTIVE announces that, as from Friday, June 1, 1951, railway sleeping berths which are reserved in advance and not claimed, will be charged for unless the reservations are cancelled before 4 p.m. on the day prior to travel. This time-limit is 24 hours earlier than hitherto; the alteration is designed, in the interests of the public, to enable cancelled berths to be made available as early as possible to other travellers.

A FINAL DIVIDEND of 12½ per cent. on the £1,204,677 ordinary stock, making 20 per cent., less tax, for 1950, compared with 15 per cent. for each of the four preceding years, is proposed by the directors of Goodlass Wall & Lead Industries, Limited. The directors have also decided to apply to the Capital Issues Committee for permission to increase the issued capital by the issue of bonus shares in the ratio of one ordinary share of 10s., fully paid, for each ordinary unit of 10s. held.

BORAX & CHEMICALS, LIMITED, announce an advance in prices, taking effect from July 2, by £2 10s. per ton on all grades of borax, excepting "Pyrobor" (dehydrated borax) which is increased £3, and also by £3 on all grades of boric acid, per ton. During June they will, if required, supply customers under contract at prices now current with the proportionate monthly quantity and other regular customers on a basis not exceeding the monthly average of supplies during 1950.

A JURY sitting with Lord Guthrie in the Court of Session found for, and made an award of £500 to, James Faichnie, a moulder, in an action in which he claimed payment of £1,000 in respect of personal injuries from the Forth & Clyde & Sunnyside Iron Companies, Limited, Falkirk. He was splashed by molten metal and he blamed his employers in respect of failure to take precautions for the safety of their employees. Defence was that the accident was caused by pursuer's own negligence.

POTENTIAL EMPLOYMENT for over 1,400 will be provided by a new American factory which is to be built at East Kilbride (Lanarkshire) for use by John Deere & Company, of Illinois, to extend production of agricultural machinery, said Lord Bilsland in Glasgow on May 25. Sir Patrick Dollan, chairman of the East Kilbride Development Corporation, said that with the establishment of the new factory, the industrial future of the new town seemed to be assured. The new factory, together with the Rolls-Royce project, represented a capital investment of £5,000,000.

TREASURY CONSENT has been given to the raising of new capital by Ductile Steels, Limited. It is proposed to issue at par 50,000 6 per cent. £1 cumulative preference shares which will be placed by Fyshe & Horton for a fee of 6d. per share. Applications from preference and ordinary shareholders who wish to take up the shares at par will receive special consideration. A one-for-one ordinary scrip bonus is proposed for holders of May 22. This will be followed by a one-for-one issue at 10s. per share to holders of that date. The new shares will rank equally with the existing ordinary for the final dividend for the year to June 30 next. The two issues for cash will produce £200,000 of fresh capital. The 300,000 ordinary are being underwritten by Fyshe & Horton for 3d. per share.

Raw Material Markets

Iron and Steel

The freight market is still moving against ore charterers and the aggregate import of foreign ore in the first four months of this year is down about half-a-million tons. It is hoped very shortly to accelerate shipments, to increase substantially the output of home ore, and to engage more fully blast-furnace capacity if the necessary coke is available. Foundrymen will be inclined to observe that the sooner this expansionist programme is implemented the better. The current cut in production of pig-iron and the rapid erosion of stocks is creating serious embarrassments in the foundries. Both the makers of light castings who are users of high-phosphorus iron and the engineering and speciality foundries, where hematite and low- and medium-phosphorus grades are extensively employed, find it difficult to maintain full-time working on the meagre tonnages of pig-iron and scrap which are coming to hand. Deliveries against allocations are in arrears and it looks as though the next four weeks will be critical.

Re-rollers are still dependent upon British steelmakers for the great bulk of their supplies of semis, and as ingot production is shrinking, no immediate acceleration in the flow of material from this source can be hoped for. Belgian makers, however, are being pressed to deliver material which is long overdue and efforts are being made to negotiate fresh purchases of billets, sheet bars, etc., in the Benelux states. Re-rollers have well-filled order-books both on home and export account, and could substantially increase production if bigger tonnages of semis were available.

With the opening of the new Parliamentary session it is hoped that no time will be lost in determining the future price levels of iron and steel products. Advances of a substantial nature are expected, and steel users would be glad to know where they stand in this matter. As to the adequacy of supplies, a more hopeful view prevails, but some curtailments may be necessary to ensure fulfilment of the arms drive. Exports of all descriptions of iron and steel and home distribution of sheets are controlled, but makers are still in enjoyment of freedom to cater for other home consumers, and generally deliveries are on a fairly satisfactory scale.

Non-ferrous Metals

The increase of £24 in the price of copper has been followed by a rise of £48 in the nickel quotation, which now stands at £454 per ton. This move did not come as a great surprise, for nickel has been held at a stable price for some time, and in all mining enterprises costs of late have been moving up. An advance has also been registered in the U.S. quotation. Other news from New York is to the effect that the Reconstruction Finance Corporation cut its tin price by 3 cents per lb. at the end of last week. The new price is $1.36 per lb., and it is presumed that this move is part of the R.F.C. plan to bring down the world price of the metal. It has been disclosed that the R.F.C. has made no purchases of tin since March 6. It was further reported last week that exports of controlled materials, (steel, aluminium, and copper) produced after June 30 will be licensed against export quotas. The tightening up process therefore continues.

The result of the cut in the U.S. tin price was to bring about a sharp fall in Whittington Avenue on Friday. The market was unusually active, the turnover amounting to some 285 tons in all at the morning and afternoon sessions. As to the general position of tin, it appears that the output of Malayan tin this year is likely to fall below the 1950 level. Shipments of Straits tin to the United States have fallen sharply this year, and during March nothing moved at all. This does not mean, however, that stocks have been piling up, for the Continent is an anxious buyer and the bulk of the Malayan tin is now going to Continental countries, where it is gladly received. Stocks of tin on the London market have slightly improved, but, the existence of a backwardation reminds us the tonnage available is not yet sufficient.

London Metal Exchange official tin quotations were as follow:—

Cash—Thursday, £1,122 10s. to £1,125; Friday, £1,110 to £1,115; Monday, £1,075 to £1,080; Tuesday, £1,070 to £1,075; Wednesday, £1,060 to £1,065.

Three Months—Thursday, £1,107 10s. to £1,110; Friday, £1,095 to £1,100; Monday, £1,057 10s. to £1,062 10s.; Tuesday, £1,052 10s. to £1,055; Wednesday, £1,045 to £1,047 10s.

Because of the increases in the price of copper and nickel, the Minister of Supply has made a new Order making increases in the maximum prices of non-ferrous scrap. The Order also provides that builders' merchants may be paid a commission of 1¼ per cent. on remelted lead, and fixes a new price of £115 per ton for old zinc free from tar.

The Order—the Non-Ferrous Metals Prices (No. 5) Order (S.I. 1951, No. 980)—came into force on Monday. The new prices (per ton) are:—

CLASS I—COPPER SCRAP: Clean bright untinned wire and commutator bar, £222; clean bright wire tinned, £217; firebox cut to crucible size, £217; firebox not cut, £212; No. 1 wire, £207; clean heavy, £202; No. 2 wire, £197; braziery, £180.

CLASS IV—ADMIRALTY GUNMETAL SCRAP: In any form—(*a*) not less than 9 per cent. tin and not more than 0.5 per cent. lead, £263.

CLASS V—COMMERCIAL GUNMETAL SCRAP: In any form, £223.

CLASS VI—CUPRO-NICKEL SCRAP: 70/30 process scrap, £257; 70/30 used condenser tubes, £217; 80/20 process scrap, £235.

CLASS VII—GILDING METAL SCRAP: In any form, £210.

CLASS VIII—BRASS SCRAP: QF cases free from primers, £200; QF cases not free from primers, £194; SAA cases mechanically treated or fired, £190; SAA cases muffled or furnaced, £184; cuttings, £190; rods and fuze scrap not burned, £178; swarf, £168; heavy, £163.

A further Order made by the Minister of Supply extends the licensing system for unwrought copper, lead, and zinc from July 2 to include licensing of scrap and residues of these metals. Under the Order a licence will be necessary to acquire, treat, use, and consume copper, lead, lead alloys, and zinc, and any scrap or residue of these metals or their alloys.

The Order—the Copper, Lead, and Zinc Distribution Order, 1951 (S.I. 1951, No. 981), was published yesterday (Wednesday).

ALTHOUGH there is an increasing demand by industry for qualified scientists and engineers, the supply from Glasgow University during the coming year will be less than during 1950. This is due to the fact that while the majority of the graduates last year had completed their national service, the 1951 graduates are still liable for this service. Details of the entry of graduates into industry is given in a report published by the University of Glasgow Appointments Committee for 1950. In this report it is pointed out that the committee have received more requests for honours graduates in the scientific and engineering groups than it was able to meet. This particularly applied to the chemical engineering field, where the demand greatly exceeded the supply.

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

(*Delivered, unless otherwise stated*)

June 6, 1951

PIG-IRON

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

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

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

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

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

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

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

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

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

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered.*)

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

Silicon Briquettes (5-ton lots and over).—2lb. Si, £44 2s.; 1lb. Si, £45 2s.

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

Ferro-molybdenum.—65/75 per cent., carbon-free, 9s. 6d. per lb. of Mo.

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

Ferro-tungsten.—80/85 per cent., 33s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 35s. 3d. per lb. of W.

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

Chromium Briquettes (5-ton lots and over).—1lb. Cr, £69 4s.

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

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

Ferro-manganese (blast-furnace).—78 per cent., £37 19s. 10d.

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

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

SEMI-FINISHED STEEL

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

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

Sheet and Tinplate Bars.—£17 6s. 6d.

FINISHED STEEL

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

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

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

Tinplates.—48s. 3½d. per basis box.

NON-FERROUS METALS

Copper.—Electrolytic, £234; high-grade fire-refined, £233 10s.; fire-refined of not less than 99.7 per cent., £233; ditto, 99.2 per cent., £232 10s.; black hot-rolled wire rods, £243 12s. 6d.

Tin.—Cash, £1 060 to £1,065; three months, £1,145 to £1,047 10s.; settlement, £1,065.

Zinc.—G.O.B. (foreign) (duty paid), £160; ditto (domestic), £160; "Prime Western," £160; electrolytic, £164; not less than 99.99 per cent., £166.

Lead.—Good soft pig-lead (foreign) (duty paid), £160; ditto (Empire and domestic), £160; "English," £161 10s.

Zinc Sheets, etc.—Sheets, 10g. and thicker, all English destinations, £180; rolled zinc (boiler plates), all English destinations, £178; zinc oxide (Red Seal), d/d buyers' premises, £178.

Other Metals.—Aluminium, ingots, £124; antimony, English, 99 per cent., £390; quicksilver, ex warehouse, £73 10s. to £74; nickel, £454.

Brass.—Solid-drawn tubes, 24½d. per lb.; rods, drawn, 26½d.; sheets to 10 w.g., —d.; wire, 30½d.; rolled metal, —d.

Copper Tubes, etc.—Solid-drawn tubes, 26¾d. per lb. wire, 261s. 9d. per cwt. basis; 20 s.w.g., —s. per cwt.

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

Phosphor-bronze Ingots.—P.B1, — ; L.P.B1, — per ton.

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

Nickel Silver, etc.—Ingots for raising, 2s. 6d. per lb. (7%) to 3s. 5½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 3s. (7%) to 3s. 11½d. (30%); to 12 in. wide × .056, 3s. 0½d. to 3s. 11½d.; to 25 in. wide × .056, 3s. 2½d. to 4s. 1½d. Spoon and fork metal, unsheared, 2s. 9d. to 3s. 8½d. Wire, 10g., in coils, 3s. 5¾d. (10%) to 4s. 5¾d. (30%). Special quality turning rod, 10%, 3s. 4¾d.; 15%, 3s. 9½d.; 18%, 4s. 1¾d. All prices are net.

Forthcoming Events

JUNE 12 to 15

Institute of British Foundrymen

48th Annual Conference at Newcastle-upon-Tyne. Details in the JOURNAL, March 22, 1951.

JUNE 13

Keighley Association of Engineers

Works Visit to the works of J. & H. McLaren, Limited, Diesel Engine Builders, Leeds. Coach will leave Devonshire Buildings, Keighley, at 6.15 p.m.

JUNE 16

Institute of Economic Engineering

Works Visit to the works (Methods Department) of G. & J. Weir, Limited, of Glasgow. Further details from the secretary.

Stamp Colours

It is not at all surprising to learn that the Post Office has received many complaints that the colours of the five lowest-value postage stamps have been changed unnecessarily. The Postmaster General, in an explanatory statement, points out that the changes are permanent, and have no direct connection with the Festival of Britain, as has been suggested. The change was made on May 3 to ensure that on that date both "ordinary" and "Festival" stamps of the 2½d. denomination should be of the same colour, *i.e.*, red. The reason for the change is that the Universal Postal Convention prescribes certain colours for stamps likely to be used extensively in international correspondence. Red and green are prescribed for the stamps (value now 2½d. and 1½d. respectively) associated with unregistered international postcards, and unregistered international printed papers. As the lower-value stamps are sold and recognised, both by the public and in sorting offices, by colour, it was necessary to change the colours of the "old" penny (red) and ½d. (green) stamps respectively.

In view of the similarity of colour between orange ("old" 2d. and "new" ½d.) and red ("old" 1d. and "new" 2½d.), it was undesirable to leave the 2d. stamp in its "old" orange colour, as it would then have been next to the "new" red 2½d. stamp in counter portfolios and counter clerks, it is suggested, might have made numerous mistakes. It was, therefore, decided to make the 2d. stamp brown and the ½d. stamp orange.

The Post Office was reluctant to make the changes, but as a signatory of the convention, felt bound to honour its obligations as soon as international postage rates had become reasonably stable. The convention covers colours for international postage rates only. Colours for stamps denoting inland postage rates are a matter solely for each country, so that increases or reductions in inland postage rates do not in themselves entail any changes of colour.

Contracts Open

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

BIDEFORD, June 25—Supply and erection of street lighting scheme, for the Town Council. The Borough Engineer, Municipal Buildings, Bideford. (Deposit, £3 3s.)

GLASGOW, June 9—Brass and other castings, bolts, nuts, rivets, crane chains, electrodes, iron castings, etc., for the Clyde Navigation Trust. The Stores Superintendent, No. 1 Graving Dock, Glasgow, S.W.1.

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

EXECUTIVE FOUNDRY PLANT ENGINEER, fully conversant and experienced in all aspects of foundry mechanisation layout, design, estimating, manufacture and installation, is desirous of a post with a manufacturing company or consultants, office where ability and knowledge can be progressively exercised to the full.—Box 1025, FOUNDRY TRADE JOURNAL.

WANTED position, OFFICE MANAGER or CHIEF CLERK. Age 53. Adaptable, experienced office routine, sales, purchases, accounts to final figures, correspondence, stores records. At present Office Manager, Engineers and Founders, business merging into larger concern.—Box 1022, FOUNDRY TRADE JOURNAL.

SERVICES OF AN ENGINEER, experienced in Foundry Plant Mechanisation, are offered temporarily or part-time to any Company undertaking the task of foundry re-organisation or planning.—Box 1026, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

JUNIOR ASSISTANT METALLURGICAL CHEMIST required for Marine Engineering Works in Belfast.—Apply, stating age, experience, and salary required, to Box 1002, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required Iron Foundry, South-West London area. Must be practical and capable of taking full charge.—Details of experience, age, and salary required. Box 1018, FOUNDRY TRADE JOURNAL.

FLOOR MOULDERS required for Aluminium Foundry in the South Midlands area. For suitable applicants, accommodation could be arranged.—Box 1016, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Light Castings Foundry in North-West Area. Good disciplinarian, with knowledge of ratefixing and estimating essential. Excellent prospects. Staff Pension scheme. Apply, giving full details, age, experience, and salary required.—Box 1017, FOUNDRY TRADE JOURNAL.

METALLURGIST, who has completed Military Service, required for Shift-work duties in a South Wales Steel Foundry. Experience of control of electric arc furnaces essential, also some knowledge of the heat-treatment of alloy steels. Salary in accordance with experience and qualifications.—Box 1015, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

FOUNDRY MANAGER, medium and small malleable castings, Birmingham district. Partly mechanised. Progressive position for competent man.—Box 1024, FOUNDRY TRADE JOURNAL.

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

FOUNDRY in Leamington Spa district, producing light castings for vitreous enamelling and medium grey iron castings pressure tested, require a FOUNDRY SUPERINTENDENT, with progressive ideas, having qualifications and experience to control entirely floor and mechanised sections. A large development scheme has just been commenced and the appointment is progressive.—Applicants should send full details of experience and qualifications to Box 1004, FOUNDRY TRADE JOURNAL.

TOOL Room FOREMAN wanted for large Aluminium Founders, Birmingham district, experienced in Die-sinking of Gravity and/or Pressure Die-casting Dies. Age 30/40 years. Capable of estimating hours required for die production from component drawings.—Apply, stating age, experience, and salary required, to the GENERAL MANAGER, Box 1010, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required for small East London jobbing grey iron foundry. Must have first-class experience and be capable of controlling and training labour. Sound practical experience necessary.—Write, giving details of experience and proven ability. Good prospects for right man.—Box 290, W.B.G., 39, Cheapside, London, E.C.2.

GOOD practical Iron Foundry FOREMAN wanted for large Foundry in North Wales. Must be fully experienced on machine and plate moulding, with semi-skilled labour. The position is a permanent one, ideally suited to someone who wants to settle down. Assistance will be given with housing. No applications will be considered without full details of experience, age, and salary required.—Box 1005, FOUNDRY TRADE JOURNAL.

ESTIMATOR AND RATEFIXER required for well-established Foundry producing high duty and grey iron castings from ¼ lb. to 5 cwts. in weight. Position is a permanent one, in ideal surroundings. Opportunity will be provided to join the Company's pension scheme, and assistance will be given with housing. It is essential all applicants must give experience, age, and salary required.—Box 1007, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd*

PATTERNMAKERS wanted. Wood and metal. Constant employment.—Apply J. H. MAY, 117, Central Street, London, E.C.1.

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

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

YOUNG METALLURGICAL CHEMIST required for analysis of various ferrous and non-ferrous alloys in large engineering works in East Anglia. Applicants should be 22/25 years of age, with good education and chemical training. Good canteen and transport facilities available.—Replies, stating full details of age, education, experience and salary required, should be made to Box 1008, FOUNDRY TRADE JOURNAL.

CORESHOP FOREMAN required for large Iron Foundry in North-West. Must be fully capable of controlling female labour and handling large quantities of small intricate cores by hand and core blower. Position is a permanent one with good prospects. All applicants must state age, experience, and salary required.—Box 1006, FOUNDRY TRADE JOURNAL.

WANTED

ASSISTANT FOREMAN MOULDER, aged 30-35, preferably with experience in production of valve castings and with metallurgical knowledge, for steel foundry in Glasgow area producing 40 tons of electric steel per week. Successful applicant will ultimately take full charge and prospects are good.—Box 1000, FOUNDRY TRADE JOURNAL.

NATIONAL FOUNDRY COLLEGE.

APPLICATIONS are invited from suitable candidates for :—

(1) THE TWO-YEAR DIPLOMA COURSE, and

(2) THE ONE-YEAR RESEARCH COURSE,

both courses commencing in the Autumn of this year.

The Courses are of post-graduate standard, although it is not essential for Students to possess a degree. There is liberal provision for awards of College Scholarships.

Full details of entry qualifications and application forms may be obtained from :

THE HEAD,
National Foundry College,
Wulfruna Street,
Wolverhampton.

AUCTION NOTICE

By Order of The Debenture Holder,
Re: Stadium Diecastings & Tools, Ltd.
MILL WORKS,
NORTH END ROAD,
EXHIBITION GROUNDS,
WEMBLEY.

HENRY BUTCHER & CO.

are instructed to offer FOR SALE BY AUCTION in LOTS on the premises on TUESDAY, 26TH JUNE, 1951, at ELEVEN a.m., the WOODWORKING PLANT & DIECASTING MACHINERY. including "DANCKAERT" 11 in. by 5 in. 5 CUTTER PLANING & MOULDING MACHINE. "DANCKAERT" 16 in. DRAW BENCH. "SAGAR" 12 in. RIP SAW. "SAGAR'S" 15 in. by 9 in. THICKNESSER. "DANCKAERT" 12 in. OVERHAND PLANER. "WILKINSON" 12 in. DIMENSION SAW BENCH. SINGLE END TENONER. CHAIN & CHISEL MORTISER. 8 in. by 6 ft. by 1 ft. 6 in. BAND GLUEING-UP PRESS. ELECTRIC 6-WELL GLUE HEATER. "GUILLIET" 8 ft. BELT SANDERS. SINGLE SPINDLE MOULDERS. "DANCKAERT" 1 SPINDLE DOVETAILER. "SAGAR" 15 in. CIRCULAR SAW BENCH. DIECASTING MACHINES, by "E.M.B." "Madison-Kipp" and "Cleveland." "CARVIN" PEDESTAL TAPPING MACHINES. "ALBA" 25 SHAPER. "VERNON" MILLING & JIG BORING MACHINE. SINGLE & 2 SPINDLE DRILLS. CAPSTAN LATHES. MOTORISED POLISHING SPINDLES.

Catalogues (when ready, price 6d. each, P.O. only) may be obtained of

Messrs. HENRY BUTCHER and Co., Auctioneers, Valuers and Surveyors of Factories Plant and Equipment, 73, CHANCERY LANE, LONDON, W.C.2, Telephone: HOLborn 8411 (8 lines).

FINANCIAL

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

AGENCY

FREE-LANCE AGENT, with important Engineering customers in London and the Home Counties, desires contact Grey Iron Foundry with capacity for loose pattern moulding with a view to arranging an Agency.—Box 1023, FOUNDRY TRADE JOURNAL.

MATERIALS WANTED

WANTED, by actual user, Aluminium Grindings from casting fettling. Maximum price for clean material. Regular supplies wanted.—Send true sample and details to Buyer, K. & L. STEELFOUNDERS & ENGINEERS, LTD., Letchworth.

MATERIALS FOR SALE

LARGE and Small Rollers. Solid and Laminated Woods. Also turnery in all hardwoods, including Lignum.—MUSTILL, Clifton Road East, Liverpool, 6.

PLANT FOR SALE

SHOT Blast Rumbling Barrel Plant, Tilghman C.B.2, double jet, external mixing tube. Complete and ready for work, with all motors, dust arrester (separate), starters, etc. Size of barrel 18 in. by 24 in.

This plant is absolutely in new condition and has done only a few hours' demonstration work.

Apply:

H. BRIDGES, "Kingscroft," Kingsbury Road, Minworth, Birmingham. Telephone: ASHfield 1439.

MACHINERY WANTED

REQUIRED.—25-30 cwts. capacity Geared Tilting Ladle. Must be in good condition. State price and where seen.—Box 1021, FOUNDRY TRADE JOURNAL.

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

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

OFFER YOUR SURPLUS PLANT TO

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

URGENTLY REQUIRED.—15 cwts., 1 ton capacity, Electric Lift, 400 volts, 3-phase, 50 cycles. New or second-hand considered providing latter will pass test as required by the Factory Act. Please state maximum lifting height and dimensions of cage, and previous use.—Box 1009, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

"SKLENAR" FURNACE. 1-ton capacity. Coke fired. New 1944. Very little used. Price £700.—Box 642, FOUNDRY TRADE JOURNAL.

AIR COMPRESSOR, vertical, two-stage, by Tilghman's. Complete with intercooler, after-cooler, and 95 h.p. motor, with two air receivers 9 ft. 6 in. high and 6 ft. high.—PLATER'S & STAMPERS, LTD., Burnley.

IN STOCK IN SLOUGH FOR IMMEDIATE DELIVERY.

COKE-FIRED TILTING FURNACES, as new, with Keith Blackman a.c. Fans, 250 lbs. and 440 lbs. size. £125 each.

BALE-OUT FURNACES, by Morgan and British Furnaces. 200 lbs.-400 lbs., in stock. Prices £40 to £150.

WEIGHING MACHINES. 30-cwt., 1-ton, 3-cwt., etc. Suitable for cupola charges. Cheap.

Small and large DISINTEGRATORS, by Alfred Herbert, at £28 to £48.

Several CUPOLAS, from ½ ton per hour to 3 tons per hour. Details on request.

Plenty of Foundry Equipment in stock. Immediate attention all enquiries.

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

MACHINERY FOR SALE—*Contd.*

FOR SALE

NO. 16 ATRITOR CRUSHER by Alfred Herbert, complete with Feed Hopper, overhauled and with a quantity of spares. Also a No. 12 Atritor by Alfred Herbert, for which we have available about 6 tons of spares. Both these machines are offered at extremely low prices for quick clearance.

SAVILLE-CALVERT (MACHINERY), LIMITED
BIRMINGHAM ROAD, STRATFORD-ON-AVON.
Tel.: Stratford-on-Avon 3681.

FOR DISPOSAL.

OPEN DIE HORIZONTAL FORGING MACHINES.

ONE Samuel Platt, ½ in. capacity, complete with 5 h.p. motor and starter for 415 volts, 3-phase, 50 cycles supply.
Three Samuel Platt, ⅜ in. capacity, arranged for belt drive.
Two Samuel Platt, 1 in. capacity, arranged for belt drive.
One National Acme, 1½ in. capacity, arranged for belt drive.
FOR FULL DETAILS AND INSPECTION APPLY:

THOS. W. WARD LTD.
Albion Works, Sheffield
Phone 26311 'Grams: "Forward."

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HAMMERS:

5-CWT. "MASSEY" CLEAR SPACE TYPE PNEUMATIC POWER HAMMER. Maximum stroke approx. 21 in.; ram pallet face 8 in. by 7 in.; dia. of ram approx. 10 in.; 26 h.p. S.C. Motor, 400/400/3/50.

5-cwt. CLEAR SPACE TYPE PNEUMATIC POWER HAMMER. Alldays anvil block; 20 h.p. Protected type S.C. Motor, 350/3/50.

50-cwt. "MASSEY" CLEAR SPACE PNEUMATIC HAMMER. 3 ft. 6 in. stroke; 185 h.p. Slip Ring Motor, 440/3/50; "Ellison" Starting Gear.

RUMBLING BARRELS:

NEW MOTOR DRIVEN HEXAGONAL RUMBLING BARRELS. 36 in. long by 18 in. across flats, ½ in. plate; driven by 3 h.p. Motor, and complete with Starter.

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

BELT DRIVEN GEARED HEXAGONAL RUMBLING BARREL. 18 in. long by 16 in. across flats. Fast and loose pulleys.

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

GEARED FOUNDRY CRANE LADLES—NEW. 3-ton; 50-cwt.; 2-ton; 30-cwt.; 1-ton; 10-cwt.

ALL THE AFOREMENTIONED ITEMS AVAILABLE FOR IMMEDIATE DELIVERY.

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Remember . Wards might have it!

MACHINERY FOR SALE—*Contd.*

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

600

AIR COMPRESSORS.

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

600-c.f.m., TILGHMAN, type FC9AM, vert., single cyl., single stage, water cooled, 60 lb. w.p., 365 r.p.m. Direct coupled to 125-h.p. S/R induction motor, by L. Scott, 440/3/50.

600-c.f.m., TILGHMAN, vert., single cyl., single stage, water cooled, type F.C.9. Speed 365 r.p.m., w.p. 60 lb.

400-c.f.m., TILGHMAN, type GB3, vert., 2 stage, water cooled, 100 lb. w.p., 320 r.p.m., with intercooler.

300-c.f.m., TILGHMAN, type FC6DY, vert., 2 stage, single crank, water cooled, 100 lb. w.p., speed 360 r.p.m., fitted intercooler and floor mounting aftercooler. Belt driven.

300-c.f.m., ALLEY & McLELLAN, type 23B, vert., single crank, 2 stage, water cooled, fitted intercooler and unloader, 100 lb. w.p. Direct coupled Crompton 75-h.p. S/R motor 415/3/50, 365 r.p.m.

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1 6-Ton Electric Overhead Travelling Crane. 20 ft. Lift, 35 ft. Span, 400/3/50 supply.

1 6-Ton Ditto. 30 ft. Span.

The above are 3-motor, double girder type Cranes. Floor controlled.

1 3-Ton Electric Overhead Travelling Crane. Electric Hoist and Hand Cross and Long Travel. 400/3/50. 35 ft. Span.

1 Ditto. 6-ton capacity. 400/3/50 supply. Floor controlled.

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

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DELIVERY EX STOCK

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

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MACHINERY FOR SALE—*Contd.*

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. BREALEY (MACHINERY), LTD., Station Works, Ecclesfield, Sheffield.

TWO Wheel Motorised Side Grinding Machine, by Beacon Engineering Co., Ltd. Inspection invited.—THE BROCKMOOR FOUNDRY CO., LTD., Brockmoor, Brierley Hill.

FOR SALE.

LANCASHIRE BOILER FLUES, suitable for Cupolas; can be inspected at our works; cheap.

MARKLAND SCOWCROFT, LTD.,
Cox Green Works, Bromley Cross, near Bolton.
Tel. No. Eagley 600/1/2

CAPACITY WANTED

CAPACITY required within sixty mile radius London for Patternmaking.—Details Box 1019, FOUNDRY TRADE JOURNAL.

CAPACITY required for Iron and Non-ferrous Castings.—Details Box 1020, FOUNDRY TRADE JOURNAL.

CAPACITY AVAILABLE

PATTERNMAKING. — Accurate first-class Patterns for machine or hand moulding. Keen prices, quick delivery.—D. C. POOLE, 27, Priory Avenue, Taunton, Somerset. Tel. 5046.

FOUNDRY in Home Counties has capacity available for repetition grey iron castings up to 24 in. sq. boxes.—Box 1001, FOUNDRY TRADE JOURNAL.

ACCURATE Patterns in the minimum of time. Plate Specialists.—A. ELSTON, 1, Cranbrook Road, London, E.17. KEYstone 6788.

BEEHIVE FOUNDRY, 50, Hall Lane, Walsall Wood, Staffs., for small to medium size Aluminium Sand Castings of Quality.—'Phone Brownhills 3323.

PATTERNMAKING Capacity available immediately.—Write or telephone F.H. (NEWCASTLE), LTD., Pottery Lane, Newcastle-on-Tyne, 1. Tel. No. 28291/2.

CAPACITY available for Light Castings weighing from 1 lb. to 5 cwts., including Castings for Vitreous Enamelling.—WESTERN LIGHT CASTINGS FOUNDRIES, LTD., Fairwood Foundry, Gowerton, near Swansea, manufacturers of malleable iron castings.

NON-FERROUS FOUNDRY. Capacity available. First-class quality castings, in Aluminium-Bronze, Gunmetals, etc., at competitive prices, including patterns if required.—BEESTON LEE & CO., LTD., 33, Swindon Road, Stratton St. Margaret, Wilts.

CAPACITY, substantial, available immediately, fully mechanised Foundry; high quality Grey Iron and Malleable Castings; boxes up to 28 in. by 16 in. by 5 in.; Patternmaking facilities if required.—E. J. WALLACE, 50, Wellington Street, Glasgow, C.2.

CAPACITY AVAILABLE—*Contd.*

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

MISCELLANEOUS

PAN MILLS, 4 ft. and 5 ft. dia. underdriven, stationary pans, self-discharging new, for delivery from stock.—W. & A. A. BREALEY (MACHINERY), LTD., Ecclesfield, Sheffield.

STAFF TIME CHECKING AND JOB COSTING TIME RECORDERS. All makes for quick cash sale. Exceptional condition.—Write Box 504, SMITHS', 100, Fleet Street, E.C.4.

PATTERNS in Wood or Metal; high finish and accuracy maintained; plate and multi-cored work a speciality.—HAYWOOD BROS., Littleborough, Lancs 2543.

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

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

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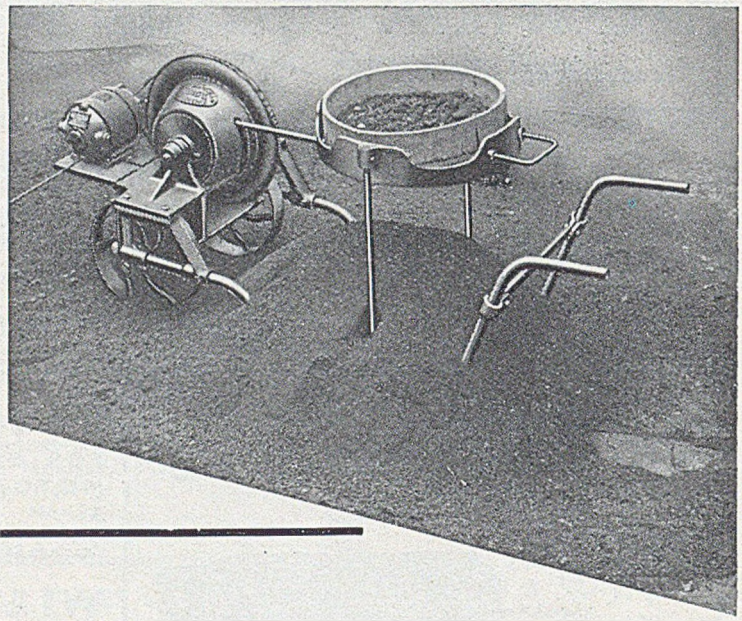

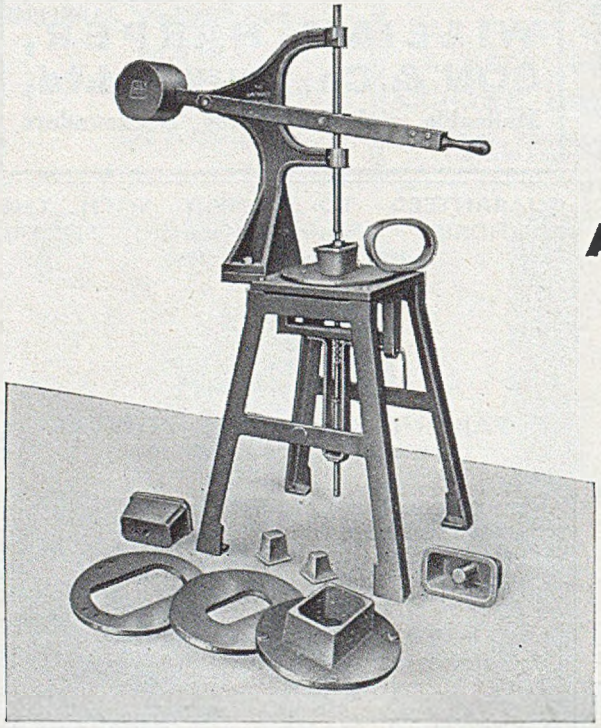

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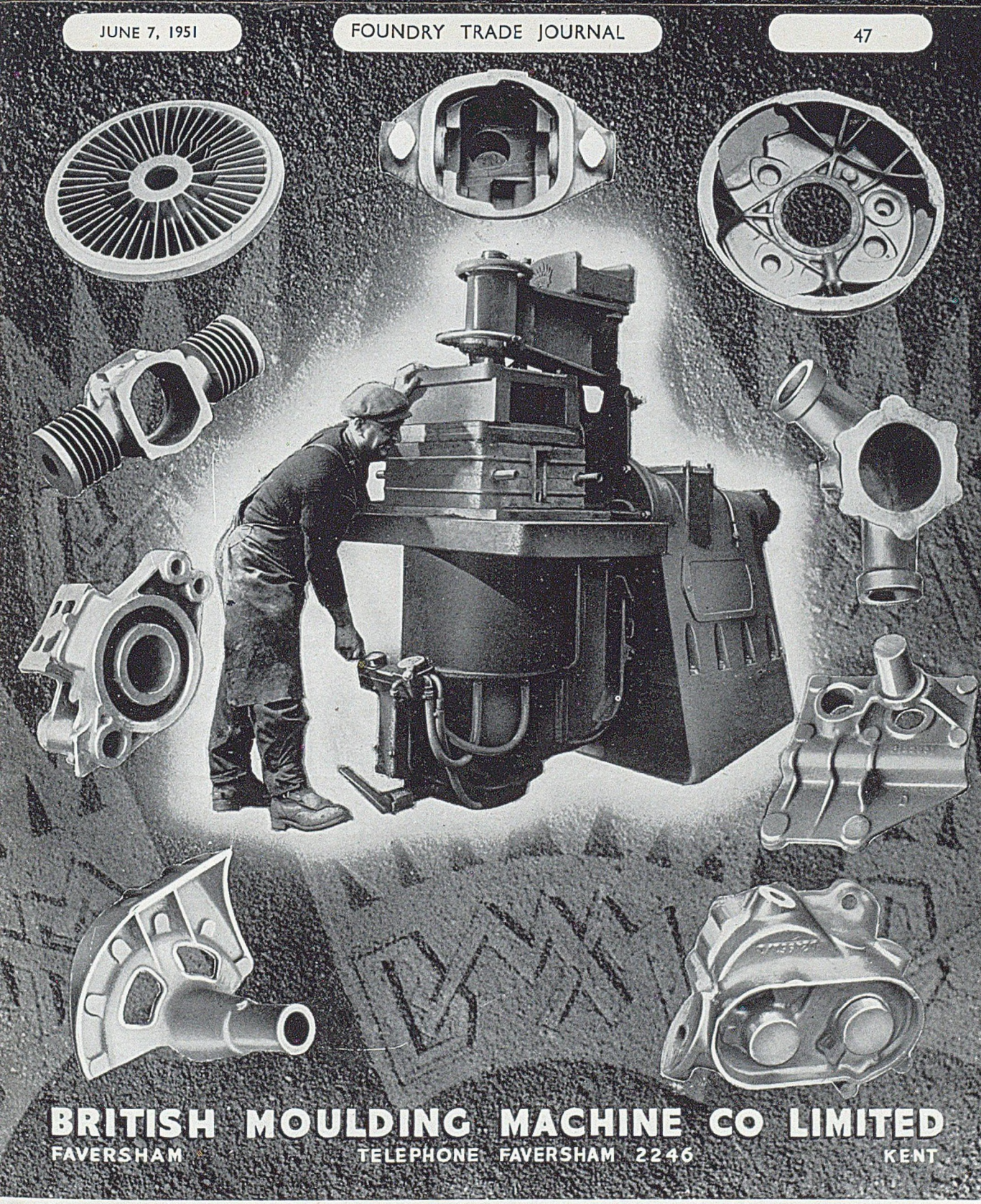

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