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Stated Objectives

Professor Mundel, addressing a group meeting at the Annual Conference of the Institution of Production Engineers, stated that to measure productivity one must have "(*a*) a knowledge of existing circumstances; (*b*) a stated objective, and (*c*) an opportunity continually to measure the progress from existing circumstances towards the objective. This requires a numerical measure." The cardinal factor to our mind is (*b*) a stated objective. This being so, we would rule out its application to industrial productivity, as its mathematical evaluation is unattainable and, if some budding Einstein were to find a method, even then its practical application would be ineffective. Obviously, it always has been, and always will be, the endeavour of enlightened people to produce a greater quantity of saleable goods economically—that is at such a cost as will ensure the continuity of the concern manufacturing them. However, Professor Mundel's clear statement, when applied to individual organisations, warrants close consideration.

Executives are required by law periodically to produce figures concerning their industrial and financial activities, and others are needed for the efficient conduct of their business. These are well known, but there are still those of transient value, for instance, statistics consequent upon the appearance on the market of new materials, or the temporary unavailability of traditional ones. For example, there have recently been introduced new types of core-bonding materials. Here the "stated objective," provided technical trials have been sufficiently promising, is to have "a knowledge of existing circumstances." This means the management must have the most complete costs to be associated with the use of the traditional materials. Such an estimation cannot be carried out on the back of an envelope, for actually it is quite difficult, but not so hard as to find out the full implications of the proposed change. A second case is worth citing, and that is where, owing to a shortage of hematite, a decision is taken to make a synthetic mixture based on melting steel scrap in the cupola. Costing this is comparatively easy, as when the synthetic pig has been made and taken to the bins in the yard, everything prior to that action can be charged against the home-made material.

The worry about what we have called transient statistics is that in government departments and some of the larger manufacturing concerns, figures are collected and tabulated long after the "stated objective" has been satisfied. A question in the House or around a board-room table may result in the hasty appointment of an official or even a small department, the function of whom or which often outlives the usefulness. Researches involving great effort, and no doubt expense, have been, and are being, undertaken to ascertain average periods of employment by both sexes in a wide range of industries, as well as relative absenteeism and the like. Such figures, when published, are about as much use as toothache to a man in charge of a shop. Thus, before any search for statistics is undertaken, the Professor's second insistence—the stated objective—should be defined as to its seriousness, let alone usefulness.

Borough Polytechnic

Shortly after the war, the question of the recruitment and training of craftsmen for the foundry industry was discussed in the London branch of the Institute of British Foundrymen, and as a result an approach was made to the Borough Polytechnic to initiate both part-time day and evening courses. Though there was naturally a comparatively large reservoir of potential students accumulated during the war period, the Principal, Dr. Ingall, warned the industry that a proper assessment could only be made after a period of several years. Now stock can be taken, and the position is that a well-equipped foundry workshop is available, together with classrooms and other facilities. The equipment consists of a gas-fired crucible furnace, a high-frequency electric melting furnace, a hand and a simple power-operated moulding machine, a complete range of sand-testing apparatus, core ovens, a shot-blast plant and various testing apparatus. A full-time supervisor has been appointed. The course spreads over three or four years, depending on the aptitude of the individual boy for taking the final of the City and Guilds examinations the year following his passing of the intermediate or whether he needs two years' further training. There are about 50 part-time release students enrolled, but the situation is not so good for the evening classes (17 only). The need for skilled craftsmen is as pressing as it was five years ago, and foundry owners would do well to support these classes to the fullest extent. It should be unnecessary to remind readers that a space has been left in an Act of Parliament to insert a date after which compulsory part-time training will be instituted. Thus there is much to be said for the prior adjustment of the works organisation to these conditions when they are implemented. The sole factor is the non-existence of buildings and staff to take care of such a major influx as would ensue. We suggest that all foundry owners in the London area should ask the Registrar of the Borough Polytechnic, London, S.E.1, to place their names on a list for the receipt of any circulars as and when issued.

Tin Research Institute

The Annual Report of the Tin Research Institute for 1950 states that a notable achievement had been the invention of a new, attractive, tarnish-resistant electroplate consisting of 65 per cent. tin and 35 per cent. nickel. Tin/nickel was deposited in bright condition and required little or no polishing. Arrangements had been made for the installation of pilot plants in England, Holland and the United States. The laboratory had been engaged in servicing the large number of users who had installed the tin/zinc plating process during the year. Tin/zinc plating had also made excellent progress in the United States. The adoption of this relatively new use of tin had been stimulated by the shortage of cadmium, and tin/zinc plating was already regarded as a satisfactory and relatively cheap substitute for cadmium plating. Wider uses would follow as the special qualities of the coating became known.

The Report also covers work on corrosion tests, chemical analysis, properties of bearings, bronze and the manufacture of electrolytic tinplate. New fundamental researches, carried on extra-murally, include a study of the theory of alloy formation, and the preparation and properties of new organo-tin compounds. The Council's building programme for the extension of its head office and laboratories at Greenford, was completed during the year, and the available working space was doubled.

Conference Paper Author

B. Levy is the Author of the Paper on "Some Present-day Practices in Patternmaking" (printed on the opposite page). Mr. Levy served his apprenticeship in a patternshop and in a very short time proved that this work was his particular niche by attaining the position of charge-hand in the patternshop of Higgs & Hill, Limited, at the youthful age of 21. He was then in full control of the output of 20 to 30 men on patternmaking of all kinds. Three years later, at the age of 24, Mr. Levy founded the firm of patternmakers bearing his name. During the 30 years or more of his patternmaking and foundry activities, he has written many articles on these subjects, including contributions to the latest volume of "Engineering Works Practice," published by George Newnes, Limited. He is the patentee of numerous inventions, and one of his notable contributions to patternmaking was described in a Paper published in Vol. XL of the Proceedings of the Institute of British Foundrymen, under the title of "A New Machine for Cutting Irregular Shapes." Mr. Levy is a member of the London branch Council and takes a very keen interest in the activities of the Institute, particularly the branch meetings at which lectures are presented and to which he frequently contributes useful discussion.

MR. B. LEVY.

Valve-makers Productivity Report

The Report of the Productivity Team from the valve-making industry which visited the United States has now been published by the Anglo-American Council on Productivity, 21, Tothill Street, London, S.W.1. It costs 3s. 6d. and is good value for money, as many handling methods which may be new to many people are clearly described and illustrated. The team have virtually ignored foundry practice as they deem the reports of the specialist foundry teams which have visited the United States to be sufficiently detailed to cover their requirements. There is one lesson in the Report which requires stressing and that is—where design lends itself to the easy making of two halves, resort is had to welding to complete the job. This is by far preferable to making the whole job as a single casting and thereby involving many complications in moulding. The factors which give the American valve-makers greater production are clearly set out and generally speaking are related to mechanical handling and intelligent use of plant. The gap however is not too wide in this particular industry.

Hydromechanics Research Association

The newly-formed British Hydromechanics Research Association is now well established at Harlow in Essex and is undertaking research work of fundamental interest to valve and pipe makers. A beginning has been made with a study of cavitation, whilst a second investigation covers seals and gland packings. About 20 scientists are now on the staff and their work will be followed with interest by a large number of foundry executives.

Some Present-day Practices in Patternmaking*

By B. Levy

Intended to show the application to the job of materials, methods and machinery both old and new, this Paper, whilst by no means put forward as exhaustive, makes special reference to the impact of the latest innovations to the patternshop on actual workshop practice. Since foundrymen to-day pay a good deal more attention to using appropriate pattern equipment than may have prevailed in years gone by, this important aspect is emphasised and recommendations made.

Prominent among the duties of to-day's patternshop supervisor is that of establishing liaison between foundry, drawing office and machine shop, in addition to those concerned with finance, economics, sales and output. Resulting from this consultation, seven primary factors detailed below may be determined, which then lead to a correct expenditure on appropriate pattern equipment:—

(*a*) Number of castings to be produced in single batches and the maximum future total requirements;

(*b*) equipment available in the particular foundry and the manner chosen for moulding;

(*c*) type of labour to be employed, *i.e.*, skilled, semi-skilled or unskilled;

(*d*) considerations of handling the pattern, arising from such obstacles as fragile design, compound curves on thin sections, warping or possible distortion;

(*e*) amount of coring and type of coreboxes suitable;

(*f*) possible modification of component design to facilitate moulding and casting in the most economical manner; and

(*g*) machining or absence thereof on the final casting.

From the answers obtained from posing these questions, a suitable choice is made from the list of pattern equipment classified broadly as follows:—

(1) Fully-machined metal equipment—patterns and coreboxes;

(2) part-filed and part-machined metal equipment;

(3) filed or cleaned-up pattern-castings from double-shrink wooden patterns;

(4) hardwood patterns and coreboxes reinforced with metal;

(5) hardwood equipment completely;

(6) cheap wooden patterns and coreboxes, including pine and general softwoods;

(7) skeleton patterns;

(8) strickle boards, for patterns and cores; and

(9) plastic patterns.

With the exception of plastic patterns, the manufacture of which is the latest addition to modern patternshop activities though not yet fully explored in all potentialities, the order in which the choice of equipment has been enumerated above begins with the class of pattern equipment required for maximum production and is graduated to the scale of the proportionate use commonly anticipated that one might expect from the levels between fully-machined metal equipment and strickle boards.

As the importance of type of pattern equipment is rather less for the small-quantity and one-off job rather than for the high production type, it is not now proposed to deal at length with the manufacture of patterns for prototypes and the like, since much has been written on standard practice in this direction and practice has changed very little over many years.

Strickles, etc., for Loam Working

Glancing briefly at strickle boards and skeleton patterns, it may be stated that, despite the clamour for faster production entailing less and less skill in the manufacture of castings, pattern equipment of this character still occupies an important place in the economic production of many types of casting, such as for marine work, etc. The emphasis in this class is undoubtedly upon the skill of the moulder and it requires a comprehensive study of loam work on the part of the patternmaker to ensure the correct functioning of the "bits and pieces" he makes. By no means should it be considered that this work is completely out of date, although it would be true to say that much loam moulding and strickle work has been replaced by the employment of full wooden pattern equipment which, manufactured by modern methods and machinery, and especially in these times of shortage of highly-skilled loam moulders, becomes an economic proposition.

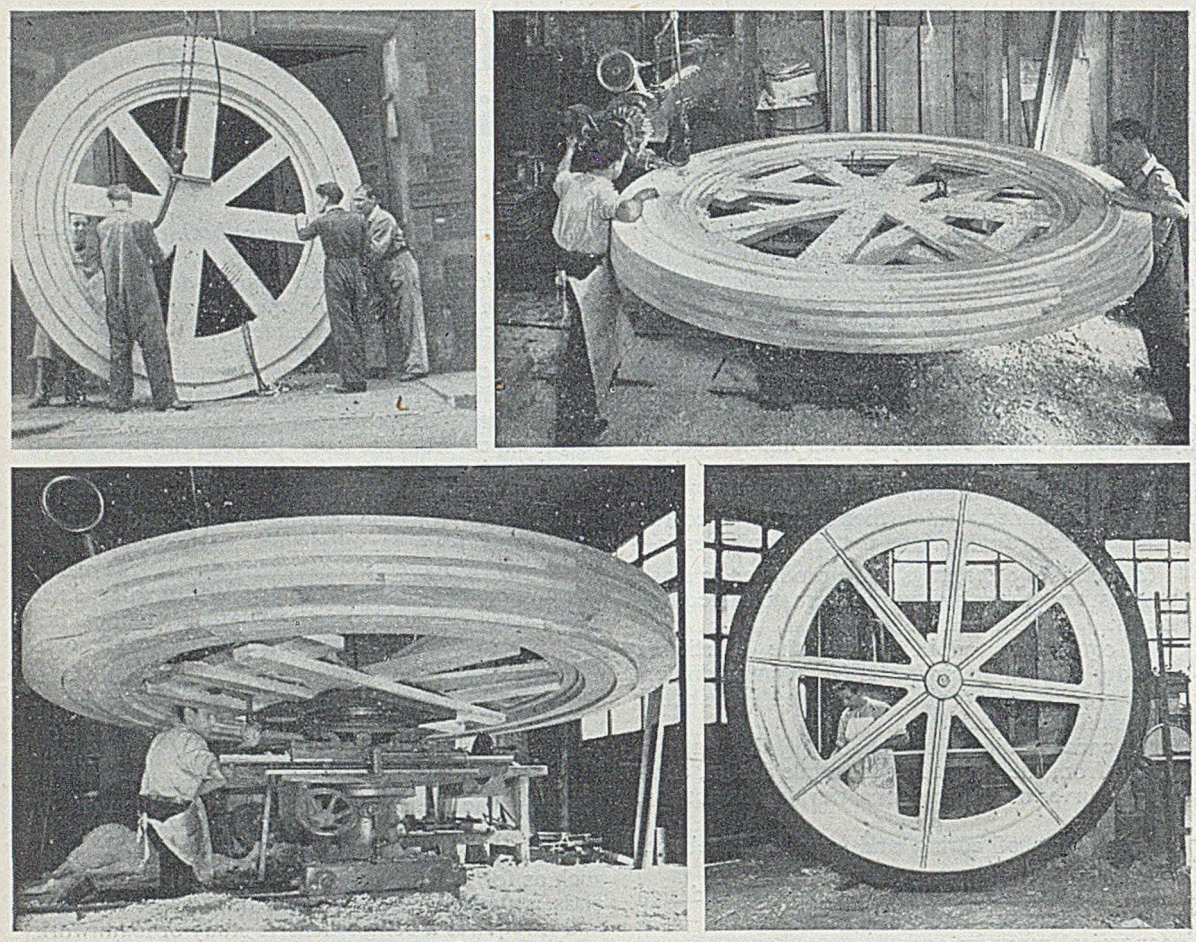
A typical example of full pattern equipment replacing strickles is shown in Figs. 1 to 4 illustrating a 10 ft. dia. sheave wheel which has been built up and in Fig. 1 is being lowered into the machine shop to be milled into shape horizontally on a pattern miller.

Modern Machining Method

Fig. 2 indicates the method of mounting the pattern on the machine, and rotating tables and slides for lateral adjustment are also visible, thus showing the manner in which diameters are variable and concentricity is obtained. The features of this set-up are:—

(1) There is no risk of "catching crabs"—an expression well known to the wood patternmaker when turning, and particularly dangerous on a large job like this if the turning tool should be drawn in to the work whilst revolving. Jobs liable to vibrate

* Paper presented at the Newcastle-upon-Tyne Conference of the Institute of British Foundrymen.



FIGS. 1 TO 4.—*Sheave Wheel Pattern, 10 ft. dia., in Various Stages of Manufacture. Fig. 1 (top, left), Rough Wooden Shape arriving in the Machine Shop; Fig. 2 (bottom, left), Pattern Mounted in the Milling Machine; Fig. 3 (top, right), Actual Milling Operation in Progress, and Fig. 4, Completed Pattern.*

and of a slender character are particularly prone to this danger;

(2) mounting and setting-up time is less than that required for turning, especially where the pattern is shaped on both sides;

(3) machining is infinitely faster than by turning in a lathe; and

(4) it is very much easier to get at the job for dimensional checking of overall depths and shapes.

In Fig. 3 the actual milling operation is seen, and Fig. 4 shows the final pattern after completion of the webs and trimming out to shape.

Only one disadvantage of milling this type of work should be mentioned; that is found when sandpapering and finishing. It must be conceded that a job such as this mounted on the lathe and sandpapered whilst revolving would have a better finish than the milled pattern, since the sandpapering has to be performed by hand after the cutting has been done on the pattern miller. The dark portion of the periphery of the finished wheel in Fig. 4 represents the coreprint for the " V " groove, for which a one-twelfth segmental corebox was made.

Semi-permanent Patterns

On large work, such as the Diesel-engine base pattern illustrated in Figs. 5 & 6 where the overall length of the full equipment is approximately 16 ft.; the choice of material leans towards good, sound, yellow pine, for considerations both of weight and stability. Shown assembled, the pattern is actually made in two halves for moulding purposes, and is additionally divided into sections throughout its length. It will be seen from Fig. 5 that, apart from the fore and aft ends of the pattern, the intermediate stages of cores and corresponding prints are similar. This feature enables the pattern equipment to be adjustable by stages of two cylinders at a time for the purpose of producing castings with a differing numbers of cylinders. The assembled pattern was held together by a series of longitudinal steel bolts and wooden battens. Substantial pine coreboxes of 3 in. timber thick-

ness were employed and these coreboxes were made in stages corresponding to the longitudinal divisions to the pattern. It was, therefore, when moulding, purely a matter of using the correct number of cores to suit the short or long pattern as rigged. The designers and draughtsmen should receive credit for the practicability of this system, one which could well do with much extension.

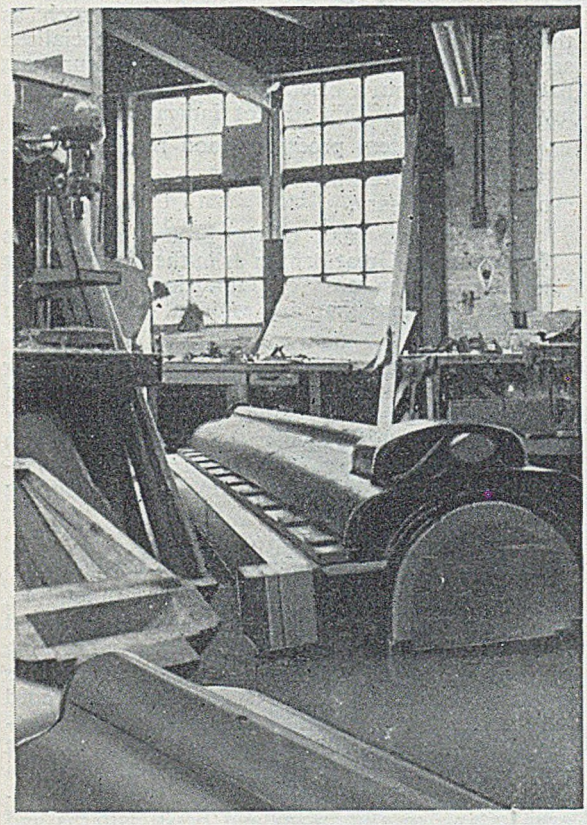
Hardwood Patterns

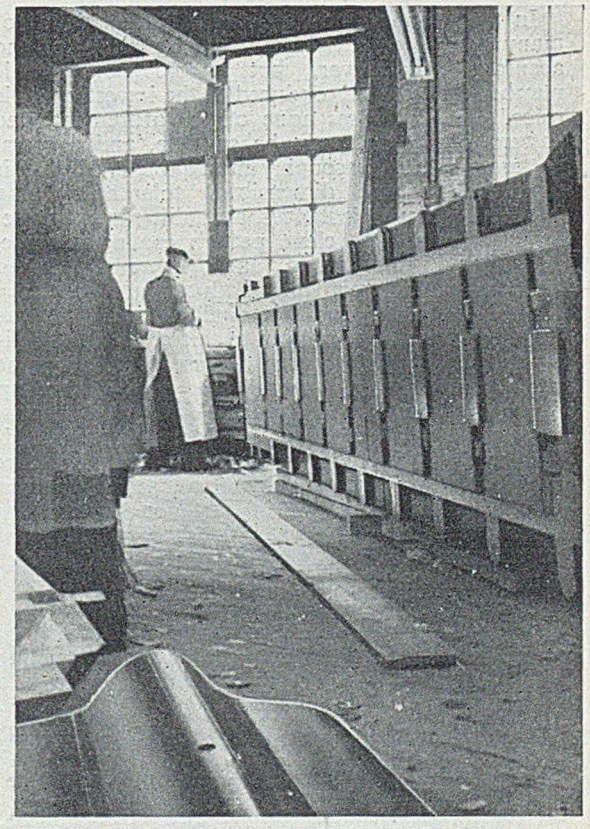
Mahogany is still the great favourite in the patternshop to-day for a good-class semi-permanent pattern, but of course would not be really suitable for a job such as the last example for reasons of weight, cost of material, and additional man-hours involved in shaping the harder timber. From medium-size work up to fairly substantial dimensions, say 6 by 2 by 2 ft., a mahogany pattern gives very serviceable results and has the special feature of machining-up very much cleaner and smoother than the soft-woods, and thereby reduces the amount of hand working, resulting in a very clean, accurately-finished job. This remark is particularly applicable to coreboxes machined on the pattern miller, and the use of this machine often leaves little difference between the cost of hardwood as compared with a similar softwood pattern or corebox.

Hardwood Reinforced with Metal

Sheet metal, small brass or aluminium castings, and strip reinforcements to the woodwork have been found to give particularly good results in prolonging the useful life of hardwood patterns in the foundry, whilst maintaining well-defined sharpness of detail. The procedure on this type of pattern equipment is to make brass or aluminium castings for webs, bosses and shaped prominences, which are liable to become damaged by the moulder's peg-pammer or in handling. Such castings are let into the pattern or corebox by means of a suitable recess, are fastened with countersunk screws, the head of the screw after fastening being soldered flush. Sharp corners of coreprints and pattern are protected by means of a small rebate into which is inserted a strip of metal, (brass, iron or aluminium) approximately 1 by $\frac{1}{8}$ in., and corners that require a radius are dealt with by using a stouter-section strip or castings as may be suitable. Pattern equipment of the reinforced hardwood type is a good "halfway house" between the plain hardwood and the full metal pattern, and may be employed on moulding machines as well as on the floor or bench.

Fig. 7 shows a cinematograph sound-head pattern (at top left) made on lines above described, from which over 1,000 castings have been made. New





FIGS. 5 AND 6.—*Pattern Equipment for a Diesel-engine Base Casting approximately* 16 *ft. long. Manufacture is so arranged that Portions of the Pattern may be utilised to produce Castings with Different Numbers of Cylinders.*

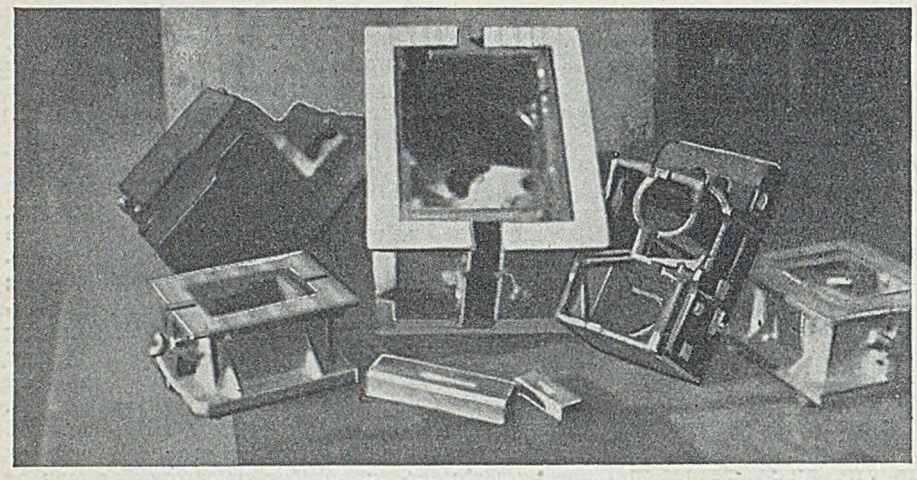


FIG. 7.—(*top, left*). *Cinematograph Sound-head Pattern; also shown are a Finished Casting* (*right, centre*) *and several Metal Core-boxes.*

surrounds, which were originally hard-wood, have been made of aluminium to the metal-lined core-boxes also shown. A finished casting is on view in the front right-hand side of the illustration and the equipment is still serviceable for many hundreds more castings.

Filed-up Metal Patterns

In the foundry industry, there is a demand for many kinds of castings requiring little or no accuracy whatsoever, but where considerable numbers have to be produced at the lowest possible price. In such cases none of the aforementioned pattern equipment may be suitable, and a metal pattern which is reasonably mouldable is all that is required, no fine dimensional tolerances being involved. In such instances, a double-shrink master from which a good clean pattern casting is made, and then filed, ground and generally finished smooth, will answer; iron or aluminium being the general favourites for this kind of work. It has also been found, in addition to this particular application, that, on certain classes of machine parts and castings, these filed or cleaned-up patterns can produce accurate and good results, especially when employed for loose pattern, odd-side or floor-moulded work. One useful feature of this system is that, taking for example an iron casting to be made off a cast-iron pattern for a long lever of irregular shape, the manufacture of a simple double-contraction wooden master pattern will provide the means whereby *any casting distortion will be discovered on producing the subsequent pattern casting,* which fault can be compensated and allowed for, before proceeding with the finishing of the iron master casting into a working metal pattern.

Pressure-cast Metal Patterns

Aluminium is the metal at present exclusively employed for making pattern castings in gypsum plaster moulds ; sharp detail is obtained when the whole technique is thoroughly mastered, and this type of casting requires the very minimum of cleaning up. Whilst this process is quite popular in America, there is no doubt that on single patterns, results equal to a pressure-cast aluminium casting can be obtained by a skilled moulder using appropriate facing sands and the proper technique. The air pressure used is quite low, rarely exceeding 5 lb. per sq. in., which is found sufficient to force the aluminium at very low temperature (near to solidification) through an asbestos baffle and into the mould. In a comprehensive Paper such as this it is not possible to deal fully with a specialised section of patternmaking as making pressure-cast pattern plates, but a brief summary of the Author's investigations on this subject indicates that:—

(1) The system produces good results.

(2) A comprehensive set of specialised equipment is necessary.

(3) The economics of the process are not as favourable in Great Britain as in the United States because of the cost of importing the special gypsum plasters that are essential to success in this field.

(4) Where it is desired to produce only one or two pattern castings, either loose or integral with a plate, a first-class sand casting will answer equally well, thus saving the cost of gypsum moulds from which the raw material cannot be reclaimed, as is the case with other moulding materials.

Part-filed and Part-machined Metal Equipment

Non-ferrous metal patterns made of aluminium, brass or gunmetal can be made to produce very good results by the machining of flat surfaces and turning of simple parts whilst the irregularly-shaped portions are merely cleaned up to match in reasonable accord with the machined surfaces. This method saves considerable cost by avoiding extensive milling, and yet frequently produces a pattern comparable with a fully-machined job. The process is found particularly suitable to aluminium and brass patterns and in certain cases to those of gunmetal. However, as the last-mentioned alloy is considerably tougher than the first two, it follows that an extensive amount

of hand blending, filing and grinding to match in with machined surfaces, might easily involve as great a cost as that of milling or fully machining.

Fully-machined Metal Equipment

For line production, permanent use, or quantity production of castings, first-class iron pattern equipment machined all over has much to recommend it. Undoubtedly this is the costliest of all pattern equipment, as it involves methods equal to the production of any high-class engineers' tool and consideration must be paid to the numerous skilled hands through which the equipment has to pass before it is finally ready for the moulding machines.

Where cast iron is ruled out by considerations of weight and handling capacity, both in machine operation and in changing over during moulding time, aluminium for very large patterns is a good substitute, and brass and gunmetal again present advantages in respect of the facility with which repairs may be made and the clean manner in which such patterns leave the mould. Brass and gunmetal being relatively free from corrosion are considered better than cast-iron and aluminium patterns where a lengthy spell in storage is contemplated between moulding batches.

Machinery Employed for Metal Patterns

The manufacture of a metal pattern to close limits of dimensional accuracy does not necessarily involve the employment of every machine tool known to the modern tool room, although in fact this does very frequently hold good. Very satisfactory results indeed have been obtained by the skilful use of a first-class lathe, a good universal milling machine, plus the employment of intelligent, highly-skilled operatives. The gear case patterns shown in Fig. 8 were produced by the use of only the two last mentioned machines, and were a first-class job of which any tool room might be proud.

Forming Cutters and Milling Cutters

Standard end-mills as used in machine shops are employed for metal pattern milling and, in addition, many special shapes are machined by the employment of home-made cutters such as " dee-bits," and flat steel mounted on a suitable arbor. When used without a facing of extra-hard material such as tungsten carbide, the flat steel cutters are best suited to the soft metals and wood. It is quite common practice to machine cast-iron patterns to all manner of shapes and close accuracy on high-speed milling machines by the use of tungsten-carbide-tipped tools.

Much good work can be accomplished by the use of quite simple equipment such as good drilling, planing, and shaping machines, not forgetting that most useful " maid-of-all-work " the " flexible-shaft " which, in conjunction with a comprehensive set of rotary files and grinding wheels, can be made to turn out the most desirable of pattern equipment.

Reproducing Patterns

For close-limit multiple patterns a very high degree of accuracy is essential to ensure that a casting off any one of the multiple patterns will interchange in all the jigs and tools involved in the subsequent machining of the finished casting, and to achieve these results the skill of the patternmaker is taxed to the utmost.

Automatic copying machines are now employed for this class of work, a brief summary of the plant available being as follows:—(1) Fully-automatic machines, electrically operated, which produce work with a series of visible lines requiring a fair degree of hand finishing; (2) hydraulically actuated copying machinery, this entails hand progression of the work through the area to be traced, and the rate of progression being a variable, it may be reduced to a degree giving almost finished results; (3) pantographic copying, the machine for this being manually controlled and dependent very largely on the skill of the operator, is not comparable with either of the first two automatic machines and is mainly suited to small work of a very fine character; (4) direct copying machines of a semi-automatic mechanical type, which have been the subject of a previous Paper* by the Author.

* " Patternmaking—A New Machine for Cutting Irregular Shapes." FOUNDRY TRADE JOURNAL, March 27, 1947. Vol. 81, p. 239 to 244.

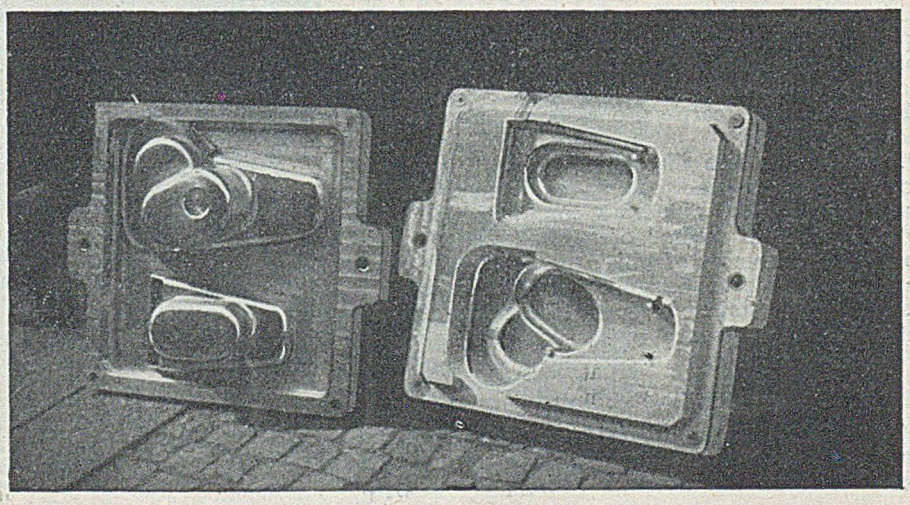


FIG. 8.—*Fully-Machined Gear-case Pattern Equipment, Produced by Lathe and Universal Milling Machine only.*

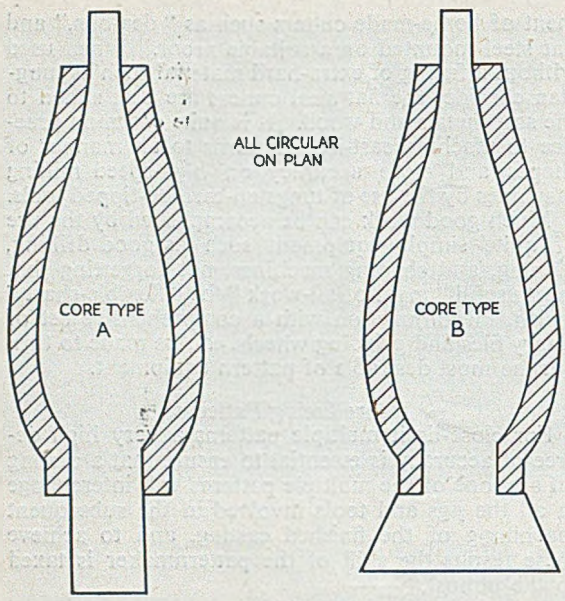


FIG. 9.—*Modifications of Core-print Design. Core, Type A, requires a Drying Shell, whereas Type B stands on its Enlarged Base for Drying.*

No mention is necessary of the everyday woodworking machinery, since it is taken for granted that all interested will be quite familiar with such equipment. It might be as well to indicate at this juncture, that where it is economical to so do there is no reason why the copying and reproducing machinery just referred to should not be employed on wooden patterns despite their primary application to the machining of metals.

Proving of Moulding Methods

Before embarking on the expenditure of first-class metal pattern equipment, one cannot emphasise too strongly the necessity for proving the complete soundness, not only of the method of moulding the pattern, but also that of making the cores. To this end it is recommended that wooden prototypes be made on lines similar to those proposed for the metal equipment. Particularly should attention be paid to core-making and to the study of coreprint systems; the latter can frequently be arranged to eliminate the use of core carriers, one such example being shown in Fig. 9.

Reference to the illustration (Fig. 10) of the wooden cylinder-head pattern equipment is also made to show the numerous coreboxes upon the construction and method of core extraction, positioning and assembly of which the final metal coreboxes are basically designed. Runner and riser systems are also tested in the moulding of prototype patterns so that proved results may be embodied in the permanent pattern equipment.

Plastic Patterns

One of the latest additions to the range of varied materials from which patterns are made is the acid accelerated resin of the thermo-setting phenolic type. This material is, of course, a synthetic resin and comes to the patternshop in the form of a syrup to which is added an accelerator half an hour before pouring into the mould. The material used for the pattern mould is ordinary fine or super-fine plaster, no special mixes being necessary. Wooden or metal patterns are employed for making the plaster mould, and a multiple pattern plate may be produced by re-moulding a single master pattern to make the number of plaster casts and plastic patterns required on the plate. On very simple shapes it has been found possible to cast more than one plastic pattern in one plaster mould although generally it is found best to make only one casting per mould.

Method of using resin

Having allowed the plaster-cast moulds to dry thoroughly, preferably in an oven similar to a core oven, a thin coating of parting lacquer of a heat-resisting type is applied to the working surfaces and allowed thoroughly to *air dry*. The mould is then assembled, after which to permit the resin to flow freely it is slightly warmed before pouring takes place. Care should be taken to pour in the resin mixture slowly and avoid making air bubbles which are difficult to eliminate afterwards. The casting completed, the resin-filled mould is

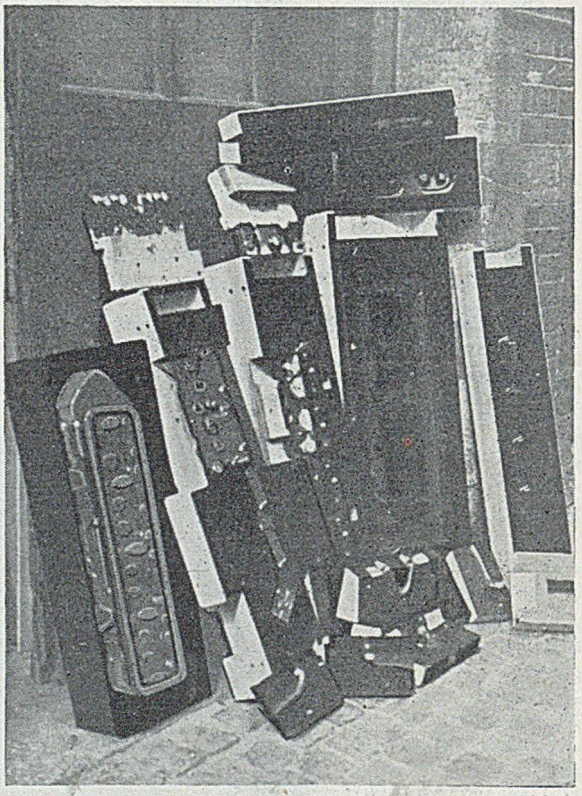


FIG. 10.—*Wooden Pattern Equipment for a Motor-car Cylinder Head. This was used to produce Prototype Castings and provide Data upon which to Design Metal Production Patterns and Core-boxes.*

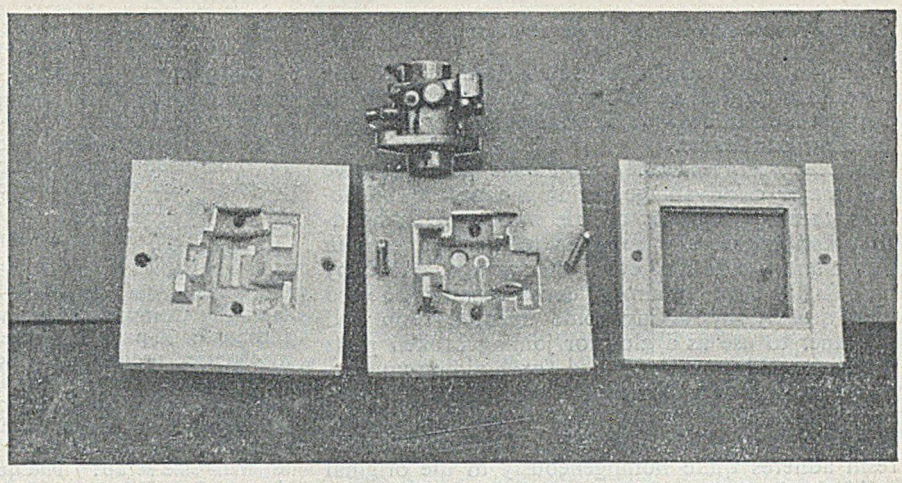


FIG. 11.—*(top) Single Master Pattern for a Carburettor Body which was used to produce Half-moulds (one Pair shown below) and, subsequently, Eight Plastic Production Patterns.*

placed in an oven, the temperature being raised slowly to approximately 50 deg. C. and held for approximately four hours. This curing process will vary according to the amount of resin in any one mould, a general rule being that the greater the volume of resin the slower the rate at which its temperature should be raised. The larger jobs will thus take a longer curing time at a lower temperature.

Whilst plaster has been mentioned for moulds for the pouring of phenolic casting resins, any material reasonably unaffected by the moderate heat involved may be employed, particularly wood and non-ferrous metals, the latter of a copper-base type. Aluminium shows a sweating reaction, and is therefore not suitable. As moisture in a mould will inhibit or retard the hard setting of the resin, precautions should be taken against the introduction of water either by condensation or from other causes.

Multiple Plastic Plate from Single Pattern

In Fig. 11 a single loose pattern of a carburettor body is shown standing on the top of the two plaster half moulds with the frame for plate thickness seen on the right. Eight such plaster casts were made off this single pattern to produce the eight plastic patterns, which were in turn let into an aluminium surround, so forming the complete double-sided match-plate shown in Fig. 12 where to the left of the picture is shown a complete gated set of eight castings made off the finished plastic pattern plate. Up to the time of writing, one thousand castings have been made off this plastic equipment, which is still as good as new. It is employed on a very old and simple type of hand-ram, turn-over machine.

Properties of Thermo-setting Phenolic Resins

The following table will enable a comparison of relative properties to be made between plastic patterns and other materials.

	lb. per sq. in.
Compression	12,000
Transverse	3,024
Shear	4,701
Tensile	3,020
Modulus of elasticity	286,900
Specific gravity	1.382
Rockwell hardness, E. scale ..	18

Moulding Qualities

In the first place a finish of highest quality can be obtained on plastic patterns, in addition to which they are completely moisture resistant, free from

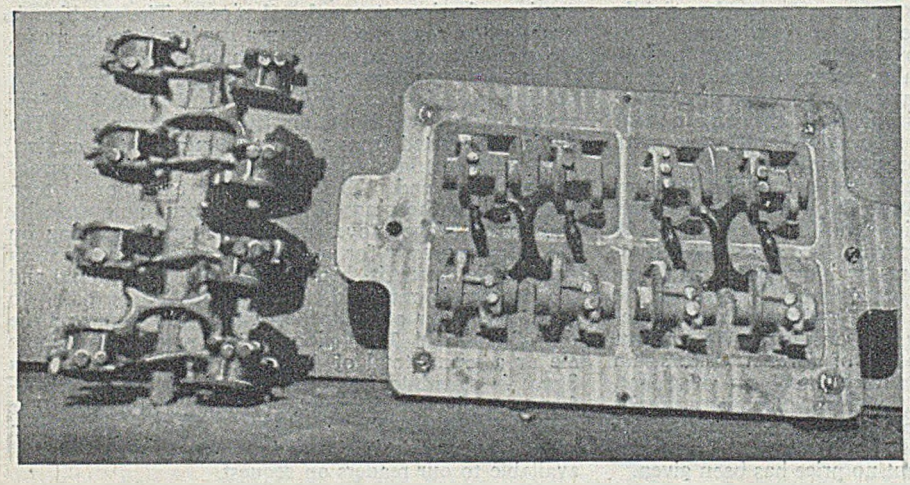


FIG. 12. — *Double-sided Match-plate for Carburettor bodies, using the Individual Plastic Patterns produced as in Fig. 11. On the* L.H.S. *is shown a spray of Castings produced from the Match-plate.*

excessive warp, and are well suited to all the conditions prevailing in moulding sands, enabling a smooth, clean draw to be obtained under the most exacting conditions.

Repairs, Alterations, etc.—Plastic patterns have one major disadvantage, being inclined to brittleness, thereby requiring a little more care in handling than is generally common to most patterns in the foundry. In the event of damage, either by chipping, fracture or similar cause, repair is effected very quickly by taking some uncured resin and hardener to use as a glue for joining broken parts together. Where so required for building-up purposes, such as at a damaged corner, the liquid resin may be contained in the place by an enclosure of Plasticine or similar material. The newly-added resin adheres quite homogeneously to the original solid plastic pattern, the only requirement being the addition of rather more than the standard percentage of hardener as compared with that used for the initial cast.

Undoubtedly there still remains much exploratory work to be accomplished in connection with plastic patterns, yet equally certain is the fact that a place in the patternmaker's and moulder's activities has already been established for this newcomer, which may prove to be of widespread value.

Acknowledgments are accorded to George Newnes, Limited, for the use of the illustrations of the 10-ft. dia. sheave wheel, taken during the manufacture of the pattern at the works of the Author.

Factory Visitors

The Author of "A Guide to the Proper Treatment of Factory Visitors," issued by the Training Department T.I. (Group Services), Limited, Broadwell Road, Oldbury. Birmingham, has produced a serious, yet amusing, handbook, which merits close study by every foundry throughout the industry. We hope the days are past when a visitor, on arriving at a factory, tapped at a window, which was then banged up by a small boy, who made the abrupt query "Who's tha represent?" The retort discourteous called for—"These B——s!"—simultaneous with the throwing down of one's card. This has been a personal experience. The Author rightly attaches much importance to the reduction to the minimum of the time from when the visitor arrives, to when the interview actually begins. We are convinced that in many cases the delay is due to the desire of the visited to impress the visitor with the notion that the former is a very busy man, whilst truly it is more an exhibition of an inferiority complex.

The guide is quite logically set out. The types of visitors are classified; in Appendix 4 a detailed layout is given for a group visit, and the reception of 20 visitors divided into four groups. The other appendices cover reception arrangements, waiting rooms, and how to find the factory. One other feature stressed is the memorising of the visitor's name and the constant repetition of the name during conversation. We endorse this necessity. The reception of foreign visitors—an important feature—is given very intelligent treatment. The reviewer learns from a covering letter that a special edition of this booklet is to be published by the British Association for Commercial and Industrial Education, Hill Street, London, W.1; but no price has been given.

New Catalogues

Boat-builders' Castings. Victor Moyle & Company, 38, Park Road, Hampton Wick, Kingston-upon-Thames have issued a four-page leaflet for the yachting fraternity. It deals with such nautical components as "cast-iron keels without centre-board slots or blisters" and various shapes of internal ballast irons. The leaflet has rather an "austerity" appearance, a matter which could easily be remedied by a better type selection.

Foundry Mechanization. The Allis-Chalmers Manufacturing Company of Milwaukee have sent us a well-illustrated 20-page brochure covering several phases of mechanised production. Included are a line of knock-outs, both fixed and portable, the hydraulic cleaning of castings and sand conditioning. The reviewer was interested to see illustrated and described a jaw crusher, conveyor fed, for breaking down defective crankcases to small size scrap! The quantity production of defective castings does not sound too good, but it can be assumed that even a small percentage at a really large works does create a scrap handling problem. Towards the end there is an interesting section dealing with cupola blowing using constant air weight control. The brochure is available to our readers on writing to Milwaukee.

Laboratory Equipment. For the British Instrument Industries Exhibition, Griffin & Tatlock, Limited, of Kemble Street, Kingsway, London, W.C.2, and elsewhere, have produced a souvenir catalogue which gives the history of the firm. This dates back to 1826. The reviewer was interested to learn that the publishing house of Charles Griffin & Company originates from the same family. The history of the company is an outstanding example of an individual enterprise which was started as a publishing house and took over the manufacture and sales of scientific instruments as a side line. Included in the booklet is a catalogue of the apparatus being shown. The early association with publishing has never been forgotten and the trade literature they issue has invariably borne the stamp of quality backed by experience. This booklet is available to our readers on writing to Kemble Street.

Centrifugal Casting Machines. A four-page leaflet just issued by Richardson Engineering (Birmingham), Limited, Singleton Works, 329-333, Icknield Port Road, Birmingham 16, deals with the Rothfischer centrifugal casting machine specially designed for the quantity production of rain-water and soil pipes. The machine is push-button controlled. When a casting is to be made, the main carriage, carrying the mould and driving motor is moved to the upper end of a sloping rail track. A holding ladle is then tilted allowing the metal to flow along the pouring spout into the rotating mould. The die is constructed from a chrome tungsten steel casting. Whilst the mould is being poured, the carriage recedes to the lower end. The mechanical extractor is then inserted into the pipe. The cover opens automatically and the carriage moves away leaving the casting on the extractor ready for any further processing. A fresh core for the faucet is then inserted, the cover closed and the process is restarted. The production is stated to be of the order of 40 to 60 castings per hour and the life of a mould 3,000 pipes before reconditioning the die or a grand total of 13,000 to 17,000 pieces. This figure is stated to have been obtained by the manufacturers who are themselves producers of pipes. The leaflet details the sizes available. From a production point of view this is a very important leaflet and it is available to our readers on request.

Mechanical Aids

Special Facilities in the Repton Street Foundry of S. Russell & Sons Limited.

Introduction

The Repton Street Foundry of S. Russell & Sons, Limited, comprises a moulding and core making bay approximately 186 ft. long by 50 ft. span served by two 12-tons capacity electric overhead travelling cranes. At one end of the bay there is a fettling shop equipped with a room-type shot-blast, and at the opposite end there is a bank of five mould- and core-drying stoves. Metal is provided by a 3 to 4 tons per hour capacity cupola furnace, which is located centrally on one side of the moulding shop. The layout is illustrated in Fig. 1, from which it will be seen that this foundry adjoins the Bonchurch Street Foundry of the Company, where complete mechanisation has recently been undertaken.

This foundry was built in 1936, primarily to produce machine tool castings with the aid of a Sandslinger to make the best possible use of the skilled labour available. The range of castings made is from a few cwt. up to two tons. The portable, bogie-type slinger was originally installed on the north side of the shop, and the sand was fed to it by hand. In recent years, S. Russell & Sons, Limited, in conjunction with their consulting engineers, John Gardom & Company, Ripley, near Derby, have introduced improvements to the layout of this foundry in order—(1) to provide mechanical feed of mixed sand to the Sandslinger, and (2) to reduce the number of overhead crane lifts by installing conveyors, a roll-over device and a pattern-drawing station to deal with the small types of work.

Sand-preparation Plant

Sand is fed to the preparation plant from the knock-out area at the fettling shop end of the foundry. Due to the variety of the work and other considerations, no knock-out grid has been installed.

The sand is shovelled into a hopper over an inclined belt conveyor (with magnetic separator for the removal of tramp iron) which discharges into a skip hoist for feeding the No. 2 Simpson mixer. The mixer discharges into a second skip hoist which loads the main storage bunker. Discharge from the bunker is by rotary table into a belt bucket elevator which delivers the sand on to the main distribution belt conveyor. The general arrangement of the plant is shown in Figs. 2 and 3. Other mixers are installed for the preparation of facing sand and core sand, and provision is made for the supply of old sand by means of a plough on the distribution conveyor.

The two most interesting features of the plant are:—(1) The feed from the distribution belt conveyor to the shaker of the Sandslinger, and (2) the electrical control of the whole plant from the Sandslinger head.

Sand Feed to Sandslinger

The design of the sand feed to the Sandslinger is shown in Fig. 4. It is well known that in order to obtain uniform ramming with the Sandslinger a constant feed of sand must be ensured, and in order to make full use of the moulding area covered by the Sandslinger, this continuous sand feed must be available at all points on the Sandslinger track. In the Repton Street installation, the Sandslinger (portable type on power-driven bogie) was originally equipped with chain bucket elevator for manual feed. After the installation of the sand preparation plant, however, this feed was removed,

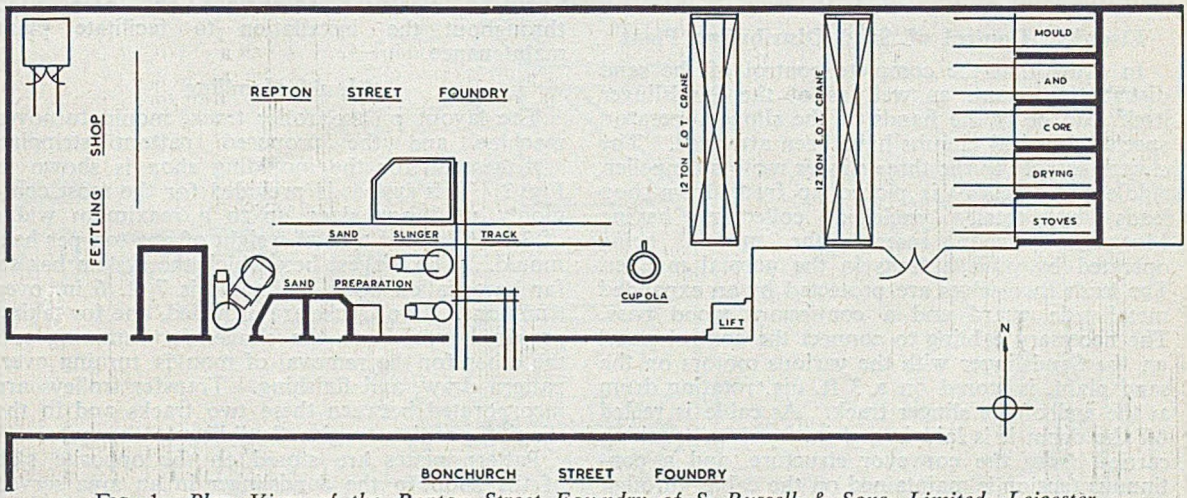


FIG. 1.—*Plan View of the Repton Street Foundry of S. Russell & Sons, Limited, Leicester.*

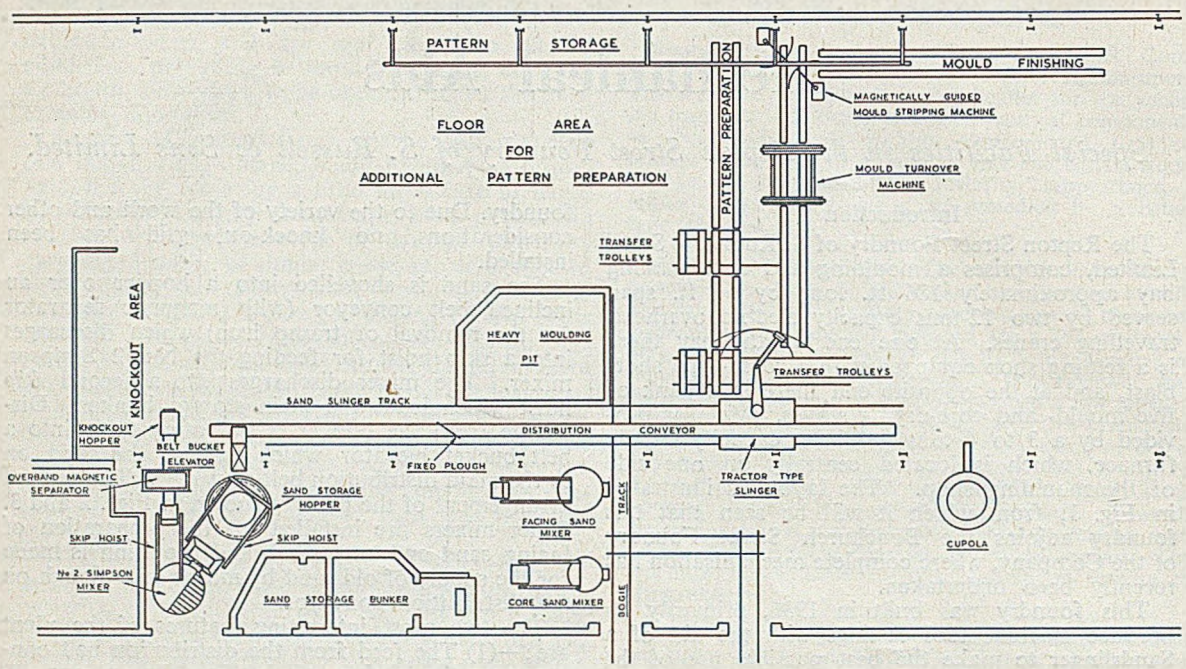


FIG. 2.—*Plan of the Sand-preparation and Distribution Plant and the Mould-handling Conveyor System at Russell's Repton Street Foundry.*

and substituted by a chute and plough built on to the Sandslinger structure. The supporting structure of the distribution belt conveyor was specially designed to ensure clearance of the machine in travel, and so that the chute into which the sand is ploughed would engage with a skirt plate along one side of the belt conveyor structure. In order to avoid the spillage of sand, the chute is provided with rubber seals on either side. The plough has been specially designed, and is raised or lowered by lever from ground level. It will be noted from Fig. 4 that the belt is supported throughout its length on a continuous skid plate instead of the usual idlers, the total length of belt being 75 ft. centres.

Electrical Control of Sand Distribution Plant

In order that the complete control of the sand distribution plant, as well as of the Sandslinger itself, can be in the hands of the slinger operator, special electrical circuits have been arranged. The electric supply to the three slinger motors (impeller, riddle and traction) is picked up from down-shop leads by totally enclosed collectors having Morganite carbon inserts, the motors being operated by push buttons in the normal manner. The leads themselves are protected by an expanded metal side guard and a continuous wood base. The necessary cabling to connect the control panel on the Sandslinger with the various motors on the sand plant, is stored on a 3 ft. dia. rotating drum at the end of the slinger track. As cable is reeled off the drum it is laid in a 4 in. by 4 in. trunking carried from the conveyor structure, and a continuous tension is maintained on the cable through a system of balance weights. Power pick-up for the drum is arranged through the drum shaft with nine slip rings with standard motor brushes.

The electrical control system provides for sequence starting of the Sandslinger head, the shaker, the distribution belt conveyor, the elevator and the rotary table of the sand storage hopper. The stopping sequence is in the reverse order, and a timing relay is incorporated to ensure that the belt bucket elevator in the sand plant is fully emptied to prevent overload on restarting. An automatic cut-out of the slinger travelling motion is incorporated in the controls, to prevent the Sandslinger plough coming into collision with the facing sand plough, if this should happen to be in operation when the slinger moves into that position. Standard electrical equipment has been used throughout the installation to facilitate plant maintenance.

Mould Handling

The layout of the roller track, mould turnover machine and the proposed pattern stripping arrangement for the moulding shop is shown in Fig. 2. This system is provided for the most commonly used box sizes up to a maximum width of 3 ft. 6 in. and a total weight of one ton per half mould. The longest box which the system has so far been called upon to handle is 7 ft. 6 in. over trunnions. Two tracks are provided, one for taking prepared moulds to the slinger for ramming and the other for the removal of moulds, turning over, pattern draw, and finishing. Transfer trolleys are incorporated between these two tracks and in the slinging position to give flexibility to the system.

Pattern plates are stored on the opposite side of the shop to the Sandslinger in an area served by a one-ton capacity chain block mounted on a

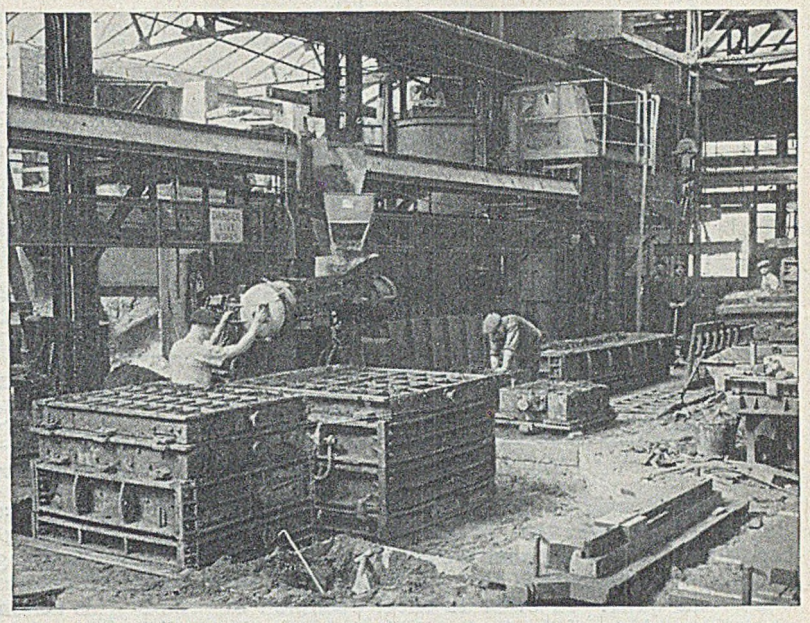


FIG. 3.—*Sand-feed Arrangement to the Sandslinger for Moulding and (in the background) the Sand-preparation Plant.*

monorail. Patterns are placed on the roller track, the moulding boxes are placed on and facing sand applied as required. The prepared mould is then mover under the Sandslinger for ramming, after which it is transferred to the return track which incorporates the mould-turnover machine. After turning over, the mould is moved on to the pattern stripping position. A further length of roller track is provided for mould finishing prior to transfer to drying stoves by overhead travelling crane.

Mould Turnover Machine

The mould turnover machine is illustrated by Fig. 5 and has been developed and built by S. Russell & Sons, Limited, in conjunction with John Gardom & Company. The machine structure comprises two 7 ft. 3 in. diameter fabricated steel tyres, connected by tie bars, and supporting two clamping jaws constructed of roller track sections. These sections are actuated by compressed air cylinders, and in the loading and discharge positions, line-up with the roller track of the mould handling system. The tyres of the machine are supported on floor-mounted rollers, the lower part being below floor level, and two fixed stops on opposite sides of the circumference of the tyres engage floor stops to check the machine in the loading and turned over positions.

Previously-developed mould turnover machines of this type have, so far as is known to the present designers, been required only to handle a uniform size of box. In the present case, however, the wide range of work to be accommodated has necessitated what are thought to be novel features of design, particularly in the control of the air cylinders.

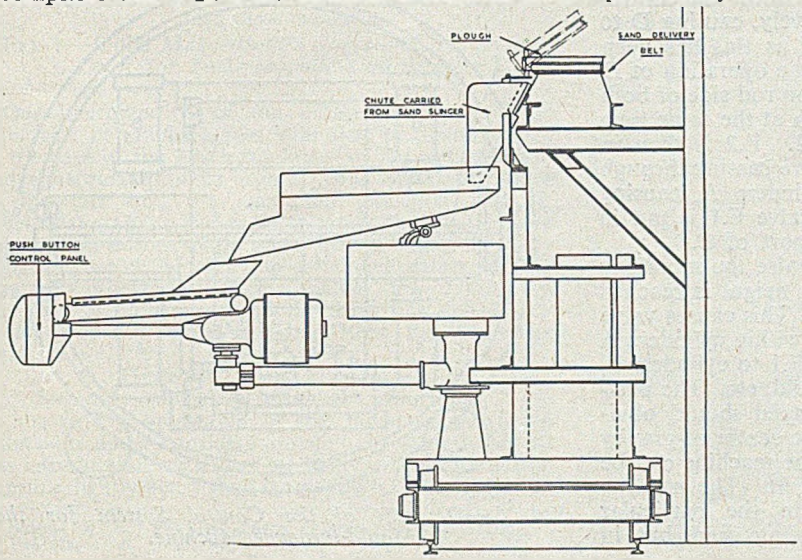


FIG. 4.—*Arrangement adopted for the Sand Feed to the Sandslinger. The Sand-delivery Belt runs on a Continuous Skid Plate instead of Idlers.*

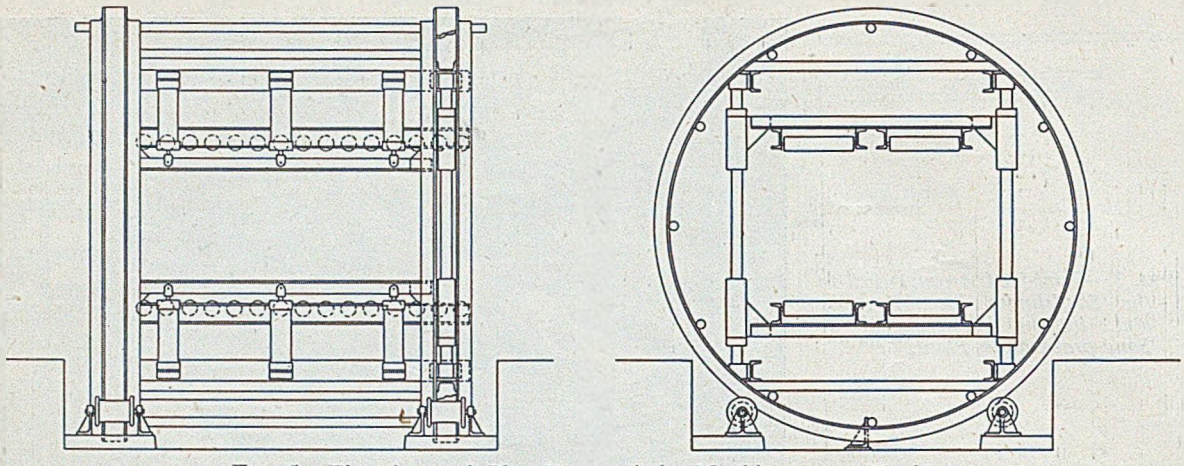


FIG. 5.—*Elevation and Plan Views of the Mould-turnover Machine.*

The circuit used is shown in Fig. 6, and from this it will be seen that push-button control has been achieved by using remote control valves, which operate when pressure is released from either one end or the other. In order to effect operation of these from either of the two control positions, air-operated pressure release valves are used as shown at F.1, F.2, F.3, and H. These are, in turn, operated by push-button valves G.2 to G.5 inclusive. The two valves G.1 and G.6 are in direct communication with valve D for the purpose of pressure release. Valves E.1 and E.2 are three-way air-operated valves used in conjunction with valve C to enable the circuit to be left in the appropriate condition after each cycle of operations, so that the following cycle (which is in the reverse sequence) will be correctly performed.

The full operating cycle after the machine has been loaded is as follows (assume cylinders A are the lower ones and that valves G.4, G.5, and G.6 are those available to the operator:—

The operator momentarily depresses G.4 which passes air to F.3 and F.1 operating these valves. These then release air pressure from the control ports of valves D and C respectively, causing D to change over but not affecting C as this has been left in readiness for this cycle. The operation of D allows the air pressure on the piston rod side of both sets of cylinders to exhaust, which at the same time changes over valves E.1 and E.2. E.2 is then in communication with the air pressure passing through C and allows it through to cylinders A, causing them to stroke upwards, while valve E.1 is put in communication with the sealed port of C.

The lower cylinders will now raise the moulding box, etc., and when the required height is reached the operator depresses valve G.5. This causes valve C to change over, sealing the air within cylinders A and supplying air through valve E.1 to cylinders B, which descend and clamp the mould, etc. The position at which the mould is clamped should obviously be as near as possible to the centre of gravity so that the manual turnover of the machine can be effected with the minimum of effort. The position may naturally vary according to the particular mould and pattern equipment being used, but in practice no difficulty has been experienced in assessing the clamping position or in turning over.

After clamping, the machine is inverted, and the operator depresses valve G.1 to release the moulding box. This action changes over valve D which supplies air to the piston rod ends of both sets of cylinders and to valves E.1 and E.2 and operates them and exhausts the air in the other side of both sets of cylinders. The circuit is now ready for the next cycle with valve C in the correct position. After discharging the mould, the machine may be re-loaded and the cycle repeated in reverse by the use of valves G.2, G.3 and G.6.

Mould Finishing

After the removal of the pattern, the moulds are finished as required prior to transference to the mould stoves. When dried, they are removed to the casting area by crane, and cored up and closed.

It will be noted that the mechanised mould-handling system occupies only a portion of the

(*Continued on page* 70.)

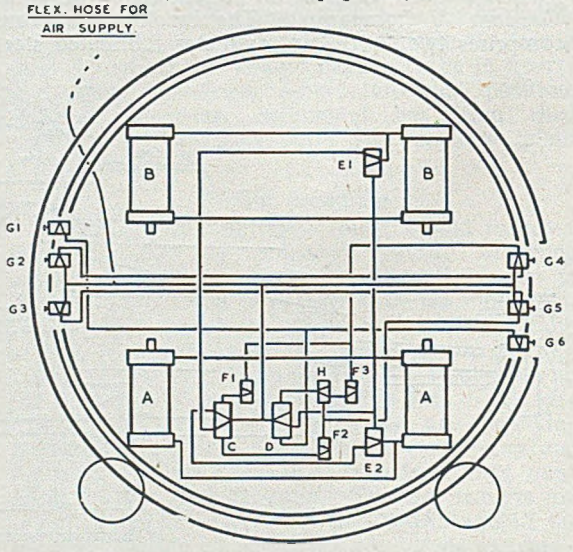


FIG. 6.—*Diagram of the Control System for the Mould-turnover Machine.*

Correspondence

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

MAGNETIC PROPERTIES OF SPHEROIDAL-GRAPHITE IRON

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—In a recent issue[1] Dr. Stauss has analysed the figures for magnetic properties of spheroidal graphite iron quoted by Everest[2] to the Buxton Conference of the Institute of British Foundrymen in 1950. In Dr. Everest's Paper it was not possible to discuss these figures in detail and he has therefore asked us to supplement the interesting commentary which Dr. Stauss has given on the magnetic determinations, which were made in this laboratory.

We reproduce in Figs. 1 to 3 the lower parts of the initial magnetisation curves and the hysteresis loops on which Table I of Everest's paper was based.

It is seen that the curves deduced by Stauss are in reasonable agreement with the original curves, but it is noticeable that the initial magnetisation curve obtained by experiment is much less symmetrically situated in the hysteresis loop than it is in the case of the reconstructed curves.

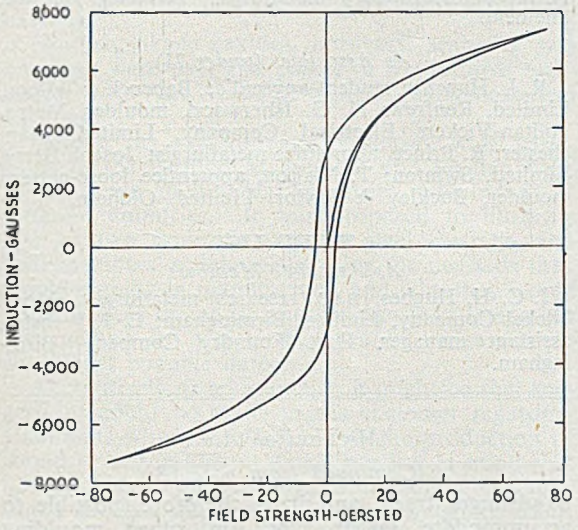


FIG. 1.—*Initial Magnetisation Curve and Hysteresis Loop for Flake-graphite Cast Iron.*

Our interpretation of the differences between the three sets of graphs agrees with that of Stauss except in the case of the hysteresis losses of the as-cast flake- and spheroidal-graphite irons. This, Stauss attributes to the fact that the maximum induction for the spheroidal-graphite iron is much larger than that for the flake-graphite irons at the same field strength, an interpretation which ignores the tabulated values of the Steinmetz coefficient. These values are 0.0056 for the flake-graphite iron and 0.008 for the spheroidal-graphite cast iron. We admit that the Steinmetz equation—

$$\text{Hysteresis loss in ergs/cc} = (\text{Steinmetz coefficient (maximum induction)}),^{1.6}$$

is not strictly applicable in the range of maximum inductions under consideration, but the error which its use introduces is such that the spheroidal-graphite iron appears slightly better than it actually is. The hysteresis

[1] Stauss, H. E. FOUNDRY TRADE JOURNAL, **90**, 553 (1951).
[2] Everest, A. B. *Ibid.* **89**, 57 (1950).

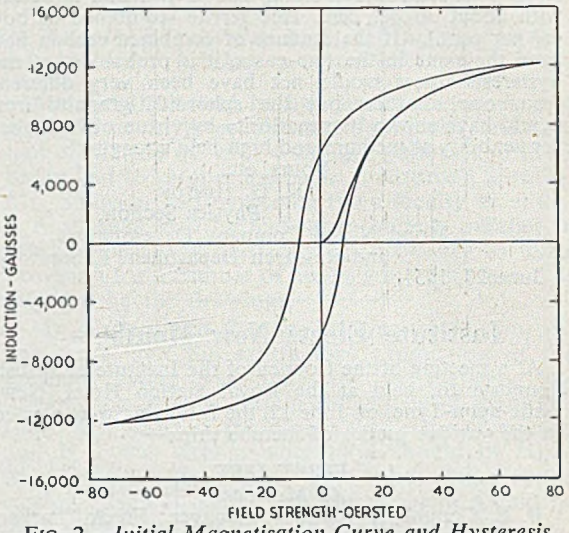


FIG. 2.—*Initial Magnetisation Curve and Hysteresis Loop for Spheroidal-graphite Cast Iron (as cast).*

loss of the spheroidal-graphite iron for a maximum induction of 13,000 gauses is 75 per cent. greater than that of the flake-graphite iron.

The difficulty experienced by Stauss in fully interpreting the results arises because it was not made clear in the earlier paper that the samples tested had the same chemical composition, apart from the nickel and magnesium contents, rather than the same matrix structure. The composition of the flake-graphite iron, which had been inoculated with ferro-silicon, was 3.3 per cent. carbon, 2.4 per cent. silicon, 0.49 per cent. manganese, 0.08 per cent. nickel, which gave a structure in which there was approximately 40 per cent. pearlite and 60 per cent. free ferrite (combined carbon 0.35 per cent.), whereas the as-cast spheroidal-graphite cast iron, which contained 0.71 per cent. nickel and

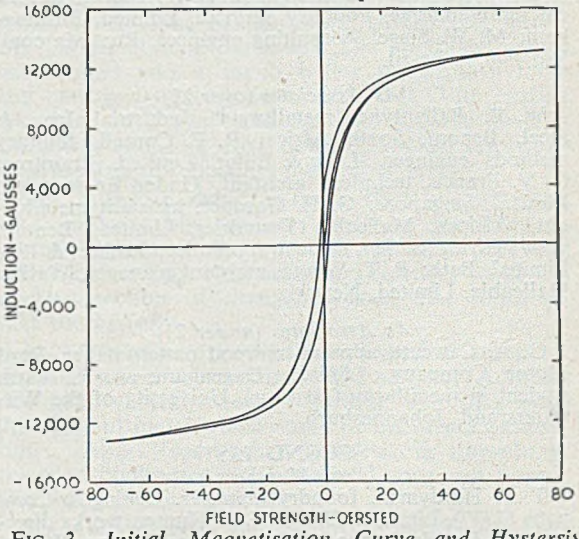


FIG. 3.—*Initial Magnetisation Curve and Hystersis Loop for Spheroidal-graphite Cast Iron (after ferritising treatment).*

Magnetic Properties of Spheroidal-graphite Iron

0.078 per cent. magnesium, had a pearlitic structure with about 20 per cent. free ferrite (combined carbon 0.7 per cent.). If the amount of combined carbon had been the same in the two cases, it is probable that the hysteresis losses would not have been very different from one another, but the spheroidal-graphite iron would have shown its superiority by virtue of its higher permeability at medium and high field strengths.

Yours, etc.,

K. G. HINTON,
Physics Section,
Mond Nickel Company Development and Research Department Laboratory.

June 27, 1951.

Institute Elects New Members

At a meeting of the Council of the Institute of British Foundrymen, held at the Royal Station Hotel, Newcastle-upon-Tyne, on June 12, the following were elected to the various grades of membership:—

FIRST LIST

As Members

B. E. Commons, foundry manager, Fredk. Parker, Limited, Leicester; E. F. Dowson, technical representative, E. F. Dowson, Leeds; R. G. Kent, foundry foreman, Enterprise Aluminium Foundry, London; D. C. G. Lees, M.A., metallurgist, Aluminium Development Association; J. H. Penfold, manager, furnace department, Morgan Crucible Company, Limited; H. A. Stephens, B.SC., senior research officer, C.S.I.R.O., Melbourne, Victoria, Australia.

As Associate Members

I. R. Duncan, assistant metallurgist, East Rand Engineering Company, Limited, Germiston, Transvaal, South Africa, W. Glover, wood and metal patternmaker, Standard Motor Company, Limited, Coventry; D. M. Mullett, assistant works manager, Westwood & Wrights, Limited, Brierley Hill, Staffs; M. E. Nichols, assistant foreman patternmaker, Stothert & Pitt, Limited, Bath; F. C. Perks, foreman patternmaker, Parkinson Stove Company, Limited, Birmingham; *M. Reading, technical representative, Foundry Services, Limited, Birmingham; M. W. Siegel, consulting engineer, Rua Marconi, Sao Paulo, Brazil.

As Associates (over 21)

W. B. Ballantyne, metallurgist, Industrial Iron & Steel, Benoni, South Africa; R. F. Cornell, foundry methods engineer, Lake & Elliot, Limited, Braintree; G. V. Francis, technical assistant, United Engineering, Limited, Singapore; G. H. Gardner, assistant metallurgist, African Malleable Foundries, Limited, Benoni, South Africa; S. Sen, student apprentice, Stothert & Pitt, Limited, Bath; P. T. Wragg, assistant manager, Walker Malleable, Limited, Newark.

As Associates (under 21)

G. A. Cawcutt, apprentice wood patternmaker, Ford Motor Company, Limited, Dagenham; A. R. Ward, student in metallurgy (1st year), University of the Witwatersrand, Johannesburg.

SECOND LIST

As Members

T. F. Hardyman, foundry manager, Dening & Company (1937), Limited, Chard; H. E. Hunter, works director and foundry manager, Barton Hall Engine Works, Patricroft; *Wm. Kay, foundry superintendent, Davey Paxman & Company, Limited, Colchester; M. R. Village, partner (managing), Alloy Steel & Iron Company, Sheffield.

As Associate Members

J. Brigg, assistant metallurgist, G. A. Harvey & Company (London), Limited, London; J. Ludlam, foundry foreman, Platt Bros., Limited, Oldham; H. J. Rehmani, works manager, Crescent Iron & Steel Corporation, Limited, India; J. T. Smith, works technical and development superintendent, Smith & Wellstood, Limited, Bonnybridge; R. N. Village, ironfounder (partner), Alloy Steel & Iron Company, Chesterfield.

As Associates (over 21)

J. Burgess, patternmaker, L. Gardner & Sons, Limited, Flixton, Lancs; W. R. Kerr, patternmaker, Kerr Pattern Company, Limited, Lincoln; F. W. Medlock, patternmaker, Kerr Pattern Company, Limited; B. A. Morrison, moulder, G. & J. Weir, Limited, Glasgow; Wm. Pollock, metallurgical laboratory assistant, G. & M. Hay & Company, Limited, Glasgow; S. H. Redford, patternmaker, Kerr Pattern Company, Limited; K. K. Sarna, trainee, Vulcan Foundry, Limited, Newton-le-Willows; A. Timmins, foundry metallurgist, Darwins, Limited, Sheffield.

As Associates (under 21)

R. L. Hancher, student apprentice, Babcock & Wilcox, Limited, Renfrew; N. G. Isherwood, moulder, Metropolitan-Vickers Electrical Company, Limited, Manchester; R. Prince, apprentice metallurgist, Joseph Berry, Limited, Swinton; T. Walton, apprentice loose-pattern moulder, Buckley & Taylor, Limited, Oldham.

THIRD LIST

As Associate Members

I. C. H. Hughes, B.SC., research metallurgist, Mond Nickel Company, Limited, Birmingham; E. J. Webster, assistant manager, Hart Foundry Company, Birmingham.

* Transferred from another grade of membership.

Mechanical Aids

(*Continued from page* 68.)

Sandslinger track, and it is, therefore, possible to accommodate larger work in other moulding positions.

Acknowledgments

S. Russell & Sons, Limited, acknowledge the assistance which they have received from Marton Air Equipment, Limited, Richmond, Surrey, for their assistance in designing the circuits on the mould-turnover machine. They also make acknowledgment to Igranic Electric Company, Limited, Sheffield, and T. H. Wathes, Leicester, who were the principal contractors for the electrical gear on the Sandslinger, and sand-preparation and distribution plant.

FIGURES ISSUED by the British Iron and Steel Federation show that pig-iron production in South Wales in May was at a weekly average of 25,210 tons, which compares with 24,300 tons in April and 25,620 tons over the first quarter of the year.

Output of steel ingots and castings averaged 67,090 tons in May, 68,530 tons in April, and 68,000 tons over the first quarter.

Problems in Castings Production

The South African branch of the Institute of British Foundrymen devoted its March meeting to the discussion of castings which had inherent difficulties in their production.

Manganese-Steel Crusher Jaws

Opening the meeting, Mr. S. JANE—branch president—said he was sure the evening would produce a most interesting discussion, because every foundryman had his own ideas as to how a casting should be made. He called on Mr. Goyns to introduce the first problem which concerned the production of two sizes of crusher jaws in manganese steel.

MR. GOYNS said that in everyone's opinion most of the people in the steelfoundry knew all about feeding of manganese steel except, perhaps, the customers. However, customers were notoriously hard to please and made an inordinate amount of fuss about a few miserable hot-tears and a crack or two, and often took up a very awkward attitude on the question of a few unfortunate shrinkage cavities.

Now shrinkage cavities, hot-tears, scabbing and cracking were part and parcel of the hazards associated with the production of manganese-steel castings.

Despite the vast tonnage produced, wide variations in the method of running and feeding were to be found in different foundries, and indeed in different countries. It was proposed to illustrate one or two typical manganese-steel castings, and hear members' opinions regarding the methods they would employ in manufacture, and why they would employ these methods; in other words in laying out the method by which they would endeavour to counteract possible defects.

Alternatively or additionally, it might be that suggestions could be made to the customer regarding alterations which would facilitate the production of sound or serviceable castings, bearing in mind that not all serviceable castings were sound castings. Fig. 1 shows a manganese-steel jaw weighing about 1,700 lb. The outside sizes are 3 ft. 6 in. by 3 ft. There are five internal cores surrounded by metal, except at the ends. The top plate, as shown in the drawing, is ¾ to 1 in. thick. Members were asked what method they would adopt and what possible defects they would endeavour to counteract.

The second example was also a manganese jaw (Fig. 2) 6 ft. 7 in. by 2 ft. and weighing about 1½ tons. Members were again asked how they would make this casting.

MR. SIMPSON said he had made a few of the type of jaws shown and had found that it was necessary to have the ingate following the run of the teeth. A narrow riser was required off the top, and the unit had to be cast on the bank to give a satisfactory result. Producing the casting in this manner, he had never experienced tears across the top. On being asked whether he had found it necessary to camber the back to allow for warpage, MR. SIMPSON said he had never experienced sufficient warpage to dictate even a small amount of cambering on subsequent castings.

MR. BULLOCK said he had seen the crusher jaws being made in three different foundries, and they had all started off with a straight pattern and eventually had to camber the back. It surprised him that Mr. Simpson had overcome the difficulty so easily.

A MEMBER said he had made quite a number of crusher jaws, and had found it necessary to make provision for a camber of about ¼ in. to come out as required by the drawings.

MR. GOYNS said that the pouring of the job was one thing, but the satisfactory production of the finished casting was quite another matter. The design gave rise to certain difficulties in manufacture. He asked if the design was right or wrong, and if it was wrong, what steps should be taken to put it right and still preserve the function of the casting. He considered that the problem should be dealt with from that angle in the first instance.

MR. BULLOCK felt that the design was wrong and that the mining engineers should be approached to change the design. In his opinion it would be far easier to overcome the difficulties in the design offices of the mines than the foundry. The thin plate at the back would set up difficult stresses, though the plate was necessary from every point of view. The design could surely be changed.

MR. GOYNS said a great deal of trouble did not arise in the casting of the jaw which was 6 ft. 7 in. long, but the very thin plate at the back of the other jaw gave rise to trouble owing to the differentials set up in cooling. There was a tendency to crack when the jaw was quenched. At the request of one Reef foundry the design was modified to give balanced sections throughout and reduce the tendency to cracking in quenching, whilst fully retaining its functional purpose. The modified design was sound and a much better proposition from the casting point of view. The 6-ft. 7-in. casting was cast on a bank and run into a large head at the lower end, and after pouring, rocked into position to place the head at the higher level.

MR. JANE remarked that the method just described was similar to Mr. Simpson's method of casting on the bank, presumably to prevent scabbing. He then asked Mr. Goyns what he would consider to be the thickest section of manganese-steel that could be cast successfully.

MR. GOYNS said he had been asked to comment on what was a very controversial subject. Authorities held varying views regarding the maximum thickness of metal which could be quenched successfully. Apart from other variables in quenching, retarded cooling of the hot metal core was bound to affect the final structure.

MR. GODWIN said the foundry was often blamed for what appeared to be hot-tears, but he was sure that in 90 per cent. of cases such casting faults were due to the composition of the metal. He knew of

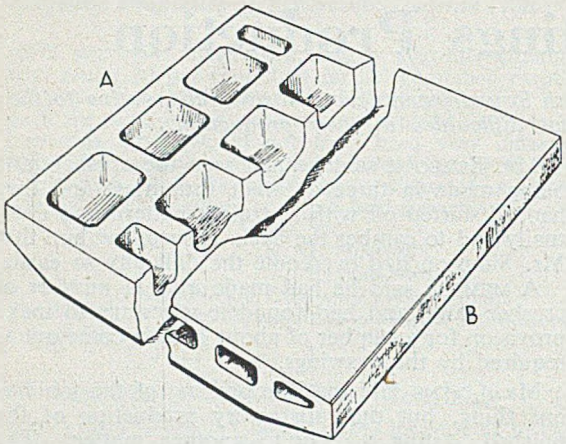


FIG. 1.—*Manganese Steel Jaw Casting weighing about 1,700 lb., size 3 ft. 6 in. by 3 ft.*

certain cases where the carbon content of manganese steel had been in excess of the usual 10 per cent. ratio.

MR. JANE supported Mr. Godwin, pointing out that one of the most important factors in manganese steel was the carbon-manganese ratio. One could often find the reason for cracking, and especially surface cracking, in a badly balanced carbon-manganese ratio. He asked Mr. Goyns what yield one could expect in the production of the crusher jaws.

MR. GOYNS said it would be reasonable to expect a yield of 70 to 75 per cent. in the production of the larger of the two jaws. He pointed out that too many heads only caused trouble in hindering the free contraction of the casting in the mould.

Crusher Mantle

Introducing the second problem, Mr. Goyns said that the meeting would now have an opportunity of discussing a simple casting which was well known to most South African foundrymen—the crusher mantle. (Figs. 3 and 4.) There were different views among South African foundrymen as to how crusher mantles should be run and fed. One method was to run into the bottom and take two heads off the top. In another method two atmospheric heads were fed into the thick section in the lower part of the casting and the metal was run into these heads. What were the merits and demerits of each particular method, in the opinion of the meeting?

A MEMBER said that he had used two risers on top and had always found this method quite satisfactory, the metal solidifying quicker than in the case of other methods.

ANOTHER MEMBER said he had never seen crusher mantles cast with atmospheric risers. In his opinion atmospheric risers were a waste of metal. If there were a thick section on top, one could provide for four or two risers, or any number that was necessary. Why put another two risers on the bottom?

MR. GOYNS explained that in one example the casting was fed by two gravity heads on the top face, and in the other case by two atmospheric heads feeding into this thick section near the bottom. In this instance the yield happened to be the same in both examples, so that the atmospheric heads could not be responsible for wasting metal.

THE MEMBER to whom Mr. Goyns replied then stated that the atmospheric risers might feed satisfactorily, but they gave a lot of extra work.

MR. GOYNS said that it would be a different proposition if the casting under discussion were a pressure casting. In that case there would probably be several advantages associated with the atmospheric head feeders—the sole advantage of using atmospheric feeders for the crusher mantle was that the hot metal went in where it was required, namely, into the feeders which were adjacent to the thickest section. With other methods, a certain amount of shrinkage might well occur in that area.

[At this stage MR. WARD passed round a defective casting and asked for opinions on the reason for its having been scrapped.]

"Last Casting" Problem

While Mr. Ward's casting was being studied, MR. JANE said he had an interesting steelfoundry problem which might have people guessing for a few minutes. The last casting out of a bottom-pour ladle broke in service and where it broke it showed a very coarse grain. It was the only one that failed in a run of about three tons. Made in ordinary mild steel, approximately 0.28 to 0.30 carbon, it was a bracket-like unit with a lug projecting from one side. The coarse grain seen at the break would not normally be associated with steel. The weight of the casting was between 70 and 125 lb.

On being asked if it came out of an electric furnace, MR. JANE replied in the affirmative and mentioned that the casting failed about two months after it had been made.

MR. SIMPSON wondered whether the casting temperature had been incorrect.

MR. JANE said there could have been no possibility of incorrect temperature, as the casting was the last one to be poured and all the others were sound. It was a sound casting to look at, there being no porosity at all.

MR. GODWIN suggested that the casting might have picked up silicon from the slag.

MR. WARD asked if any sections of the casting had been tested as well as the broken piece.

MR. JANE said the only piece the foundry had got

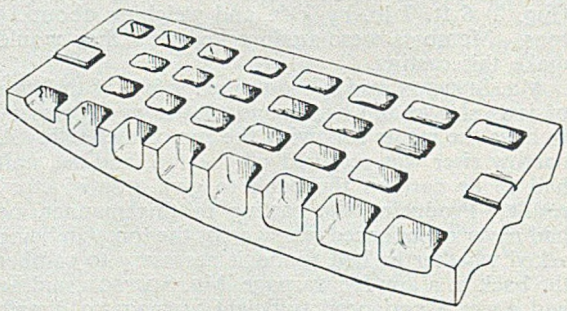


FIG. 2.—*Manganese Steel Jaw, weighing about 1¼ tons, 6 ft. 7 in. by 2 ft.*

back was the broken lug, and the whole face was of very coarse grain. What the grain was like further in the casting he was not able to say.

Dealing with the casting being handed round, which apparently showed a "blow" defect, MR. MARAIS put forward the following argument. If the gas pressure in a mould varied, which might be due to a number of factors, for example, the temperature of the metal, the percentage of volatiles or moisture present, this would certainly affect the velocity of the gas as it passed through the sand. The resistance to the flow of gas would become greater, the higher the velocity, not unlike the effect obtained when gas flowed through an orifice. As far as the permeability meter was concerned, the permeability was always measured under constant pressure. Did the permeability reading thereby obtained give a true reflection of what occurred in the mould? Different types of gases most probably registered varied resistances to the flow of gas, and all tests in the laboratory were done using air at more or less room temperature. The means of obtaining a true permeability could only be accomplished if the sand could be tested under actual foundry conditions.

A MEMBER said the job was defective because of a blow from the core. MR. MCGOWAN agreed with Mr. Marais and the previous speaker. MR. CLUETT said the scrapper had been caused probably by a blow from the core owing to the fact that the core had been moist. MR. WARD said the core might not have been properly dried and might not have been properly vented. A continuous oven was used by the foundry for the drying of the moulds, but it was possible that the actual core for the casting shown had been in stock for some time and had drawn moisture. A MEMBER considered that the core had been in the mould too long.

MR. HOLDSWORTH expressed the opinion that the mould had lifted slightly and caused a blow. If the core had been in the mould too long, it should have collapsed, but obviously it had not done so.

A Matter of Venting

MR. GODWIN said the casting discussed had served to emphasise one point—that foundrymen were inclined to overlook the obvious. Clearly, the

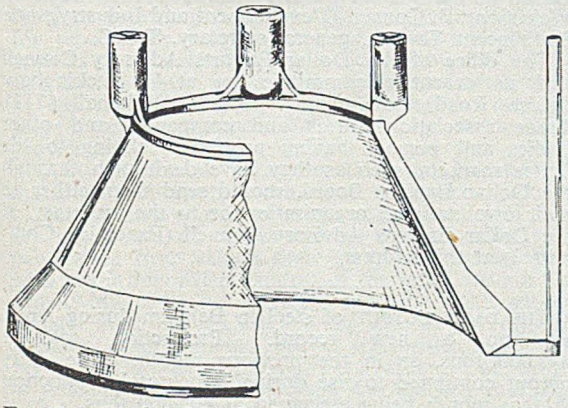


FIG. 3.—*Crusher Mantle Casting run from the Bottom, with open Feeding Heads around the Top.*

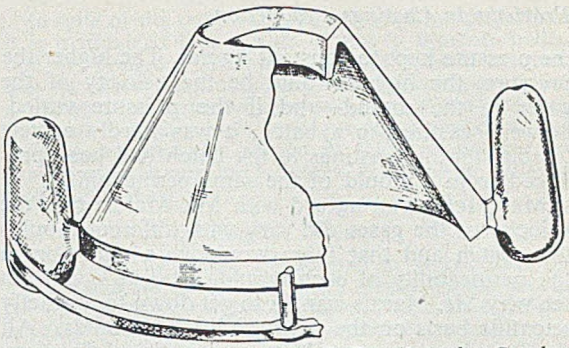


FIG. 4.—*Alternative method of Running the Crusher Mantle by gating into Atmospheric Feeders at the Bottom.*

core had not been properly vented—something for which there could be no excuse. Prevention was not only better than cure—it was a lot simpler. And it was a very simple matter to see that cores were not sealed off.

MR. DE KIEWIET said one of the main reasons for drying small cores was to enable metal to be cast round them without the core collapsing. The main cause of failure was that metal had entered the vent. If green-sand had been used the metal would not have entered the vent and the casting would have been a good one. His experience had shown that a green-sand core would give just as good a casting as a dry-sand core. A MEMBER said he had used green-sand for the casting of soil-pipes and bends, etc. This was actually quite a common practice and no real difficulty came into the picture.

ANOTHER MEMBER pointed out that the casting handed in by Mr. Ward was a deep one, and he felt that the use of green-sand cores for a job of that type would lead to trouble owing to the generation of steam. MR. MCGOWAN said he had used green-sand cores at the rate of 3,000 a day and had never put a vent in any of them. MR. GODWIN agreed that green-sand cores were quite useful for certain jobs, but he was of the opinion that those used by Mr. McGowan had a fairly large print area.

MR. MARAIS felt that the whole discussion of green-sand boiled down to the question of permeability. A vent had to be put in when the sand was fine.

Jointed Casting

At this stage a member passed round a casting made in slip flasks. It was slightly cross-jointed. MR. DE KIEWIET said that when using slip flasks it was easy to get a casting off-joint. The casting shown had been moulded off-register; the top half of the slip flask must have been $\frac{1}{8}$ in. or $\frac{1}{16}$ in. to one side. He had found that it was a good precaution to make a basin in the pattern plate, locating sand on sand with a step-in, so that the top half of the mould would not slip. THE MEMBER who showed the casting said that the jacket had been carelessly placed, one side having been pressed down.

Dealing again with permeability measurement, MR. MARAIS maintained that a constant permeability figure could not be recorded for a batch of castings unless the sand had been rammed and

Problems in Castings Production

the pressure kept to constant figures. The higher the pressure, the higher would be the velocity of the gases in the mould—and if the pressure varied between castings in a batch, it was hardly correct to state that all castings in the batch had been produced from a mould of the same permeability.

MR. MCGOWAN agreed with Mr. Marais that the velocity of the gases did vary with different moulds in a batch and that there would be a variation in the permeability of each mould. But he could not see why Mr. Marais wanted to get down to a strictly scientific basis on the permeability of moulds. All the foundrymen wanted was an empirical figure to work on as far as the permeability of the sand was concerned. If one used the empirical permeability figure to obtain good casting results, he did not think it mattered at all that the figure was not applicable to the sand when it was in the mould. If one man obtained a successful casting using sand with a permeability of 60, and another man produced the same casting equally successfully using a permeability figure of 40, both would stick to those figures without worrying whether or not they were scientifically correct.

MR. MARAIS pointed out that in his opinion sand testing was still in its infancy, and much had to be done to reflect the true basic qualities or properties of a sand.

MR. GODWIN said he could see no object in measuring permeability under moulding conditions. All the foundryman wanted was permeability figures so that he could use the sand most suited to the job.

Measures to Increase Exports

In a statement on the gold and dollar position in the House of Commons recently, Mr. Hugh Gaitskell, Chancellor of the Exchequer, said that while raw material shortages and higher prices had dominated the first half of 1951, the problem of the balance of payments was likely to return to the centre of the economic picture in the second half of the year. There was little doubt that there would be a deficit on the overall balance of payments for the first half of 1951, when imports for stockpiling were taken into account. Exports must be increased, if possible by higher production, but failing that by cutting home consumption.

Giving a mid-year review of Britain's economic outlook at a Press conference, the Chancellor said that production had so far been in line with the Economic Survey estimate. Although raw material shortages were proving an obstacle to further increases, the position was not so menacing as it had been a little while ago.

Referring to coal, Mr. Gaitskell said that the rate of consumption had been rising alarmingly, and there was need not only for increased output, but also for much greater economy in consumption.

On steel, he said that what would help most would be if firms intensified their efforts to seek out all available supplies of scrap. The Chancellor said that the home scrap drive had recently been bringing in an extra 10,000 tons a week. It had been hoped that when the new mills at Margam and Trostre started up in the second half of the year they would produce some 130,000 tons of sheet and 40,000 tons of tinplate, but without sufficient crude steel such an improvement could only be at the expense of other types of finished steel.

Trade with North America

The work of the Dollar Exports Board to promote greater two-way trade with North America has been taken over by the newly established Dollar Exports Advisory Council, the board having now ceased to operate. The council will maintain close relationship with the Dollar Sterling Trade Advisory Council of Canada, with the Economic Co-operation Administration Mission to the United Kingdom, and, of course, with the Canadian Association of British Manufacturers and Agencies in Toronto and the British Chamber of Commerce in New York.

The Dollar Exports Advisory Council consists, as did the Dollar Exports Board, of the presidents or chairmen of its sponsoring organisations and a number of individuals closely concerned with the problems of export trade. The council is under the chairmanship of Sir William Rootes, who, in addition to being chairman of many motor firms, is also chairman of British Light Steel Pressings, Limited, and its first members are:—Mr. A. H. S. Hinchliffe, president of the Association of British Chambers of Commerce; Sir Archibald Forbes, president of the Federation of British Industries; Sir Patrick Hannon, president of the National Union of Manufacturers; Sir Charles Hambro, chairman of the Financial Advisory Committee; Lord Bilsland, chairman of the Scottish Council (Development and Industry), and Sir Vincent Tewson, general secretary of the Trades Union Congress.

The council has power to co-opt individuals, and Sir Cecil Weir, the former chairman of the Dollar Exports Board, and Sir James Turner, of the National Farmers' Union, have already accepted invitations to be co-opted to the council. Sir William Wiseman and Mr. Alexander Brackenridge, who were resident members in the United States of the Dollar Exports Board, will continue in the same capacity with the new organisation.

Executive Committee Established

The council has established an executive committee consisting of the senior officials of the national organisations which have sponsored the Dollar Exports Board and initiated the British Trade Promotion Centre in Toronto. The constitution of the executive committee is as follows:—Mr. A. R. Knowles, secretary-general, Association of British Chambers of Commerce; Sir Norman Kipping, director-general, Federation of British Industries; Mr. J. B. Atkinson, secretary, Financial Advisory Panel; Sir Leonard Browett, director, National Union of Manufacturers; Dr. Macrae or Mr. MacNeill Weir, Scottish Council (Development and Industry); and Sir Vincent Tewson, general secretary, T.U.C.

The office of the Dollar Exports Advisory Council and its executive committee are at 41, Buckingham Palace Road, London, S.W.1 (tel: Whitehall 6711). Trade associations, firms and companies, and other bodies and persons having problems relating to the dollar markets, such as they have dealt with through the Dollar Exports Board, should send them either to their own national organisation or to the secretary of the Dollar Exports Advisory Council (Executive Committee) at this address.

THE DAILY OUTPUT of steel in Belgium during April set up a new record. Production totalled 425,000 tons, as in the previous month. The daily output continued to rise during May, total production in that month being estimated at 405,000 tons.

Steel exports remain at a high level, but the home market is reported to be somewhat quieter.

Europe's Scrap Supplies

E.C.E. Experts on Need for Improved Deliveries

The United Nations Economic Commission for Europe panel of experts on scrap, which met in Geneva recently, had earlier in the year visited the Benelux countries, France, the United Kingdom, and Western Germany, and was able to give much useful advice to those countries on measures to improve deliveries of scrap both for the benefit of their own industry and the industries of other European countries.

Europe's present demands for scrap for maximum iron and steel production, the experts say, can be satisfied to a large extent if countries increase scrap collection and channel available scrap for its most effective immediate use.

Although scrap by itself cannot continue to provide a solution to the raw material problem which the steel industry faces, at the present time steelmakers in some countries are not able to work to maximum capacity unless they obtain increased supplies without delay. For this reason, the E.C.E. experts maintain, it is now essential to intensify scrap collection and ensure the rapid flow of the collected and processed supplies to the consuming works.

In the not-too-distant future the demand for steel might decrease and pig-iron supplies improve considerably as a result of additional supplies of ore and coke and the building of blast furnaces, with a consequent reduction in scrap requirements, the experts explain, adding: "This is, therfore, no time to leave scrap dormant for possible requirements in future years."

Level of Prices

If Europe is to improve its scrap position, the scrap price policy adopted in each country must be such as to encourage the collection of all available supplies, including those marginal tonnages difficult and expensive to collect which normally might not be recovered, the experts declare. They add that this policy may in certain cases include special subsidy arrangements. All countries should also take appropriate measures to recover light scrap for baling—despite its inferior quality and high cost of transport.

Whatever the price policy followed by a country, limitation of the level of stocks of scrap held by suppliers and the control of stocks at consumers' works will prevent unhealthy speculation and ensure more regular deliveries and distribution.

Interested countries should study jointly the possibility of providing financial and organisational support for schemes to recover scrap from unusual sources, such as the deserts of North Africa, abandoned wrecks, and sunken ships. Substantial quantities of scrap might be recovered from such sources during the next few years if adequate financial help and equipment could be provided.

Even where high prices constitute an incentive for maximum collection, some scrap does not reach the market because owners of even small quantities of scrap are not aware of the immediate benefits which they can derive from selling their scrap, or because those who are in immediate control of the scrap are not personally interested in the price factor. The E.C.E. experts explain that this can arise in the case of governments, military establishments, public authorities, and even private enterprises where, in the absence of proper direction from the highest level, it is unlikely that steps will be taken to dispose of obsolete equipment. Similarly, many small farms or households can only be reached by intensive and well-organised collection.

In spite of the results already achieved in scrap drives, it is maintained that further efforts to promote collection are needed. No country should suspend or abandon its efforts for intensifying scrap collection as soon as its own industrial requirements are satisfied, because the need to obtain extra tonnages for export continues. Further, no measures should be taken to prevent the export of such surplus tonnages to countries suffering from scrap shortage.

Import Needs

Purchasing countries are advised to secure their imports exclusively either through organisations set up for that purpose, or through specialised and organised buyers. This advice arises from the fact that certain buying practices in the last few years have seriously upset the European market by the introduction of speculative elements resulting in the freezing of stocks.

The E.C.E. experts further state that European countries with a scrap surplus should, in disposing of it, give priority consideration to the need for maximum production of steel in Europe. They also urge that the abnormally high percentage of steelmaking scrap consumed in blast furnaces at present by certain countries should be substantially reduced to the extent that availabilities of iron ore and coke permit.

A.E.I. Capital Reconstruction

Full details of the capital reconstruction of Associated Electrical Industries, Limited, were posted to stockholders on July 3.

Under the plan, the capital is to be increased from £8,696,050 to £10,000,000 by creating 303,950 4½ per cent. cumulative "B" preference and 1,000,000 ordinary £1 shares. In addition, the 26,810 unissued 8 per cent. £1 cumulative preference shares are to be converted into "B" preference shares. Authorised capital will then be £30,000,000 in preference and £7,000,000 in ordinary stock.

Existing preference stockholders may, before October 1 next, convert all or part of their holdings into 4½ per cent. "B" cumulative stock. Holders so converting will have the right to subscribe in cash at par for new ordinary £1 shares in the ratio of three shares for every £10 of stock converted. The shares, which will be renounceable, will be payable as to 1s. per share on application and 19s. per share before October 31 next. The new ordinary shares to be so allotted will not rank for the interim dividend, but will rank for the final ordinary dividend for 1951.

The directors also announce that the difference between the interim and final ordinary dividends is to be reduced. "It is intended, earnings permitting," the statement says, "to adjust the dividend payments in 1951 by declaring an interim in that year of 7½ per cent. This is not to be taken as implying that the total rate of dividend will be higher than for 1950." The interim dividend on the existing £6,000,000 ordinary stock is proposed to be made in October.

If the proposals are approved at class and extraordinary meetings called for July 27, the newly created 330,760 "B" preference shares will be offered to preference stockholders for cash at par.

R. & W. Hawthorn, Leslie & Company, Limited, has been granted permission by the Tyne Improvement Commission to erect a 15-ton derrick crane at its St. Peter's Works, Newcastle-upon-Tyne, to replace the 50-ton sheerlegs installed 80 years ago.

Tungsten, Molybdenum, and Sulphur Allocations

The immediate introduction of an allocation scheme for tungsten and molybdenum was agreed upon by the International Materials Conference at Washington on July 7. At the same time, the third-quarter allocations for these materials were announced. Of the 2,800 tons of tungsten available, the United States will receive 1,255 tons, Britain 695 tons, Germany 290 tons, France 280 tons, Sweden 210 tons, Canada 26 tons, Yugoslavia 16 tons. Australia 15 tons, and Spain 13 tons.

The division of the 4,400 tons of molybdenum available is as follows:—United States, 3,420 tons; Britain, 515 tons; France, 195 tons; Germany, 125 tons; Sweden, 100 tons. An additional 45 tons of molybdenum is available as reserve to other countries whose requirements have not been filed. It was stated that the allocations are not to be regarded as establishing a permanent pattern for future allocations.

An export quota of 1,700,000 lb. of molybdenum for the third quarter of this year was announced by the U.S. Commerce Department on July 10. This quota is 17 per cent. larger than the quota of 1,495,000 lb. established last quarter, but 3 per cent. lower than the average quarterly exports of molybdenum in 1950.

The Board of Trade has revoked as from July 4 the open general licence permitting the import of magnesium metal and tungsten ores and concentrates from countries other than the following:—Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian zone), Guatemala, Haiti, Honduras, Hungary, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Persia (Iran), Philippines, Poland, Rumania, Tangier, U.S.A., U.S.S.R., Venezuela, Yugoslavia (as revised).

A quota of 106,300 tons of sulphur for consumption in the third quarter of this year has been allocated to Britain by the International Materials Conference in Washington, it was announced on July 11. The quota represents 105,000 tons in imports and 1,300 tons local U.K. production. The level of imports is at a slightly higher rate than in the first half of the year; the bulk of the 105,000 tons will come from the United States.

Supplies to U.K. industry, based on the distribution scheme put into effect on May 1, can be maintained at the present level, and there will be no cuts, according to a Board of Trade announcement.

Credit for Mexican Steelworks Expansion

The Export-Import Bank has announced that it has granted a credit of $5,000,000 to Nacional Financiere, S.A., of Mexico, under the $150 million credit earmarked last August to expand the steelmill of Altos Hornos de Mexico, S.A., at Monclova. The bank granted a credit of $6,000,000 in 1942, to assist in the construction of this mill; the figure was raised to $8,000,000 in 1945.

The existing plant at Monclova consists of a fully integrated steel plant, including a blast furnace, three open-hearth furnaces, a universal plate and hot-strip mill, and cold-rolling and tinplating facilities. In addition, facilities exist for producing cast-iron pipes. The proposed expansion includes improvements to the blast furnace; the addition of a new and larger open-hearth furnace; the construction of a new hot-strip mill, and the provision of additional processing and tinplate facilities. These additions and improvements will increase the plant's finishing capacity from 115,000 tons to 185,000 tons per annum.

Steel Output Recovers

Figures for June and the First Half Year

Steel output in the first half of this year was at an annual rate of 16,306,000 tons, which was only 303,000 tons below the level of the first half of last year. Production this year is thus well above the upper target of 16,250,000 given in the Government's Economic Survey and has been achieved in the face of an increasing shortage of raw materials.

The June steel output figures, announced by the British Iron and Steel Federation on July 9, show that production recovered well in that month to an annual rate of 16,007,000 tons. In May, when output was affected by the Whitsun holidays, the annual rate of production was down to a level of 15,864,000 tons. Last month's production rate compares with an annual rate of 16,249,000 tons in June of last year.

Steel output in the second half of the year will be affected by summer holidays, and, of course, by shortages of iron ore and scrap. These shortages, it is expected, will prevent some of the new capacity —a figure of 500,000 tons is mentioned—being brought into commission.

Increased Pig-iron Production

Pig-iron output in June was at an annual rate of 9,497,000 tons, which compares with 9,474,000 tons in June, 1950. The annual rate of pig-iron production for the first half of this year was 9,506,000 tons, against 9,611,000 tons at the end of June last year.

Latest steel and pig-iron output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1951—April ..	178,500	9,280,000	322,500	16,771,000
May ..	182,400	9,482,000	305,100	15,864,000
June ..	182,600	9,497,000	307,800	16,007,000
Half year	182,800	9,506,000	313,600	16,306,000
1950—April ..	182,500	9,492,000	323,500	16,822,000
May ..	185,500	9,646,000	319,200	16,597,000
June ..	182,200	9,474,000	312,500	16,249,000
Half year	184,800	9,611,000	319,600	16,619,000

Control of German Steel

The transfer of assets this week from their owners to five of the new unit companies, by order of the Allied High Commission, marks an important stage in the reorganisation of the German iron and steel industry. It is expected that five or six companies will be formed every month, until 24 or 28 are created, when, it is hoped, the occupying powers will have eliminated concentration of economic power, prevented the development of the war potential, and effected the exclusion from control of supporters of the National Socialist Party.

The first order is in respect of the transfer of the property of the Vereinigte Stahlwerke, A.G., to four unit companies—the Rheinische Röhrenwerke, the Hütenwerk Ruhrort-Meiderich, the Gusstahlwerk Witten, and the Gusstahlwerk Oberkassel. The fifth is the Stahlwerke Bochum. The assets of 13 of the new companies will come wholly or partly from the Vereinigte Stahlwerke. Shares in the old concerns will be transferred to trustees to be appointed by the Allied High Commission in consultation with the Germans.

Book Reviews

Grand Alliance—A Chapter in Industrial History by Basil H. T. Tripp. Published for Allied Ironfounders Limited, by Chantry Publications Limited, 63 Neal Street, Shaftesbury Avenue, London, W.C.2. Price 12s. 6d. net.

The reviewer is not quite sure as to what is the object of this book. The presentation is excellent, carrying a pleasing dust jacket which is a replica of the design of the curtains used in the "Allied Train"; the illustrations are an interesting mixture of antique castings and the current productions of the constituent companies of Allied Ironfounders. Paraphasing the last sentence and using the words "foundry history" instead of "antique castings," it would present a truthful description of the text. The mixture makes quite good reading especially the story of the development of the Coalbrookdale Company. It "debunks"—to use an Americanism— much of the current claptrap of the inhumanities of the industrial revolution. In many cases at that time, ex-workmen suddenly found themselves at the head of factories with no tradition of enlightened leadership to guide them. This must have been at the back of the mind of the Author for he stresses throughout the book, how from the inception of the Coalbrookdale Company to the present time, the managements have consistently followed an enlightened policy in respect of their workpeople. Actually, the Author has captioned his first chapter "Responsible Leadership." The other seven sections have been compiled chronologically starting from 1699 and concluding with 1951 The text has been well written, except for the wrong use on two occasions of the word "ductility" instead of "versatility" when referring to the potentialities of the casting process and the inclusion of a piece of Whitehall jargon "lower-income brackets." The price of the book is high, regarded in the light of the publicity it accords to Allied Ironfounders' group productions.

V.C.F.

Analisi dei Difetti di Fonderia. Published by Assofond (Associazone Nazionale della Fonderia), Via Boccheto 2, Milan, Italy (for private distribution).

This book is a translation of the American Foundrymen's Society's book "Analysis of Casting Defects." The work has been efficiently carried out and both letterpress and illustrations alike are excellent. Fortuitously it forms an excellent English-Italian foundry technical dictionary. The book has been provided with a dozen or so "squared paper" pages so that personal experiences can be recorded. By the issue of this book a worthwhile service has been completed for the Italian foundry industry.

Annealing and Recarburising Furnace

Annealing and recarburising processes are being carried out in a single continuous furnace operation at the works of Republic Steel Corporation, Massilin, O. The furnace was built and installed by Surface Combustion Corporation. Furnace atmosphere-conditioning units supply carburising gases to prevent carbon loss, and to correct surface decarburisation which may have occurred in earlier heat-treatment. This procedure is said to eliminate grinding or machining operations which were previously necessary because the annealing process made the surface of steel bars too soft for certain industries, so that the low-carbon surface had to be removed.

Film Review

"They're Everywhere." This is a film describing the manufacture of all types of valves by Glenfield and Kennedy, Limited, of Kilmarnock. It has been carried through by the Big Six Film Unit under the direction of Mr. Edward Cook. Mr. Lionel Marston is once more the commentator. Throughout the presentation, the reviewer could not help but get the impression that this was a further instalment of an earlier series. There was the same selection of adjectives and phraseology from the same pleasing voice still pronouncing cupola, cupula, the same visits to the laboratory where the same tensile and Brinell hardness machines were shown. Yet forgetting earlier productions, the film was in every way excellent. It showed in a series of flashes the ultimate destination of the valves, then followed the complete manufacture, testing and despatch of goods. The interest in this film is enhanced by the extensions, rebuilding and re-equipment which have taken place since the war. The pictures of the patternshop and foundries were amongst the best so far filmed. They materially enhance the splendid collection now available. The whole of the shops are so excellently equipped that the film cannot fail to do as it was intended—that is to publicise the manufacturing efficiency of this great enterprise.

V. C. F.

Works Manager Fined

A company director, George P. Guest (36), of Dixon Street, Wolverhampton, was found guilty at Stafford Assizes on July 5 on 10 charges of fraudulently converting to his own use 11¾ tons of lead and copper, valued at £1,206, the property of Metal Recoveries, Limited, Walsall. He was fined £200.

The firm recovered copper and lead from scrap electric cable for customers in a furnace invented by Guest, whose salary as works manager was said to be £500. In evidence Guest said that after processing there was a residue of pot scrapings and yard sweepings which he resmelted. He admitted disposing of the metal and receiving £1,206, but said he did not know that he was doing anything criminal.

The jury recommended leniency, considering that Guest's wages were "very low for a skilled man," and that this had started the temptation.

Mr. Justice Lynskey said he was satisfied that Guest knew he was doing wrong. He did not entirely agree with the jury's recommendation, but he had to take it into consideration.

Summer School of Production Engineering

The Institution of Production Engineers have arranged their second annual summer school of production engineering at University College, Durham, from August 29 to September 2, 1951. The theme this year is "Developments in the Study of Production Technology and Management," and will include a survey of some of the recent developments in the study of production technology and management to see how far these developments should be reflected in courses in production engineering. The technical programme is to be opened by the president on August 30. Lectures will be presented on Standards of Industrial Performance, Science and Industry, Production Design, the Armed Services and Industry, Materials Handling, and Education and Industry, and each will be followed by group discussions.

A.S.T.M. Awards

Ten technical leaders in the field of engineering materials—men who have rendered outstanding service to the American Society for Testing Materials particularly in its technical committee work—were honoured during the recent annual meeting of the society in Atlantic City when they received awards of merit. The recipients were:—

Mr. WILLIAM BLUM, chief of the electrodeposition section and assistant chief of the chemistry division of the National Bureau of Standards, Washington; Mr. HYMAN BORNSTEIN, chief technical consultant, Deere & Company, Moline, Ill.; Mr. ROBERT BURNS, a member of the technical staff of the Bell Telephone Laboratories, Inc., Murray Hill, NJ; Mr. HARRY VAN OSDALL CHURCHILL, head of the analytical division of the research laboratories of the Aluminium Company of America, New Kensington, Pa.; Mr. MAX HECHT, adviser, Power Stations Chemistry, Drexel Hill, Pa.; Mr. CARL DEWITT HOCKER, Associate Professor of Chemistry, Union College, Schenectady, NY; Mr. WILLIAM HENRY KLEIN, vice-president and operating manager of the Lawrence Portland Cement Company, Northampton, Pa.; Mr. HORACE HARDY LESTER, principal physicist, Watertown Arsenal, Watertown, Mass.; Mr. STANTON WALKER, director of engineering and research, National Sand and Gravel Association, also director of engineering and research, National Ready Mixed Concrete Association, Washington; Mr. WILLIAM HENRY WHITCOMB, Cranston, RI.

Authors of outstanding technical Papers presented at pevious meetings of the A.S.T.M. received awards at the annual meeting. The following awards were made:—

CHARLES B. DUDLEY MEDAL—To Prof. D. S. CLARK and Prof. P. E. DUWEZ, California Institute of Technology, for their Paper entitled "The Influence of Strain Rate on Some Tensile Properties of Steel," presented at the 1950 annual meeting. This medal is presented for a Paper of outstanding merit constituting an original contribution on research in engineering materials.

RICHARD L. TEMPLIN AWARD—To Mr. R. L. TEMPLIN and Mr. W. C. ABER, Aluminium Company of America, for their Paper entitled "A Method for Making Tension Tests of Metals Using a Miniature Specimen," presented at the 1950 annual meeting. This award is presented for a significant Paper describing new testing methods and apparatus, the purpose of the award being to stimulate research in the development of testing methods and apparatus.

SAM TOUR AWARD—To Mr. C. T. EVANS, Jr., The Elliott Company, for his Paper entitled "Oil Ash Corrosion of Metals at Elevated Temperatures," presented at the 1950 annual meeting. This award is presented for the purpose of encouraging research on the improvements and evaluation of corrosion testing methods and to stimulate the preparation of technical Papers in this field.

More Tunisian Iron Ore

Iron-ore production in Tunisia in January totalled 65,841 tons, and in the following month there was an output of 65,307 tons. Exports of iron ore in the first two months of the year were 81,868 tons and 73,093 tons, respectively. Production for the two months showed an increase over the monthly average for 1950 of about 3.5 per cent., and exports for the period showed a heavy increase over the corresponding period of last year.

The United Kingdom took 28,670 tons of Tunisian iron ore in January and 37,156 tons in February, while exports to the United States were 29,210 tons and 9,601 tons, respectively. France, Holland, and Italy took smaller quantities.

Stocks of Tunisian iron ore at February 28 last were:—At the ports, 105,094 tons; at the mines, 26,026 tons, making a total of 131,120 tons, against 109,847 tons at the same time last year.

A FINAL DIVIDEND of 13 per cent., less tax, on the £288,000 ordinary capital as increased by the bonus issue of 20 per cent., is recommended by Hick, Hargreaves & Company, Limited, the Bolton engineers and ironfounders. This makes with the unchanged interim dividend of 2 per cent. on the smaller capital, 15 per cent. for the year to March 31, against 10 per cent. for the previous year.

International Nickel Directors

One of the two newly-elected directors of the International Nickel Company of Canada, Limited, is an extremely popular and well-known figure in this country where he served as United States Ambassador from 1947 to 1950. Mr. Lewis Douglas was born in Arizona, of Canadian ancestry. His father, the late James Stuart Douglas, was a native of Megantic Township, Quebec, and was president of United Verde Extension Mining Company, and his grandfather, the late Dr. James Douglas, was a mining engineer and chairman of Phelps-Dodge Corporation. Previous to being elected a member of the Arizona House of Representatives and subsequently a member of the United States Congress, Mr. Douglas had been engaged in mining and general business in Arizona. He resigned from Congress in 1933 and became Director of the Budget. Later he became vice-president of the American Cyanamid Company, then principal and vice-chancellor of McGill University, Montreal.

The other new member of the board of International Nickel is Mr. I. C. Raymond Atkin, a former president of the Canadian Society of New York. He was with the Royal Bank of Canada until he joined J. P. Morgan & Company in 1925, becoming a partner in 1939 and a vice-president on its incorporation in 1940. A director of Canada Life Assurance Company and Johns-Manville Corporation, Mr. Atkin is chairman of the foreign exchange committee of the New York Money Market.

Publications Received

Produktivitet i Amerikansk Stoperiindustri (Productivity in the American Foundry Industry). A Report by a group of Norwegian foundrymen on their visit to the U.S.A.

The pattern created in the Report of the British Steelfounders' Team—the first to be issued—has been emulated by many others. This one, for instance, carries a picture of the team, a map of the route followed, and the usual appendices. The important matter for our readers is that amongst these is a nine-page summary of their findings in English. The reviewer found this section most interesting for it reads remarkably easily, despite the sometimes rather amusing spelling mistakes; never is the sense lost or even masked. Mr. John Sissener was the team leader and the reviewer is reasonably sure that he has written this section himself and has made a remarkably good job of it. There are two outstanding remarks in the Report which are well worth repeating. One is that one large American iron foundry could produce the same yearly output as the whole of the Norwegian industry. The second is a war reaction which has been noted when visiting Continental countries, and that is for the long period of war men were exhorted to go slow, and to put the labour machine into reverse takes time and patience. The Report runs to about 170 pages and carries 147 illustrations. It has taken about a year to produce, much the same as in this country, but the task has been well worth while, for it should be of the greatest use to the Norwegian foundry industry.

Target Vol. 4 No. 6. Published by the Central Office of Information, Norgeby House, Baker Street, London, W.1.

This issue cites a number of cases, where general co-operation has achieved excellent results. The reviewer fails to remember the citing of any cases where co-operative action in the State monopoly factories has resulted in increased production. This is an omission that should be remedied.

Personal

MR. GEOFFREY W. GREENWOOD, of Low Moor, Bradford, who has been awarded the George Senior Research Fellowship in Physical Metallurgy at Sheffield University, gained an Edgar Allen scholarship to Sheffield in 1947.

A DINNER has been held by William Doxford & Sons, Limited, the Sunderland engineers and shipbuilders, to mark the completion of 40 years' service with the company by MR. W. H. PURDIE, a director and general manager of the engineering works.

THE INVENTOR of the vacuum cleaner and chairman of the British Vacuum Cleaner & Engineering Company, Limited, MR. H. CECIL BOOTH, welcomed guests at a reception in London held recently in celebration of the 50th anniversary of his invention. It was in 1901 that Mr. Booth, then a young civil engineer, regarding the sweeping and beating of carpets as ineffective and unhygienic, conceived the idea of cleaning carpets and upholstery, without removal, by means of high suction.

MR. FRANK CAWLEY, who has taken up his new post as assistant steelworks superintendent at the Workington Iron & Steel Company branch of the United Steel Companies, Limited, is now mainly responsible for steelmaking in the Bessemer and arc-furnace plants and is assisting MR. L. R. G. JENKINS in the general supervision of the works. MR. T. SANDERSON has been appointed ironworks superintendent and MR. A. C. DUNKLEY, who has been with the Control Commission in Germany, has been appointed education officer.

MR. W. B. BAXTER left the board of the United Steel Companies, Limited, at the end of last month, on reaching the retiring age, and also retired from his position of joint general manager of the Appleby-Frodingham Steel Company, Limited. Joining the Frodingham Iron & Steel Company in 1914, he became works manager in 1927 and general manager in 1939. He is a member of the council and a vice-president of the Iron and Steel Institute, a member of the council and chairman of the Plant Engineering Division of the British Iron and Steel Research Association, and chairman of the Lincolnshire Ironmasters' Association.

MR. J. H. W. PAWLYN, following his retirement at the end of last year from the chairmanship of Ruston & Hornsby, Limited, the Lincoln engineers, has now vacated a similar position which he held with Ransomes, Sims & Jefferies, Limited, engineers and ironfounders, of Ipswich, although he will retain his seat on the board. Mr. Pawlyn is vice-chairman of Ruston-Bucyrus, Limited, and chairman of Ransomes South Africa (Pty.), Limited. The new chairman of Ransomes, Sims & Jefferies, Limited, is MR. R. J. HUNT, who became a director of the company in 1945 and was appointed deputy chairman three years ago.

DR. JAMES T. MACKENZIE, technical director of the American Cast Iron Pipe Company, Birmingham, Ala., has been honoured by the Georgia State College for Women through the award of the Herty Medal. The late Charles H. Herty, it will be remembered, was an eminent president of the American Chemical Society, and the award was to mark the great contributions made by the recipient to the science of ferrous metallurgy. The work of MacKenzie on cupola practice, the relationship of Brinell hardness to the tensile strength of cast iron, and in the establishment of the centrifugal casting process as a major foundry process, are recognised throughout the metallurgical world. We heartily congratulate Dr. MacKenzie on the new well-merited award.

I.B.F. Newcastle Conference Fund

In addition to the subscriptions to the Newcastle Conference Fund acknowledged in our issue of May 24, the following donations have since been received. The Council of the Institute of British Foundrymen take this opportunity of expressing their gratitude to the the many firms and individuals who have contributed so generously to the fund:—

	£	s.	d.
The Consett Iron Company, Limited	105	0	0
C. A. Parsons & Company, Limited	100	0	0
R. & W. Hawthorn, Leslie & Company, Limited	50	0	0
Vickers-Armstrongs, Limited	50	0	0
British & Continental Traders, Limited	26	5	0
The Heaton Foundry Company, Limited	26	5	0
A. Reyrolle & Company, Limited	25	0	0
Armstrong Whitworth & Company (Pneumatic Tools), Limited	20	0	0
The British Oxygen Company, Limited	20	0	0
Fordath Engineering Company, Limited	15	15	0
Washington Steel Foundries, Limited	15	15	0
The Jarrow Tube Works, Limited	15	0	0
Corn Products, Limited	10	10	0
T. W. Ward, Limited	10	10	0
Smith Patterson & Company, Limited	10	0	0
Geo. Blair & Company, Limited	7	7	0
G. Cohen, Sons & Company	5	5	0
Ellis Flower, Esq.	5	5	0
The Norton Grinding Wheel Company	5	5	0
H. A. J. Rang	5	5	0
C. Rutherford, Esq.	5	5	0
Scott Bros., Limited	5	5	0
F. Turnbull & Company (Engineers), Limited ...	5	5	0
Wilsons Forge (1929), Limited	3	3	0
British Insulated Callenders Cables, Limited ...	2	2	0
The Foundry Trades' Equipment and Supplies Association, Limited	154	14	0
Total ...	704	1	0
Amount previously published	835	0	0
Grand total ...	£1,539	1	0

Designing Foundry Products

The Council of the Royal Society of Arts have decided to continue in 1951 the offer of bursaries to aid young British designers in Great Britain and Northern Ireland who are engaged in, or intend to enter, branches of industry in which design is of primary importance. The purpose of this offer is to provide the winners of the bursaries with opportunities to broaden their knowledge and experience by travel abroad and the study of foreign design, or, in certain cases, to obtain art training or industrial experience in this country at an approved college, institution or industrial establishment. A competition has therefore been organised, on the same lines as that of last year, in order to select suitable candidates to receive these bursaries; but it is the Council's hope that it will also serve a broader purpose by encouraging an increased number of students to turn their attention to designing for industry. This year it has been decided to offer bursaries of £150 each in value, including awards for the design of domestic gas appliances and domestic solid-fuel-burning appliances. Details of the conditions for entry are available from the Royal Society of Arts, 8 John Adam Street, London, W.C.2.

A WORLD METALLURGICAL CONGRESS is being staged at Detroit, Michigan, from October 14 to 19. It is being attended by 500 visiting delegates who will meet thousands of American metallurgists. The Congress is being organised by the American Society for Metals, 7,301, Euclid Avenue, Cleveland, Ohio, and inquiries as to participation should be addressed to Mr. W. Eisenman, the secretary, at that address. In connection with the Congress, there are to be works visits and an exhibition. Each overseas delegate will have an American chaperone having similar interests—a new and very sensible notion.

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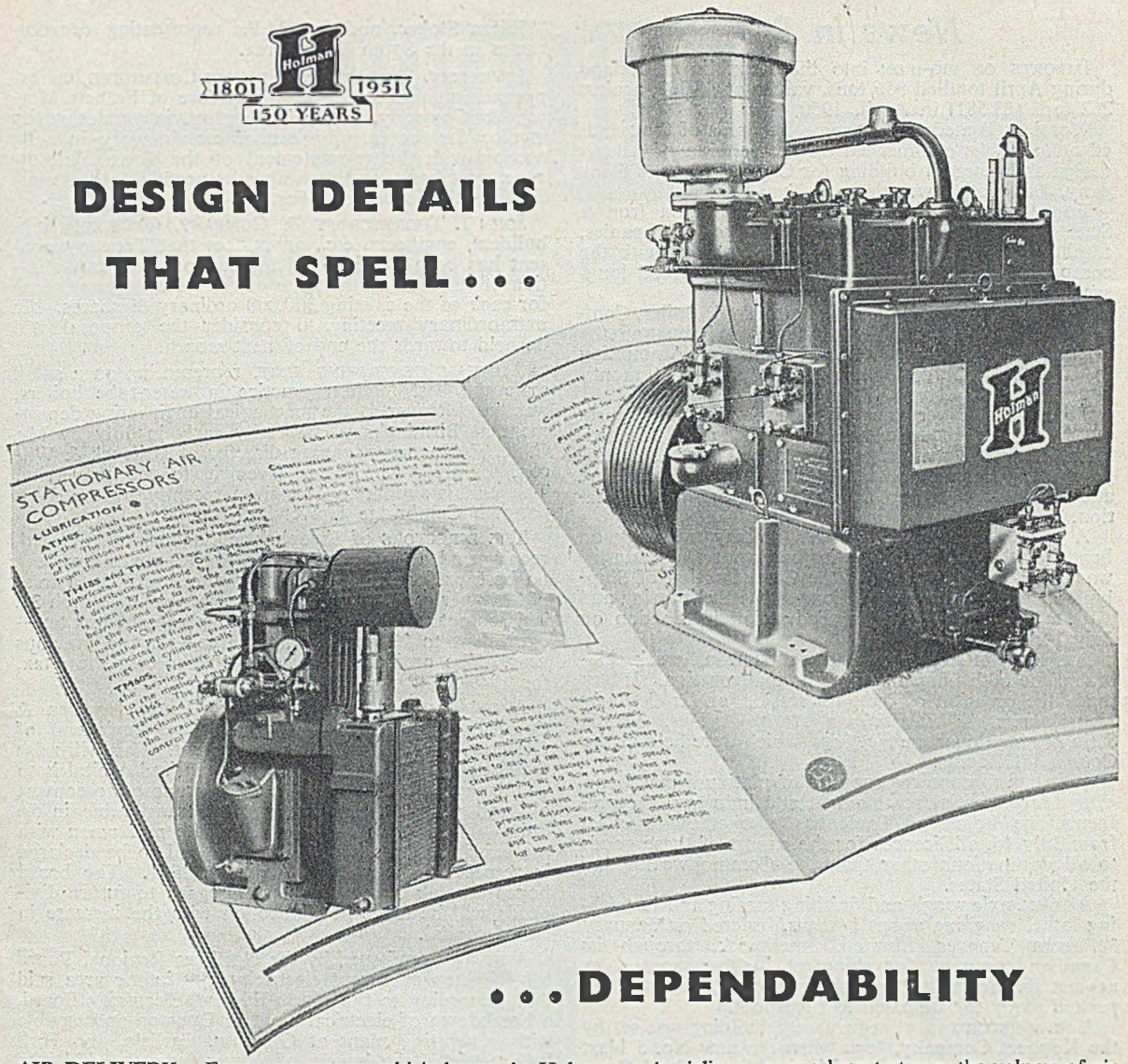

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TA13S	130	1200	125
TH.18S	180	1000	125
TH.36S	360	1000	125
TM.60S	612	720	125

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News in Brief

IMPORTS OF PIG-IRON into the Republic of Ireland during April totalled 356 tons, valued at £5,362, against 262 tons (£3,581) in April, 1950.

WORK, estimated to cost some hundreds of thousands of pounds, has commenced on the erection of a large design and research building for C. A. Parsons & Company, Limited, Newcastle-upon-Tyne.

FIFTY-THREE EMPLOYEES of the Workington Iron & Steel Company, branch of the United Steel Companies, Limited, who have 45 years' or more service with the company, have been presented with plaques and long-service awards.

EMPLOYEES of the Leeds & Bradford Boiler Company, Limited, are to receive the first bonus of the recently introduced profit-sharing scheme. Amounting to 12½ weeks' wages, half will be paid next month and half at Christmas.

TO COPE with increasing demands for its various products, Foster Transformers & Switchgear, Limited, Wimbledon, has transferred the production of its switchgear to Crypton Equipment, Limited, Bridgwater (Som), another factory in the Lancashire Dynamo organisation.

A CLAIM for a second week's holiday with pay on behalf of 2,000,000 workers in the engineering industry was submitted by leaders of the Confederation of Shipbuilding and Engineering Unions to the Engineering and Allied Employers' National Federation in London on July 10.

THE BRITISH ACETYLENE ASSOCIATION last week celebrated the 50th anniversary of its inauguration. It was made the occasion of the 34th session of *La Commission Permanente Internationale de l'Acétylène*. Mr. E. Stein presided over the meetings, which were held at the Connaught Rooms.

IN ORDER to conserve supplies of platinum metal and alloys for essential rearmament and industrial requirements, the Board of Trade has revoked, with effect from July 16, all licences for the export of these goods to all destinations other than the Commonwealth and the United States.

A 16-IN. axle rough and finishing turning and burnishing lathe, weighing about 14 tons, ordered on January 31 from Tangyes, Limited, Smethwick, through its Canadian company for shipment in five months, as against the normal 12 months or longer, was recently packed ready for despatch to Liverpool.

A NEW RECORD in blast-furnace rebuilding was set by the Koppers Company, Inc., when the new No. 5 blast furnace at the Ohio works of United States Steel Company was blown in 120 working days after the old furnace was blown out. Forty-one days were required to dismantle the furnace and 79 days to rebuild.

LAKE & ELLIOT, LIMITED, steelfounders, of Braintree (Essex), are to pay a capital bonus of two-for-one on the ordinary shares. The board states there is no implication that the same rate of dividend will be paid on the increased capital. The C.I.C. has agreed to the issue of the necessary 200,000 shares, of 10s. each.

A SATISFACTORY CONCLUSION to trade discussions in Madrid between representatives of the British and Spanish Governments is announced by the Board of Trade. Existing arrangements regarding trade exchanges between the two countries, including supplies of essential products, were extended, subject to slight modifications, up to the end of 1951.

DISCUSSIONS of the situation of the steel industry in South Wales and the effect of the present position on employment in the area took place recently between Mr. S. J. L. Hardie, chairman of the Iron and Steel Corporation of Great Britain, Sir John Green, and Mr. William Stokes, and five M.P.s representing constituencies in the South Wales area.

LIVERPOOL CORPORATION FINANCE COMMITTEE has expressed its appreciation of the gesture of Francis Morton & Company, Limited, Garston, in rendering its invoice for the carrying out of certain work in connection with the reinstatement of the Town Hall on a net cost basis, and foregoing its profit as a contribution to the Liverpool Festival.

JOHN I. THORNYCROFT & COMPANY, LIMITED, shipbuilders, engineers, etc., announces that Treasury consent has been obtained to a share-for-share capitalisation of reserves by the issue of one new ordinary share for each of the existing 300,000 ordinary £1 shares. An extraordinary meeting to consider the proposal will be held towards the end of next month.

A STEAM GENERATING UNIT, representing on a small scale the best modern practice in water-tube boilers, was handed over to the mechanical engineering department at Birmingham University early in July by Mr. C. K. F. Hague, managing director of Babcock & Wilcox, Limited, which has given it to the university. The unit is similar to one given recently by the company to Cambridge University.

THE DIRECTORS of Sheepbridge Engineering, Limited, recommend a final dividend of 16⅔ per cent., tax free, on both preference and ordinary shares, making a total of 22 $\frac{5}{10}$ per cent., tax free, for the year ended March 31. This compares with a total of 40 per cent., less tax—equivalent to 22 per cent., tax free—for the previous year. The ordinary interim of 10 per cent., less tax, for 1949-50 was payable on smaller capital.

A ONE-FOR-ONE SCRIP BONUS by James Howden & Company, Limited, boiler and general engineers, of Glasgow, has received Treasury consent. This will raise the issued capital to £546,000. Authorised capital is to be increased to £700,000. It is also proposed to convert old and new 10s. shares into stock transferable in 5s. units. The new shares will participate *pari passu* with the existing shares in the final dividend to be declared in respect of the year to April 30, 1951. The board hopes that no assumptions with regard to future dividends will be made in connection with the increase in issued capital.

A STATEMENT issued by the Northern Regional Board for Industry on recent electricity cuts in the area said that, according to the North-Eastern Electricity Board, a breakdown of electrical plant at Dunston and trouble with generating plant at Glasgow, Carlisle, and Hull had restricted the import of power from the grid. In the north-east, the load was mainly industrial and because of this the domestic and commercial load was not sufficient to provide a major part of the relief required from day to day. The board has urged that firms not normally making electrical plant should be asked to help in supplying this equipment for the electricity supply industry.

MATTHEW SWAIN LIMITED, Newton Heath, Manchester, gave a dinner on July 6, at Queen's Hotel, Manchester, to celebrate their 75th Anniversary, to their managers, representatives, and senior staff. The guests were welcomed by the chairman, Mr. Matthew E. Swain. On July 7, a party of 300 employees was taken to Blackpool for the day, as guests of the firm. Sports were held at Stanley Park in the morning, dinner and tea being served at the Baronial Hall, Winter Gardens. Mr. Matthew E. Swain presented gold slide bars to Mr. L. Hinchley (50 yrs service), Mr. J. W. Churm (55 yrs), Mr. G. Beckett (45 yrs) and Mr. J. Potts (45 yrs) and gold medals to five employees each with 25 yrs service. Every employee also received a gift to commemorate the occasion.

Raw Material Markets

Iron and Steel

Production of pig-iron continues to be hampered by shortage of raw materials, which not only restricts outputs from furnaces now in blast, but also precludes the blowing in of fresh units. Reports are received of increased imports of iron ore, but the foundries have not yet benefited by any appreciable increase in pig-iron deliveries, particularly in the case of hematite, supplies of which are very stringent. Output of castings is being adversely affected by existing conditions, and many users' stocks are exhausted.

The engineering, motor, and textile foundries are unable to obtain anything like the tonnages they need and for which licences are granted. The low- and medium-phosphorus irons they can secure cover only a small proportion of their needs, and with hematite so scarce, they are indeed in trouble, particularly as they are unable to augment their supplies to a satisfactory level by acquiring other grades, such as refined irons and Scotch foundry irons. The light and jobbing foundries require larger tonnages of the high-phosphorus grades of pig-iron than are available.

Supplies of cupola scrap remain difficult, and the supply of both steel and cast-iron scrap—particularly the latter—is quite insufficient to meet all demands. Foundry coke deliveries are satisfying current consumption, but many consumers are experiencing difficulty in accumulating the permitted stock. Ganister, limestone, and firebricks are received to requirements, and the foundries in need of ferro-alloys can usually satisfy their needs.

All the re-rollers are well placed for business for sections, bars, and strip, while the sheet re-rollers are heavily booked for their outputs. The need for increased supplies of steel semis daily becomes more acute. Some re-rollers have been assisted recently by small consignments of imported steel.

Non-ferrous Metals

The announcement by the Ministry of Materials at the end of last week that the selling price for zinc was to go up by £30 for both grades and of lead by £20 came as a distinct shock to the trade. At the same time it was explained that these increases were necessary to cover increased prices paid to producers, and the consumer has no option but to accept the situation and prepare to shoulder the increased burden of financing stocks and purchases. Nevertheless, these upward adjustments are most disconcerting, being equal, in the case of zinc to 3¾ cents and in lead to 2½ cents per lb. in U.S. currency.

The trade is now asking itself whether the authorities have embarked upon a policy of buying at any price, and, if so, what is to be the end of this battle for the world's marginal supplies of non-ferrous metals. Many people feel that we should cut our coat according to the cloth which we can afford to buy, and that if commodities rise beyond our reach, then the country must face up to conditions of short supply until the situation rights itself, as it assuredly will one of these days. Scrap prices are to be adjusted to meet the changed values of virgin zinc and lead, but it is unlikely that the full rise will be reflected in old metal quotations. The revised prices for zinc and lead, of course, represent new high records for these metals.

Consumption of tin in the United Kingdom in May, according to the Bureau of Non-ferrous Metal Statistics, was 2,263 tons. Consumption of copper was 45,319 tons, against 46,997 tons in April, the drop being due to some reduction in scrap usage. Stocks of virgin metal in the United Kingdom at May 31 were 107,501 tons, compared with 115,040 tons a month earlier. Little change was seen in zinc stocks at 31,954 tons, while consumption, primary and secondary, at 22,746 tons was about 400 tons down. Lead usage was up fairly sharply—from 29,046 tons in April to 30,298 tons in May, both these totals including scrap and remelted lead. Stocks of virgin lead rose from 24,669 tons at April 30 to 27,335 tons at May 31.

London Metal Exchange official tin quotations were as follow:—

Cash—Thursday, £882 10s. to £885; Friday, £880 to £885; Monday, £850 to £855; Tuesday, £837 10s. to £842 10s.; Wednesday, £855 to £860.

Three Months—Thursday, £835 to £837 10s.; Friday, £840 to £845; Monday, £820 to £821; Tuesday, £816 to £818; Wednesday, £824 to £825.

Correspondence

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

FOUNDRY PROPAGANDA

SIR,—Your leading article in last week's issue of the FOUNDRY TRADE JOURNAL made mention of this Association's publicity and you were good enough to make one or two suggestions for the development of its publications programme.

You and your readers will be interested to learn that the Association has already embarked upon three new additions to its bulletin series. The first, entitled "Machining Steel Castings," shows that your thoughts have followed very much the same line as those of the Committee responsible for the Association's publicity, and you will recognise that the other two, *i.e.*, "Buying Steel Castings" and "British Standard Specifications and Steel Castings," follow logically the established sequence.

As you mention the need for some standard book of reference, you will also be interested to learn that this need has been anticipated by the Association whose handbook covering every aspect of steel castings is already written and is now in the final stages of production, and is due to make its appearance in public early in 1952.

As for the steady stream of technical Papers which you wish to see produced, it is the policy of the B.S.F.A. and its sister organisation, the B.S.F.A. Research and Development Division, to maintain an adequate flow of authoritative information about the industry and its products, so that no one need remain in ignorance of the uses to which steel castings can be put, why and how they are made, and how users and producers of steel castings may together make the best possible use of this important process of producing a steel part.

Yours, etc.,
ROBERT BARBER,
Secretary.

British Steel Founders' Association.
Broomgrove Lodge,
13, Broomgrove Road.
Sheffield 10.
July 18, 1951.

WHEN THE MARGAM AND ABBEY WORKS of the Steel Company of Wales was opened by the Rt. Hon. Hugh Gaitskell, Chancellor of the Exchequer, last Tuesday, it marked a climax of four years constructional work by thousands of men who have nearly completed the task of turning 500 acres of marshland and sand dunes into the most up-to-date steelworks of its kind in the world.

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

(Delivered, unless otherwise stated)

July 18, 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, £175; ditto, copper-free, £190.

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

Tungsten Metal Powder.—98/99 per cent., 35s. 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. 11d. per lb.

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

Manganese Briquettes (5-ton lots and over).—2lb. Mn, £46 18s.

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, £855 to £860; three months, £824 to £825; settlement, £860.

Zinc.—G.O.B. (foreign) (duty paid), £190; ditto (domestic), £190; "Prime Western," £190; electrolytic, £194; not less than 99.99 per cent., £196.

Lead.—Good soft pig-lead (foreign) (duty paid), £180; ditto (Empire and domestic), £180; "English," £181 10s.

Zinc Sheets, etc.—Sheets, 15g. 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, 24⅓d. per lb.; rods, drawn, 27d.; sheets to 10 w.g., 28⅝d.; wire, 30½d.; rolled metal, 27⅝d.

Copper Tubes, etc.—Solid-drawn tubes, 26⅞d. 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), £277 to £281; BS. 1400—LG3—1 (86/7/5/2), £282 to £300; BS. 1400—G1—1 (88/10/2), £348 to £360; Admiralty GM (88/10/2), virgin quality, £348 to £350 per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £356 to £390; L.P.Bl, £309 to £322 per ton.

Phosphor Bronze.—Strip, 38½d. per lb.; sheets to 10 w.g., 40⅝d.; wire, 43½d.; rods, 38½d.; tubes, 43½d.; chill cast bars: solids —, cored, —. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 2s. 7½d. per lb. (7%) to 3s. 7½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 3s. 1½d. (7%) to 4s. 1½d. (30%); to 12 in. wide × .056, 3s. 1½d. to 4s. 1½d.; to 25 in. wide × .056, 3s. 3½d. to 4s. 3½d. Spoon and fork metal, unsheared, 2s. 10½d. to 3s. 10½d. Wire, 10g., in coils, 3s. 7½d. (10%) to 4s. 7½d. (30%). Special quality turning rod, 10%, 3s. 6½d.; 15%, 3s. 11d.; 18%, 4s. 3½d. All prices are net.