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Germans Planning Economy

In 1938, there appeared in Berlin a reprint, made under the editorship of Dr. Clans Ungewitter, of a collection of articles from " Die Chemische Industrie," published under the title of " Verwertung des Wertlosen " or " Making the Worthless Valuable "; this strange book has now been translated into English under the title " Science and Salvage."* It certainly has much to say about the salvage of value materials from both kitchen and industrial waste, but much is not and never will be economic, except under stress of war. Thus throughout the book, the reader would be well advised mentally to translate " German economy " to " German war potential." The following extract clearly illustrates this:—" The economic importance of the utilisation of the atmosphere for Germany is clearly shown by the following figures. In 1913, Germany consumed the following quantities of nitrogen-containing fertilisers: 200,000 tons of nitrogen [itemised in the text]. The capacity of the German plants in 1933 would have been sufficient to produce the following quantities of nitrogen compounds: 1,525,000 tons of nitrogen [again itemised]."

We wonder how much of this went into trinitrotolual and the like and how much into true German economy? The utilisation of low-grade iron ores is of universal interest. As quite often concentration involves increased sulphur content, the note that the use of strontianite as an addition to the lime is three times as effective is a matter worth consideration. After the general and rather ridiculous condemnation by German metallurgists of nickel as an alloying agent in iron and steel production, we read with interest that the sole local deposit at Frankenstein in Silesia, after being abandoned after the last war, as being uneconomic, became economic in 1938, although the ores contained but 1 per cent. of nickel. Yet if we remember rightly world prices were much lower. This type of economy also opened up several other types of mines.

The author tells us that imputed iron ores contain gold, but its extraction without government subsidy would not be economic. Hun mentality is nicely illustrated by the silence. " The newly incorporated districts of Lower Austria along the Danube will probably become a valued source of supply *for Germany*, as they are considered to be the most promising in central Europe for successful oil prospecting." The italics are ours. Oil production figures prominently as would be expected, and there is the suggestion of the use of coffee grounds for this purpose. The translators have used the word " grouts "—a word new to us, but its use is confirmed by the Oxford dictionary. Amongst the many ersatz products detailed are textiles from sea weed, leather from fish skins, plastics from fish scales, egg substitute from fish protein, and vitreous enamel frit from ironfoundry slugs.

Dr. E. F. Armstrong, F.R.S., has written an introduction, as he believes that economically borderline cases should be exploited by the State as a means of taking up any slack in industrial employment. If that can be done without damage to the structure of existing industries so much the better. Our view is that this book is valuable as giving hints to the industrial and scientific research laboratories, who might take as their motto, " Where there is muck reduction, there's money." Still its main interest is that it gives an insight into Germany's preparations for the prosecution of war and a warning that her essentials—especially chemists—are still potentially dangerous.

* Published by Crosby, Lockwood & Son, Ltd., 20, Tudor Street, London, E.C. 4. Price 12s. 6d. net.

The Metropolitan Chapter of the American Foundrymen's Association announces that its exchange Paper to the London Branch of the Institute of British Foundrymen is by Mr. A. Cristello, foundry manager of the Eclipse Pioneer Division of the Bendix Aviation Corporation, Teterboro, New Jersey.

Contents

NOTES FROM THE BRANCHES

Wales and Monmouth Branch.—The first meeting of the session, held on October 7, was addressed by Mr. R. D. Lawrie, of Nottingham, on the subject of "Some Interesting Examples of Loam Moulding," illustrated with a range of excellent slides. The lecture was preceded by a tour of a local factory, where tea was served in the canteen. Mr. H. J. V. Williams, Branch-President, presided over the gathering, which represented 60 per cent. of the Branch membership. Mr. Lawrie described his Paper as an illustrated talk, and he held the attention of his audience with his description of each slide, the series of which illustrated details in the moulding of two very large castings. The practical nature of the subject stimulated a volley of questions, every one of which was dealt with to the satisfaction of the company present. Mr. Wm. Williams proposed, and Mr. W. S. Kinsman seconded, a vote of thanks for what they described as an eminently practical discourse most clearly illustrated. They also paid tribute to the ready replies to questions by the lecturer. In briefly acknowledging, Mr. Lawrie made an appeal to the younger members of the Branch to take advantage of every opportunity of increasing their knowledge in every way possible. Their membership of the Institute would then be the first step in a progressive career in the industry.

IRONFOUNDRY FUEL NEWS—XXVI

The current issue of "Fuel Efficiency News," issued by the Ministry of Fuel and Power, draws attention to some statistics, in the recent White Paper of that Ministry, which are interesting to those concerned with the progress of the fuel efficiency campaign. The figures show that, omitting large fuel consumers such as gas and electricity undertakings, railways and coke ovens, an enormous increase in industrial activity from 1941 to 1942 was accompanied by a reduction in fuel consumption from 46.1 to 45.7 million tons—a saving of 1 per cent. A further increase in production in 1943 was attained with a fuel consumption of 43.9 million tons—a further 4 per cent. saving. Nor was this creditable achievement due to a major change-over from solid fuel to gas or electricity.

The above results reflect the greatest credit on the work of the Ministry's Fuel Efficiency Committees and the Trade Association Fuel Committees, and the efforts of individual domestic and industrial consumers.

There can be no relaxation now, however, for, following the warning in last week's article in this series, the same issue of "Fuel Efficiency News" contains the definite statement that "coke will be scarce this winter."

The [American] National Association of Manufacturers has issued a special pamphlet designed to instruct foremen as to their duties to demobilised soldiers who are entering or re-entering industry. Special emphasis is laid upon the attitude to be adopted with the physically disabled.

CASTINGS DEFECT CHART

The third issue of "Foundryman's News Letter," the house organ of the H. W. Dietert Company, 9330 Roselawn Avenue, Detroit, 4, Michigan, U.S.A., carries a double page table set out as a castings defects chart. Fourteen typical defects are listed against seventeen potential causes, sub-divided into cause and remedy. Thus, where a difficult shake out is encountered, the following remedies can be applied:—(1) Increase the grain size and reduce the fines of the facing sand; (2) reduce the moisture content of the sand; (3) reduce the clay substance or select new bind; (4) select special compounded materials for the facing; (5) reducing ramming energy; (6) increase the refractoriness of the sand and reduce any flux content it may contain; (7) increase carbon content or carbon-producing materials.

It is only fair to the publishers to state that the chart is not meant to be a conclusive work, but as a suggestive guide that may prove helpful in the advancement of casting technique. We feel sure that a request addressed to Detroit will procure interested readers a copy of this chart.

WOLVERHAMPTON PRODUCTION EXCHANGE

Since its inauguration some 15 months ago, there have been 55 meetings, and deals to the value of £756,900 have been reported. A feature of the Exchange, which is held on Tuesday afternoons, has been a long series of "talks" by some of the best known personalities and experts in the country. This scheme seems to rank amongst the most successful in the country, and a booklet they have published emphasises the great contribution production exchanges can make to the war effort.

RECENT GERMAN DEVELOPMENT IN CAST IRON

Piwowarski, in a recent issue of "Die Giesserei," states that rolling mill tests have shown the feasibility of rolling cast iron. The reduction per pass ranged from 10 to 20 per cent.; this is of the order of high carbon steel. Tensile strength and elongation are said to show large increases. Another development reported upon is reinforced cast iron, through the use of 3 to 5 per cent. of steel, which is said to lead to an increase of 2.5 to 3.5 per cent. in the transverse strength.

The Missouri Pacific Railroad Company has placed an order with the American Car & Foundry Company for twenty-five 70-ton hopper cars, to be constructed from aluminium alloy plates and sheets instead of steel. It is regarded as an experiment designed to increase the pay load of trains.

MECHANICAL HANDLING IN FOUNDRIES

Discussion on the Report by the Mechanical Development Sub-Committee of the Technical Committee which was read on behalf of the Sub-Committee at the annual conference of the Institute of British Foundrymen by Mr. J. W. Gardom. Mr. Daniel Sharpe occupied the chair. The Report was printed in our issues of July 13, 20 *and* 27.

The CHAIRMAN said there was a very great deal of material in the Report which should be very helpful, to smaller foundrymen particularly. The Sub-Committee were to be congratulated upon having taken that angle of view when they were carrying on their discussions.

MR. A. S. BEECH, M.I.Mech.E. (Member) regretted that it was not possible for him to congratulate the Sub-Committee on the Report. Whilst one might have a certain amount of sympathy with them due to the restrictions which they placed upon themselves, namely, only to deal with general principles of each method or device described, and to cut out all reference to all proprietary articles or plant, the result had been that the Report generally was of a very elementary character. It further appeared lamentable that such a document should have been drawn up by a committee and presented for the consideration of an intelligent body of foundrymen, many of whom had already had much practical experience with mechanised plants. In addition, the Report, as presented, was full of errors of commissions and omissions, most of which needed exposing. On the other hand, to deal with the matter properly it would need a completely new Report, and consequently he was only proposing in his criticism to deal as briefly as possible with some of the main outstanding faults in the Report.

No mention was made in the Report of design and quality of the various units, and he felt that these points needed emphasising, owing to the very bad conditions under which plants of this description usually had to function. Most of the failures and disappointments, in respect to mechanisation, experienced in the past in foundries in this and other countries, had been due to these factors, and this had, in some cases, given mechanisation a very bad name, which it certainly did not merit.

The following points appearing in the Report were only some of those which needed correction:—

Position of Sand Mill

He saw no reason to insist on the sand mill being elevated above floor level. There were many facing sand installations where the sand mill was at floor level and the sand was elevated after milling by means of an inclined belt, feeding into some receptacle, and this arrangement worked extremely well and was independent of deep foundations or heavy supporting structure. With regard to the statement by the Committee that "inclined chutes are a potential source of trouble, since sands will build up on all but the steepest angles, and as a consequence it is better to avoid inclined chutes where possible," he wished to draw attention to the fact that, in his opinion, the difficulty had been overcome by a newly patented device.

Bucket Elevators

Mr. Beech most strongly contradicted the statements that the correct manner to operate an elevator was to create an artificial sand bottom and allow the bucket to "dredge" through such a sand bottom. He thought that foundrymen who had had practical experience with the use of elevators would agree that to adopt such a practice would be asking for trouble.

It must be remembered that when buckets were continually "dredging" on the sand, it would become hard, owing to the continuous scraping, and this would certainly cause friction, the effect of which would most assuredly be disastrous in an elevator which was generally running at a speed of approximately 200 ft. per min. An elevator should only be selected where space forbade the use of an inclined belt, because amongst other things, it was never possible to see what was happening inside the elevator casing. Consequently, the elevator and the feed to such apparatus should be designed and built so as to avoid any "dredging" at all, and the feed should be direct into the ascending buckets.

For the benefit of the Committee he would inform them that there were many elevators in existence in British foundries which had been in operation for years, and the design of such elevators and the manner in which they were fed and the steps which were taken to avoid "dredging," even to the smallest degree, clearly proved that the Committee were definitely wrong in this direction. He further disagreed with the Committee when they said that it was advantageous to arrange the tensioning device of the elevator at the head. His reason for this statement was that the point of discharge would vary with the tensioning and surely it was very important that the point of discharge of the elevator should be constant into the receiving item. Thus he maintained that it was clearly indispensable that the tensioning device should be at the foot of the elevator and not at the top, as suggested by the Committee.

Tilting Bucket Conveyors

In his opinion this type of conveyor should never, in any circumstances, be embodied in any mechanised plant. The maintenance costs were not only high, but were positively prohibitive. The so-called advantages mentioned in the Report in favour of this type of conveyor could be obtained from ordinary conveyor belts, or a combination of a bucket elevator and conveyor belt. The efficiency of the elevator and belt was far above that of the tilting bucket conveyor, without even mentioning the difference in capital outlay and maintenance costs.

Mechanical Handling in Foundries

Belt Conveyors (Flat and Troughed)

The Committee suggested that guide rollers should not be fitted to a conveyor belt as the only means of obtaining a true-running belt, and suggested that misalignment was caused from sand being deposited on the tail-pulley. He pointed out that misalignment was not only caused by sand on the pulley, but also was caused by other factors, such as uneven friction between the skirting and belt, the action of ploughs on the belt, uneven distribution of sand on the belt, and consequently, as these factors were very often difficult to control, it was definitely advisable to insist on guide rollers to overcome misalignment. He also questioned the speed of 100 to 150 ft. per min. given by the Committee in the paragraph for flat belt conveyors. He would suggest that it would be advantageous to run these belts at 200 ft. per min., so as to minimise overloading as much as possible. Moreover, where a belt was situated under a knockout it was of definite advantage to run it at a speed of 200 ft. per min., so as to reduce as much as possible the time that the hot sand was on the belt surface. In addition, the higher speed was preferable because the throw of the sand at the head-drum cleared the bottom of the chute, and thus the risk of sand sticking on the chute was considerably lessened. He was also somewhat surprised to read the strong statement relating to sand distribution into hoppers by means of ploughs, which clearly indicated that such ploughs had to be controlled either from foundry floor level or from an overhead walkway, or, in other words, that the filling of such hoppers was not automatic. A simple patented arrangement which operated extremely well did away altogether with the need for an overhead or independent operator.

Scraper or Push-Plate Conveyors

The speaker did not agree with the Committee that in all cases the hoppers were fed automatically from this type of conveyor. This might be the case when only a few hoppers had to be fed, but it was not the case where, say, twelve or fourteen or more hoppers in a line needed feeding. Although the stream of sand was divided, or, in other words, the apertures connecting the trough to the hoppers were gradually offset in order to feed a few hoppers simultaneously, it was generally found in practice that it was a case of "first come, first served," and from actual practice he had observed that the hoppers at the end of the line were generally waiting for sand until the ones higher up the line were filled up, before they received a supply. As he said earlier, therefore, this conveyor was only automatic where a very few hoppers had to be served, and whilst it could be improved by having a very wide conveyor trough, this could hardly be a practical or an economic proposition, especially in view of the arrangement mentioned previously, for automatically filling hoppers with a belt and plough.

Apron Plate Conveyors.—Here again he entirely disagreed with the Committee when they stated "whereas a belt conveyor requires regular and continuous feeding." This was certainly not the case, providing equaliser scrapers were provided where required. He could demonstrate in several foundries a belt conveyor dealing quite successfully with as many as ten knocking-out stations, distributed along its length. There was no doubt that intermittent loading could be dealt with quite successfully by a belt, if the problem and method of dealing with it was understood.

Roller Tracks.—These should not be used when metal was continuously available, because the moulds must be pushed by hand, which defeated the object of a mould conveyor. There were other, many other, manifest disadvantages not mentioned in the Report, but he had not the time to deal with them fully.

Overhead Chain Conveyors.—These, to his mind, were much more suitable for core conveying than for moulds, due to their inaccessibility for pouring purposes and lack of steadiness of the plates. In any case, if they were used they should only be used for very small moulds, where the gate was always at the front of the conveyor plate.

Plate Conveyors.—Through lack of time, Mr. Beech confined his comments to the omission to describe what was probably the best type of plate conveyor, namely, the complete table top type, driven by two lengths of chain at approximately 8 ft. centres, and fitted with steel plates underneath, with special steel rollers on the outside of the axles, and four cast-iron rollers on the inside of the axles for taking such conveyors around curves. Many of such conveyors had been operating for ten years and more, and were certainly the very best of this type of mould conveyor yet used in any foundry.

He could certainly have criticised many other matters in the Report, but already had taken up too much time. He would repeat that to go through all the statements made in the Report would need a special Report of its own. Finally, he regretted to state that in his opinion there was absolutely nothing in the Report what would add to the already accumulated knowledge on this very interesting subject, and as such he considered a great chance had been lost. To sum up, the Report, coming from such a source as a committee, should have been above criticism, and it was certainly very far from that.

Is Mechanisation Worth While?

MR. H. J. YOUNG (Member) said that the Report, being compiled by a Sub-Committee, was one with which he was not in close agreement. The midst of a great mechanised war was not a good time to propagate or to consider this subject. They had become used to vast outputs at remunerative prices, to mass production such as that read about in overseas magazines, they had become accustomed to labour scarce in quantity and accomplishment. They could only with difficulty drag themselves back to realities, to the fact that they were not the U.S.A. or Canada, to the other fact that there were days when healthy, hearty, youthful labour shifted things in the foundries, and shifted them well.

The youthful labour would return. He (Mr. Young) was one of those who were caught in the depression which overwhelmed the ironfoundries and all else associated with the shipping and marine industries, and which rendered workless for six and more years tens of thousands of foundry workers and others. To-day he saw the seeds of what might develop into a similar happening. There were great foundries fitted with labour-saving devices regardless of number or cost. Many of these foundries did not exist before the war. They needed to be considered by any foundry owner thinking of putting in new plant. Moreover, no unit should replace a man unless substantial benefit was assured. The Report was a glossary of everything the Committee could think of, much of which he seemed to have seen in operation in Continental foundries before 1932; perhaps in this country also.

Furthermore, the Report was based on a somewhat disparaging view of the knowledge of the few foundries it concerned, because it was very full of platitudes. For example, taking the subject of stockyards at cupola level, the Report said, "This arrangement obviates the necessity of hoisting materials to the stage, and the charges may be introduced into the cupola by any of the methods previously described. It is necessary to lower cupola patching material to the cupola base. A hoist or lift is therefore required for this duty unless another route for barrows can be conveniently arranged. Similarly dirt and debris from the cupola drop must generally be disposed of by raising to the stage level." How employees entered was about the only problem not solved on this pit-like site.

The Report recommended that incoming materials should not be delivered to storage bins but to the working stock bins. This was quite contrary to what he knew as the best practice, in which incoming pig-iron was not used until it had been analysed and all mixtures regulated to suit the slight differences which were generally found. Hence, whilst one bin of that particular pig-iron was in work, another bin of it was being analysed, and would be put into use when the first was exhausted, and so on. He was sorry to be unable to appreciate the Report. He would wish to see something "alive." Foundry mechanical devices were problems of the highest order and importance. But they *were* problems, and the recitations of their names and purposes solved each problem not at all.

MR. J. W. GARDOM assumed, in the first place, that both Mr. Beech and Mr. Young did not agree with the way the Report was written. Personally, he felt that the Sub-Committee had done an excellent piece of work by giving rise to such a discussion. Such criticism was bound to be helpful, because, after all, there were some members present who did not know quite so much about mechanised foundries as Mr. Beech and Mr. Young, or the Sub-Committee. Members of the Sub-Committee had operated foundries, and some of them, strange as it might seem from the previous criticism, successful foundries. It was expressly stated in the Report that the Sub-Committee were not dealing with any particular plant; it would be appreciated that a committee could not do so,

Location of the Sand Mills

Dealing with the location of the sand mill, Mr. Gardom said it could be put on the floor level, but it should not be forgotten that it would then be necessary subsequently to elevate the sand to moulding machine hoppers. It was a question of price and economy as to whether sand mills were elevated or not. It was important for the sand to be delivered into the moulds as soon as possible after preparation, and therefore the mill should be arranged to give the least number of transfers of the sand between it and the moulding station. Speaking on behalf of the manufacturers, unless mills were rigidly supported there would be increased maintenance. Dealing with inclined chutes, he had not yet seen a perfectly satisfactory one to handle sand in any of the foundries he had visited. Particularly was this so with sand suitable for high production.

Mr. Beech had made a point with regard to bucket elevators that if the tensioning device were at the head pulley there would be a varying discharge, but it was as true to say that if the tensioning device were at the tail pulley then the periphery of the edge of the buckets varied and this would probably be more dangerous. For some of the very highly bonded sands the tilting bucket type was perhaps the only suitable type of conveyor, but the Sub-Committee had sought to illustrate all types of conveyors in use. Mr. Beech was well aware that the tilting bucket type was being successfully used in quite a number of foundries.

In connection with the misalignment of belt conveyors Mr. Beech had suggested that the most important thing was to use the pulleys on the side of the belt. It was stated in the Report that misalignment should be overcome if possible without any forcing mechanical means, namely, by paying attention to correct installation and afterwards keeping all idlers and pulleys clean. Generally speaking, proper alignment of a belt should be the concern of the millwright. Apparently Mr. Beech did not agree with this.

MR. BEECH said that in the Report the misalignment of the belt was attributed to sand getting on to the head pulley. His point was that there were very many other factors which caused the belt to run out of true. It was definitely advisable to insist on side guide rollers to overcome misalignment.

Scraper Conveyors

MR. GARDOM said the best thing to do was to discover the cause of the misalignment and remove it. He (the speaker) had until recently subscribed to Mr. Beech's view with regard to the scraper or push-plate conveyor, namely, that it could only be used for short runs, of the order of eight or ten moulding machines. There were, however, many excellent plants working at the present time where more than ten moulding machines were supplied by this type of conveyor. He was now personally inclined to think that the scraper conveyor was the best method of handling sand to moulding machines. The makers of these appliances had very greatly improved their products and there were now satisfactory installations of over 200 ft. centres.

Mechanical Handling in Foundries

With regard to Mr. Beech's remarks on plate conveyors, it was better to use roller tracks, generally speaking, for batch metal. He knew of plants where the mould conveyor put in by the designer had been taken out and gravity roller track used instead, the advantage being that all the working parts were away from any splashes of metal.

With regard to Mr. Young's point about the metal going up on to the cupola stage and coming out at another level, followed by an enquiry as to where the moulders got in, he never knew that that gentleman lived in such a flat country that there could not be two levels. Quite a number of foundries were built on the side of hills and discharged their raw materials direct on to the level of the cupola stage, the metal being tapped in the foundry at a lower level.

Future of Mechanisation

Mr. Gardom said Mr. Young had queried whether mechanisation was worth while. One of the finest examples of mechanisation was, perhaps, that of the boot trade, by means of which boots were now made very much more cheaply. There had been no diminution of labour in the boot trade from the day that mechanisation was introduced into the industry. Even in peacetime the employment of labour was greatly increased, and everyone was shod. If a mechanised foundry could make a good casting cheaply then the natural result would be that more castings would be sold, and having regard to the possibilities of future international competition it would be necessary for this country to increase its production in order to maintain employment at a reasonable level.

Mr. P. D. Pincott (Member) could not associate himself with the sentiments of either Mr. Beech or Mr. Young. On the whole he considered the Report had been very well presented, and he was not going to criticise it in any way whatever. Some further information respecting the plate conveyor (Fig. 17) would be welcome, as it was something new as far as he was concerned. It appeared to be a bogie conveyor with a motor and gear-drive which seemed to be taken from the lower rail. The conveyor was described as of the "train" type. Was its source of origin foreign or was it first brought into use in this country? Again, was it a continuous plate conveyor or was it, as it was named, a train? In other words, the equivalent of an engine hauling a length of conveyor behind it. The point was perhaps rather a small one, but he would be very interested to receive further information concerning it.

A Push-button Control Train

Mr. Gardom amplified the information contained in the Report by means of a diagrammatic sketch on the blackboard. The motive power, he said, was supplied by an electric motor which picked up its current through collectors on cable or rail. The number of mould-carrying plates provided was equal to the number of moulding machines or the number of moulds put down at a given point. When the train at the moulding station was fully loaded, a button was pressed, and the train moved on to the next station, and another train moved into the moulding station. Each subsequent operation was controlled in a similar manner. An advantage of the system was that increased cooling time could be obtained by shunting a train into a siding. The illustration of this type of a conveyor in the Report had been taken from an American installation.

Mechanised Jobbing Shops

Mr. J. Blakiston, A.M.I.Mech.E. (Member), congratulated the Sub-Committee upon having prepared such an excellent Report; it was above criticism, and he would retain it for future reference. Although it obviously did not set out to describe in detail various mechanical perfections of components, it certainly brought before the 4,000 odd foundry undertakings in this country the possibilities and potentialities of mechanisation in an attractive and understandable manner. There was not a foundry in this country, no matter how small, but could improve its methods by some small degree of mechanisation in some direction.

Mechanisation, however, must be introduced with discretion, as there was such a condition as over-mechanisation. In order to cope with competition after the war, some degree of mechanisation would be essential, while, on the other hand, it would enable working conditions to appertain in foundries which would go far to attract the right type of labour in post-war years.

He was privileged to supervise a large mechanised jobbing foundry where attempts had been made to mechanise a process which the average foundryman hitherto had declared to be impossible. This attempt had been crowned with success, and the working conditions in the particular foundry had shown a vast improvement, and in a district where labour was extremely difficult to obtain on account of competition from light industries, a good-class apprentice was being attracted from the secondary schools; a special apprentice training scheme had been introduced, and the boys appeared to be very happy in their employment.

An Omission

One point about the Report which occurred to him was that the Sub-Committee had not dealt with the use of light railways of 18 in. or 2 ft. gauge, using ball- or roller-bearing bogies which did not require any power to operate. Breakdowns were unknown and they could be incorporated into any system similar to those shown in the Report. A large and highly mechanised foundry in America used electric bogies which, apart from running round the light railway system, interconnected with the continuous casting conveyor system.

Rails at Ground Level

MR. GARDOM thanked Mr. Blakiston for his contribution to the discussion, and asked whether he would recommend the installation of the rails above or at ground level.

MR. BLAKISTON elaborated on the use of narrow-gauge track, and stated the firm with which he was connected worked this at three levels and not two; the stock yard was on the intermediate level and, as far as this was concerned, there was a down grade of 6 in. in 100 yds., which enabled loaded bogies to move with a minimum of manual effort. A 20-lb. standard flat-bottomed rail was used; sleepers were omitted, the rails being concreted flush with the foundry floor. The space between the rails was concreted convex, so that the track could always be swept clean and no lodgments in the rail grooves would be experienced. A further advantage of this system was that the gangways had to be kept clean and clear so that it was always possible to walk freely about the foundry. No points were used and sweeping curves were avoided in favour of two short curves and a straight length. Ball-bearing turntables, giving right-angled turns, were always used. These were very cheap, costing less than £5 each. A very robust 16-cwt. universal tipping type of bogie could be obtained for approximately £17.

MR. GARDOM said he was afraid of accidents due to obstructions caused by tram rails and generally preferred overhead rails. He hoped, however, that members would take note of the method described by Mr. Blakiston, which had been overlooked by the Sub-Committee.

MR. P. A. RUSSELL, B.Sc. (Member), regarded the Report as serving the purpose of a text-book, but he failed to understand the walking beam conveyor. Would Mr. Gardom amplify the description? He wished to support Mr. Blakiston's statement with regard to the light railway track. The floor level was level with the top of the track and it was convex in between.

MR. GARDOM explained that the walking beam conveyor was in use in some American foundries. It was able to carry moulds up to 20 tons in weight and in handling a total load of 375 tons. The principle was that the moulds were supported by a twin length of roller track and were moved forward by dogs operated on a ratchet principle attached to a beam operated by compressed air. The Sub-Committee were indebted to Mr. Kennedy, of the A.F.A., and Mr. Dwyer, of "The Foundry," for the particulars given in the Report.

Core-sand Driers

MR. A. TIPPER, M.Sc.(Eng.) (Member), referred to the drying of core sand, concerning which he wished to sound a note of warning. It was stated in the Report:—". . . If the sand contains a clay content in excess of 2 per cent., it will not easily flow, and for this type of sand, and where quantities in excess of ½ ton per hr. are required, it is more satisfactory to employ a rotary sand dryer. . . ." In his experience, sands with considerably less than 2 per cent. clay content were difficult to handle through stationary type sand driers. He suggested that a figure of 0.5 per cent. clay would be much nearer the safe limit for the use of that type of drier.

MR. BLAKISTON said he was in agreement with that statement.

MR. GARDOM thought all members of the Sub-Committee would prefer the rotary drier for handling large quantities of sand, and he appreciated Mr. Tipper's warning and was in full agreement with it.

Automatically Discharged Hoppers

Mr. Gardom then read a written contribution to the discussion which had been received from MR. BASIL GRAY (Member), as follows:—"The Committee are to be congratulated on their Report, which gives a comprehensive survey of mechanical handling in foundries at the present time. One statement should be corrected, however, namely: 'It is not practicable automatically to discharge the requisite amount of sand into the hoppers . . . and the ploughs must therefore be controlled by an operator when feeding from a rubber belt.'

"It not only is practicable, but hoppers have been in operation in this country for nearly ten years which have been fed automatically without the slightest trouble. The hopper, which is of about 30-cwt. capacity, is suspended on trunnions rather above its centre of gravity. The trunnions rest on levers, which are supported by a counter weight on a knife edge in the middle and the weight of the hopper and sand is balanced at the opposite end of the lever. A simple lever system attached to one side of the bunker raises and lowers the usual type of plough according to whether sand is required or not. The motion of the bunker up and down is about 1 in. and very gentle, and no attention is required except occasional adjustment. The levers, knife edges, etc., are made of steel castings without machining."

MR. GARDOM stated that this was a very interesting contribution to the discussion, and he was aware of a satisfactory application of this idea.

The CHAIRMAN said that, provided there was ample sand on the belt, there could be automatic feed to the hoppers.

Spillage Conveyors

MR. GARDOM said it was an interesting point which had been raised previously by Mr. Beech, though he had overlooked it. His view was that, generally speaking, in the preparation of moulding sand for a mechanised plant, the foundry manager would be well advised to spend a little extra money on horse-power in getting spillage rather than try to get the sand down to the exact requirements of a moulder. He thought that this had been quite definitely proved to be the case. Automatic feeding of the sand to the machines was not worth considering in many cases.

Mechanical Handling in Foundries

The Future Bound up with Mechanisation

MR. J. J. SHEEHAN, B.Sc., A.R.C.Sc.I., A.R.I.C. (Member), wished to refer to the statement made by Mr. Young. He believed that Mr. Young was scared of mechanism or of anything that moved. There was no reason why he should be, though he (the speaker) shared Mr. Young's anxiety as to the employment of men when they returned from the war. Nevertheless, he was very conscious that in the post-war period this country would be in competition with three of the greatest mechanised units in the world, namely, the U.S.A., U.S.S.R., and a defeated Germany. The mechanised Germany had put forward a tremendous war effort, and had tried to mechanise Europe. The U.S.A., by means of mechanisation, had undertaken the task of supplying this country with materials necessary for the prosecution of the war. He regretted to state that, in his opinion, the transport end of the war, the tank end of it, the landing barge end of it, had been, and could be only adequately handled by the U.S.A. alone. In this country, unless they did something on the mechanisation principle, it would have to take a secondary place. He had been connected with foundries for a sufficient length of time to become a realist. His opinion was that, if something was not done in the way of establishing mechanisation in this country, then its people would become merely second-rate sentimentalists.

Vote of Thanks

The CHAIRMAN was quite sure the Report had served the purpose for which it was prepared, and Mr. Gardom had dealt with it in a very capable manner. It was the desire of the members that Mr. Gardom should convey their thanks to the Sub-Committee for the trouble they had taken in preparing the Report. Thanks were also extended to Mr. Gardom for reading it upon that occasion.

The vote of thanks was carried with acclamation.

MR. GARDOM, in responding, said he had thoroughly enjoyed attending every meeting of the Sub-Committee, and his view was that there ought to be more meetings of more committees, so that members could come into closer association with one another.

Written Contribution

MR. D. CHERRY PATERSON, M.I.Mech.E. (Member), wrote:—

He was particularly disappointed at not being present at the reading of the Report by the Mechanical Development Sub-Committee of the Technical Committee, entitled "Mechanical Handling in Foundries." He would like to congratulate this Sub-Committee on this Report, and particularly the title, and for resisting the temptation to call it "Foundry Mechanisation." He began to read it from a critical aspect as one intimately concerned with the design and installation of mechanical handling equipment in foundries for more than twenty years. He found, however, as he continued to read, that the Sub-Committee evidently did not intend this to be a technical Paper, but rather a review of the subject, to bring it easily before the notice of the members of the Institute. He recognised that the illustrations were purely diagrammatic, and he felt that the Sub-Committee would have achieved their object in arousing the interest of the foundrymen in mechanical handling, and the different types possible of being installed in foundries, to such an extent as to cause them to seek advice from the specialists. It should help to make clear to the foundrymen that the handling equipment in the foundry is a distinct and separate problem of the production unit. There was the maker of the actual production machines, such as moulding machines, sand mills, cupolas, and such like, to enable the foundryman to produce his goods.

He was particularly interested in the remark that the handling equipment in a foundry consisted of units not peculiar to the foundry industry, and the mechanical handling engineer, being in the habit of installing equipment in many trades, had the advantage of applying his experience in other industries to the problems in the foundry. The information given throughout the Report was such as may be obtained in any descriptive book on the subject of mechanical handling, but the Sub-Committee had done a good job in presenting it in this way—applying it entirely to the foundry.

The Sub-Committee's Reply

In reply to the discussion the Sub-Committee wrote:—

The Sub-Committee would first like to express their appreciation of the comments and criticisms of the various contributors to the discussion of the Report, and in particular the congratulatory remarks of Mr. Pincott, Mr. Blakiston, Mr. Basil Gray, and Mr. Cherry Paterson. It is gratifying to find that the Report—probably the first independent review of this subject to be published in this country—has aroused the attention of so many able and experienced foundrymen. The Sub-Committee wish to endorse the verbal replies which Mr. Gardom made during the discussion, but take this opportunity to amplify, where necessary, his remarks on the more important issues raised.

The Sub-Committee feel that Mr. Beech's remarks confirm the wisdom of their decision to confine themselves to the principles of the methods and mechanisms discussed, and not to attempt to catalogue the many refinements which individual plant manufacturers almost daily devise. The remarks made by Mr. Young and Mr. Beech, that there is nothing new in the Report are, of course, true. The opening sentences of the Report clearly define the Sub-Committee's policy in this respect, and the Sub-Committee are glad to have Mr. Cherry Paterson's assurance of the value of this method of approach. Mr. Young's conception of the economic effects of mechanical production methods was a very popular one during the 18th and 19th centuries. This aspect is, however, outside the scope of the present Report, but it is considered that Mr. Gardom's references to the effects of the introduction

of machinery to the boot and shoe trade will satisfy Mr. Young so far as the economics of the question are concerned. The Sub-Committee would also refer him to Mr. Blakiston's contribution which is indicative of the improvements in working conditions attainable where mechanical handling of materials and products is practised. Mechanical equipment should not be regarded as labour saving, but as labour aiding.

The Sub-Committee reply as follows to Mr. Beech's comments on specific sections of the report:—

Position of Sand Mills

The Sub-Committee have not insisted on the sand mill being elevated above floor level, they have merely pointed out the advantages and limitations of the mill being on and above floor level as a principle, and could have suggested many other methods of removing the sand in addition to the one described by Mr. Beech.

Bucket Elevators

If Mr. Beech will again refer to the text of the Report, he will see that it was emphasised that sand should be fed directly into the buckets, but it was also recognised that this cannot be done perfectly, and the formation of an artificial sand bottom to the elevator is inevitable, and it is only after this has been formed that the sand can be lifted to the full capacity of the elevator. It is because of this accumulation of sand at the bottom of the elevator that a slatted type pulley is used, and for the same reason it is definitely desirable to remove the tensioning device from this end. Quite apart from the other disadvantages, such as spillage, which occur through the tensioning slides. When the tensioning device is at the top it is usually more convenient, and it can be kept clean and adjusted accurately. No difficulty will arise because of the variable point of discharge if the lowest tensioning position is the minimum permissible for correct discharging conditions.

The Sub-Committee are of opinion that it is impossible in the open bucket type to avoid a certain amount of spillage which will result in some slight dredging, but agree that every endeavour should be made to keep this to a minimum. Bucket elevators have a very useful and important function in foundries, and many are working very satisfactorily in the manner described, which is the outcome of actual experience.

Tilting Bucket Conveyors

With regard to Mr. Beech's statement that this type of conveyor should not in any circumstances be embodied in any mechanical plant, the Sub-Committee would point out that tilting bucket conveyors are being used successfully in many foundries, and if Mr. Beech will refer to the Report he will see that the Sub-Committee recommend that consideration should be given to this type of conveyor, where the special advantages of multiple point feeding and discharging can be fully utilised.

Belt Conveyors

It is felt that Mr. Beech and the Sub-Committee are really in agreement on the fitting of guide rollers to belt conveyors. Mr. Beech is inclined to insist on guide rollers to overcome misalignment, but the Sub-Committee insist that they should not be relied upon as the only means of obtaining a true running belt. The operative word is only. The Sub-Committee recommend that the tensioning pulley and idlers should also receive attention.

Mr. Beech questioned the speed of 100 to 150 ft. per min. The Sub-Committee would refer Mr. Beech to the opening paragraph in the appendix: "Wide variation of these figures will be found in general engineering practice, but they are typical of foundry applications." It might also be pointed out that if the knock-out belt is running at 200 ft. per min. instead of 150 ft. per min., then while the hot sand is on the belt only three-quarters of the time for one revolution of the belt, it is on the belt one and one-third times as often for the same tonnage of sand. Stated more simply: For a given amount of sand, if the belt be running twice as fast, half the hot sand is on the belt twice as often. It is difficult to see the thermal advantage of Mr. Beech's reasoning.

Scraper or Push-plate Conveyors

In observing the supply of sand to hoppers over moulding machines Mr. Beech has overlooked the fundamental fact that if some hoppers are not being supplied with sand that can only mean that insufficient sand is being handled, and it has no relation whatever to the type of conveyor which is used for distribution. As far as push-plate conveyors are concerned, it must be obvious that (to quote the Report) "if the amount of sand passing along the conveyor is always slightly more than the total required, all stations will be kept supplied." Under these conditions the adjustment of the hopper apertures such as Mr. Beech suggests is quite unnecessary, and it is a fact that push-plate conveyors will supply any number of hoppers in a line entirely automatically.

Apron-plate Conveyors

In connection with his remarks under this heading, the Sub-Committee are indebted to Mr. Beech for pointing out that an impression has been given in the Report that belt conveyors are unsuitable for handling sand from knock-out stations. The Sub-Committee agree with Mr. Beech that belt conveyors are employed in this capacity, and that it is desirable to arrange for the sand to be equalised by scrapers or other means.

Roller Tracks.—Mr. Beech agrees that in some circumstances (notably where the metal is available in batches) roller tracks should be used, and with regard to his statement that the moulds must be pushed by hand, the Sub-Committee would refer him to the three methods of power-operated roller track which are described in the Report.

(*Continued overleaf, column* 2.)

BOOK REVIEW

"Patternmaking for Gears," by G. Offiler. Published by Charles Griffin & Company, Limited, 42, Drury Lane, London, W.C.2. (Price 7s. 6d. net.)

Cast tooth gears of all kinds and especially of large dimensions often prove something of a mystery to the patternmaker, particularly in regard to their marking out and moulding. The Author deals carefully and practically in very thorough manner with this section of patternmaking, which, being allied so closely with the operation of the gear moulding machine, requires a rather special study quite apart from the many other fields of engineering castings which provide numerous problems and jobs for the patternshop.

Whilst modern machinery such as the pattern miller can very quickly and efficiently produce gear wheels of all kinds, including worms and bevels, etc., the patternmaker must, as an essential background to his learning and accomplishments, be able to produce such patterns by hand, and in sectional form, and above all to know the essential principles of marking out, moulding, and tooth formation, all of which are contained in this book.

The opening chapters take the student and the practical man through simple formulæ, with their practical application, on to the many ramifications of part core and part strickle, and comprehensively deals with corebox construction in addition to the sectional tooth blocks necessary for employment on a gear moulding machine.

Some readers with wide experience in the many other methods of patternmaking and moulding of all types of cast gears may think this book somewhat narrow in its treatment, but the chapters relating to worm-wheels and tooth shapes are worthy of thorough study by the experienced journeyman as well as the student, wherein as in the preceding chapters, ample illustrations and sketches are provided to enable the practical following and application of the text.

It should be appreciated that the average patternmaker is scarcely likely to be as familiar with the versatility of the gear moulding machine as the Author of this book, and indeed many will not know the existence of such a system of moulding.

In view of these facts, a book dealing so completely with an important section of patternmaking and foundry practice should prove a most useful "reference-guide" to every patternmaker and student, even though such class of work may not be the immediate concern of the individual.

B. L.

Payment by results has increased earnings in 86 American shops by 18 per cent., whilst reducing labour costs by 12 per cent. Production was increased by 42 per cent. The shortage of man-power still exists, and now the authorities have permitted the sending of C.O.D. telegrams which read "I'll take a foundry job." Contracts are being made for 90 days.

THE EFFECT OF HYDROCARBON GASES ON REFRACTORY MATERIALS

Mr. E. Rowden has undertaken a further study of the action of methane on certain firebricks, and has summarised his results in the Bulletin of the British Refractories Research Association in the following statement.

Certain firebrick specimens when subject to the action of methane at 800 deg. C. were disintegrated after 15 to 40 hours. The iron spots in the brick were the foci of the attack, carbon being deposited at the iron spots, this carbon deposition and accumulation apparently causing the disrupture of the bricks. Analyses of the gases leaving the furnace tube showed: (1) Pronounced decomposition of the methane into carbon and hydrogen, to the extent of approximately 25 per cent., occurred only when the specimens were disintegrating. (2) Small percentages, of the order of 0.5 to 2.0 per cent., of carbon monoxide to be present. This may have been produced by reduction of the oxides present in the brick, such as the iron oxide. (3) Traces of unsaturated hydrocarbons, but usually the amounts were practically negligible. The rate of disintegration of the specimens bore no relation to the total iron content of the brick, although it must be related in some manner to the iron present. Silica specimens were found to resist the disruption by methane at 700 deg. C., 800 deg. C., and 900 deg. C.

The world has sufficient copper above ground to satisfy the normal requirements of industry for four years. Thus it can be assumed that it will be amongst the first metals to be decontrolled on the conclusion of hostilities. Moreover, the U.S.A. is said to have sufficient base metals now available to last for three years of peacetime production.

MECHANICAL HANDLING IN FOUNDRIES

(*Continued from previous page.*)

Overhead Chain Conveyors.—The Report shows that the Sub-Committee generally agreed with Mr. Beech's remarks under this heading, but the objection which he raised in his second sentence will not arise where a conveyor of the type illustrated in Fig. 13 is employed.

Plate Conveyors.—The Sub-Committee considered that by describing the trolley plate type of mould conveyor, and making reference to the caterpillar drive, the points raised by Mr. Beech under this heading are covered.

In reply to Mr. Young's objection to the use of working stock bins for the receipt of newly delivered material, it is entirely agreed that materials such as pig-iron should be analysed and sufficient bins should be available to enable deliveries to be isolated until released. The point the Sub-Committee wished to make was that delivery to main storage entailed increased handling.

PLEA FOR A NEW ASSESSMENT OF CASTINGS

MR. G. R. SHOTTON'S PRESIDENTIAL ADDRESS

For the opening meeting of the session the Birmingham, Coventry and West Midlands Branch of the Institute of British Foundrymen registered an attendance of over 50, which included Mr. J. W. Gardom, President of the Institute. It was held on September 29, at the James Watt Memorial Institute, Birmingham, and Mr. G. R. Shotton, Branch-President, delivered his presidential address entitled, "Castings in Their True Perspective," in the course of which he said:—

Mr. Sheehan and Gentlemen, it is generally considered by foundrymen that commercial users of castings, and perhaps even the engineering industry as a whole, show a lamentable lack of appreciation for the art of founding, and of the very considerable technical knowledge which is essential for the successful production of good castings. It is no exaggeration to say that all too often are castings regarded as a purely raw material, only one stage removed from ingots or billets. The value of a casting is regarded as the value of so many pounds of metal which have been poured into a sand mould, and the whole emphasis when assessing value is on the basis of "X" pounds of metal at "Y" pence per lb.

There is a similar lack of appreciation for the wide variation in production cost of different castings in the same metal. Many commercial users of castings still use, as a yardstick of value, a purely arbitrary "average cost per lb." for castings in any one particular type of metal, and they are often intolerant of any appreciable variation from that average cost per lb.

Redesigning to Reduce Buying Price

Any foundryman could quote examples, at a few seconds notice, to show how two castings of approximately equal size, required to fulfil the same function, can vary 100 per cent. in production cost per casting; and if the variation in production cost is translated into cost per lb. of the respective castings, the variation may be considerably greater. One could cite innumerable cases of unnecessary intricacy in design which had the sole object of reducing the weight of the casting by an odd pound or so, in the expectation that the cost would thereby be reduced, but which had the contrary effect of increasing the production cost by 25 per cent. or more.

To the foundryman, such statements sound elementary, and are obvious truths. If one discusses a specific example with an engineer, mentioning production operations in detail, he will be quick to admit the logic of the argument; and he will often be equally quick to repeat the error on a subsequent design!

This is often puzzling to the foundryman, unless he really appreciates how very deep rooted in the engineering profession is the conception of a casting as so many pounds of metal. If a component is to be machined from steel bar, the value of the metal used is a constant for any one grade of metal, and the value of the component is mainly governed by the cost of machining. If the component is to be fabricated, or made as a drop-forging, full credit is given to the cost of the production process involved, and no engineer would envisage for one moment the possibility of buying such fabricated articles or forgings at an average cost per lb. Is it logical then, to expect to buy castings on such a basis?

Although the phrase "cost of metal at the spout" is probably quite unknown to most engineers, there is undoubtedly a strong tendency to regard the value of a casting from this angle, *i.e.*, so many pounds of liquid metal, of more or less constant value, poured into an appropriately shaped impression in sand. The cost of producing such a sand impression (or mould) would be expected to vary somewhat, but is *not* expected to influence very greatly the value of the molten metal poured into this mould. Certainly there does not appear to be any real appreciation of the individuality of a casting nor of the extent to which a high labour cost for moulding and coremaking is normally reflected in increased costs for indirect labour and subsequent process labour.

Securing Recognition of Value

It therefore behoves the foundry industry to secure full recognition of the casting as a manufactured article, instead of a semi-raw material. A casting should truly be regarded in the same light as a component machined from the bar, or a fabricated article. The value of any particular casting might then be assessed on the following basis:—

1. *Production Cost.*—(*a*) The man-hours of labour necessary to produce it; (*b*) the value of materials used in its manufacture; (*c*) the cost of technical staff and control methods, and the overhead costs of the organisation, and (*d*) the capital value of the technical knowledge and skill necessary for its successful production.

2. *Engineering Value.*—(*a*) Physical properties of high standard; (*b*) absolute reliability—(*i*) metallurgy, and (*ii*) freedom from physical defects likely to lead to failure in service, and (*c*) smooth finish and pleasing appearance.

3. *Processing Cost.*—(*a*) Readily machinable, and absolutely consistent; (*b*) accuracy—(*i*) A minimum of work to be subsequently expended in bringing it to its final form, and (*ii*) its accuracy for jig location for subsequent machining operation; and (*c*) low scrap return, thus avoiding wasteful expenditure of labour and materials in machining or other processes.

Production Costs

If we examine first the items listed under production cost, it will be recognised that from the foundry viewpoint, items (*a*) and (*b*) (man-hours of labour and material cost) are purely domestic matters of cost accounting. But a better knowledge of foundry technique, and a consequent ability to estimate production procedure, with its effect on labour cost, would be invaluable to the engineer during the initial stages of design.

Unnecessary intricacy to reduce weight, particularly where the object is to reduce cost (as distinct from

A New Assessment of Castings

cases where weight reduction is necessary for engineering reasons), the addition of awkward lugs and brackets which could reasonably be manufactured as a separate component, could all be avoided, and thus facilitate foundry production, reduce the cost of the casting, and perhaps reduce risk of failure in service. Many apparently trivial modifications to design have a disproportionate effect on the cost of the casting by rendering necessary the use of inconvenient feeder locations, and, perhaps, the necessity to mould the pattern of a plane which further complicates the moulding, in order to overcome shrinkage and porosity.

The designer who has the knowledge to assess these points, which are further reflected in item (*c*) (cost of technical staff and control methods) would be in a position to effect real savings in cost, instead of " chasing the rainbow " of weight reduction to secure a reduction in cost which is often nebulous. The capital value of the foundryman's technical knowledge and skill is largely ignored by foundrymen themselves, but this would automatically produce its just financial reward from a better appreciation by the engineer of the other points discussed.

Engineering Value

The engineering value of a casting, and the attributes listed under that heading, are probably more fully recognised already by the engineering industry. There is undoubtedly a pronounced tendency for users of castings to assess these qualities more carefully, and those foundries which give full consideration to these, undoubtedly acquire a " reputation value " for their products.

Processing Costs

The items listed under processing cost are not so universally assessed by users of castings. The production engineer certainly has a very deep appreciation of the meaning of these qualities in terms of cash expenditure in the machine shop, but, unfortunately, his voice is often lost in the wilderness of the buying department, where prime cost overshadows all other virtues—and vices. It is surprising to find how few engineering factories keep any form of record to show what additional costs are incurred (or saved) in the machine shops, although the ultimate cost of castings purchased may be appreciably varied by these factors.

Surely it is only by the full appreciation of these attributes of an efficiently produced casting that the foundry industry can hope to secure the high status to which its technical developments entitle it. Foundrymen should therefore be quick to exploit and emphasise their successes in this direction, and equally quick to recognise and rectify their failings.

My remarks thus far might appear to lay undue bias on the attitude of the engineering profession, and it is worth pausing to consider how far the foundry industry has most signally failed to " sell itself." In spite of the very pronounced change in the type of products produced by foundries, in response to the demand for high quality castings for modern, mass-production, engineering manufactures, technical contacts and sales propaganda have failed, in the main, to lift castings out of the " raw material " category. The exceptions which prove the rule are the foundries making specialised castings, which secure fuller recognition and appraisement of their products and, very often, a fuller financial reward.

Establishing a New Basis

I would suggest that in this respect the foundry industry has failed in two essentials:—Firstly, by an almost complete lack of propaganda, resulting in a universal failure of the engineering profession to appreciate the production difficulties in the making of castings, or the high degree of technical skill necessary, together with the lack of knowledge of the principles, governing the ultimate cost of producing castings. Secondly, by the undue emphasis on weight as a selling medium, which has undoubtedly biased design and has fostered the tendency to regard castings as " raw material."

Through the medium of their technical contacts with engineers, foundrymen can do much to eliminate the first point, and should be assiduous in this work of enlightenment. The most rapid enlightenment would probably be achieved by absolute frankness on the subject of cost, and a complete taboo on anything in the nature of " average " selling prices. Much might be achieved also by seeking to obtain more emphasis on foundry subjects in all engineering educational courses. To criticise the selling of castings by weight may appear illogical, as the cost can be expressed with the same mathematical accuracy on a weight basis as on a cost per casting basis. But I do feel, however, that it is psychologically important that the cost of a particular casting should be adjudged on its design, and no implication (however insidious) should be made that the cost is only proportional to the pounds of metal contained in the casting.

Considerable thought and time have been devoted in the last few years to the welfare of foundry workers, and more particularly to the recruitment and education of foundry apprentices. I would, however, suggest that the most idealistic of schemes will fail, if the industry cannot achieve a fuller statue and recognition of its technical skill and art, and more particularly, that financial reward which its arduous manual labour and technological skill so amply warrants.

MR. J. W. GARDOM, the President of the Institute, in proposing a vote of thanks to Mr. Shotton, conveyed the best wishes of the Council and officers for a successful session. This was seconded by Mr. D. H. Wood (Senior Vice-President of the Institute), and supported by Mr. F. J. Cook, the oldest past-president. The meeting heartily endorsed the vote of thanks.

Without the advantage of the accompanying film, which was delayed in the post, Mr. J. J. Sheehan introduced a Paper, entitled " Wartime Calls on Women to Make Aluminium Air-cooled Cylinder Heads," by M. J. Gregory, originally given at the Manchester Conference last June.

PATTERN REFINEMENTS

By "Chip"

Patterns are the tools by which moulders are enabled to produce castings. They vary in quality from a few rough pieces of timber, somewhat resembling the required casting, to well-made metal patterns which would do credit to any tool room. The following notes deal with a class of pattern coming about midway between these extremes. Made of timber, they are used for semi-repetition jobs, at regular intervals.

For one-off jobs, or castings required in very small quantities, much is left to the moulder, but when reasonable numbers are required, it is a more economic proposition to incorporate these extras into the pattern equipment and thus save the moulder's time. Each job has to be taken on its merits. It would be foolish to spend a day, or even a half-day, putting prices on a pattern which only saves the moulder seconds, or at the most minutes, each time, as, if only a small number were to be made, the patternmaker's time would be greater than that saved by the moulder.

Assuming, however, that the job is to be standard, then all fillets should be made on the pattern and not left to the moulder to tool them. Other refinements suggest themselves to a thoughtful patternmaker as he observes the moulder at his work. Take the refinement of standard runners and risers. For one-off jobs these are hand cut, but for any number off the same pattern they should be incorporated in the pattern equipment. Not only is this necessary to speed up moulding and economise the moulder's time, but it eliminates one of the variables which can be the means of success or failure on any particular job.

Often, when watching a moulder at work, one sees him cut out various portions of his mould in the vicinity of core prints or seats. The purpose of this is to enable him to connect the vents from the core with the outside of the mould. This cavity is subsequently filled with fine ashes and the gases generated in the core during casting find a ready escape to the atmosphere through the loosely packed ashes in this channel.

Fig. 1 is a typical example; it is a part section of a certain type of cylinder head, with a rather thin water jacket core A with outlets each end, as B. The core vent is brought out to the core print and awa to the joint through C. To economise time in remov ing the sand at C for each mould, a suitable piec.

(*Continued overleaf, column* 1.

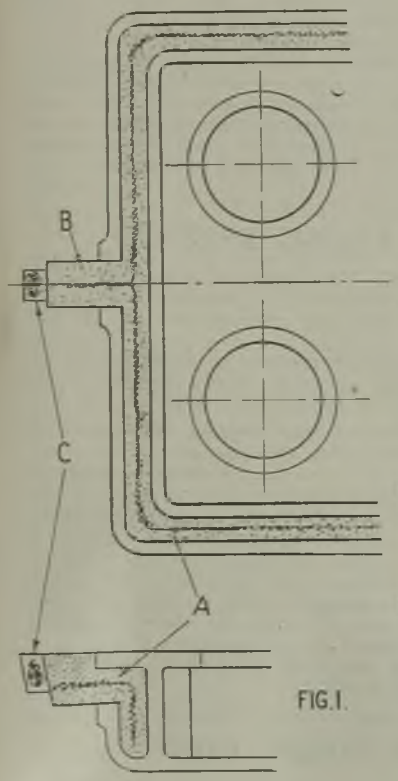

FIG. 1.

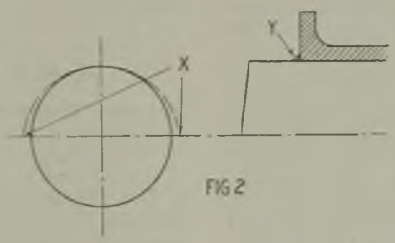

FIG 2

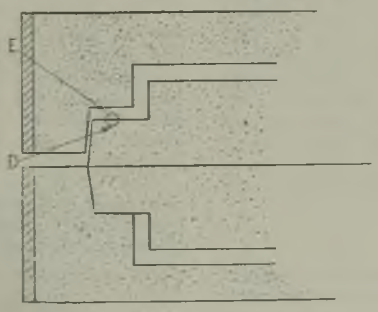

FIG 3

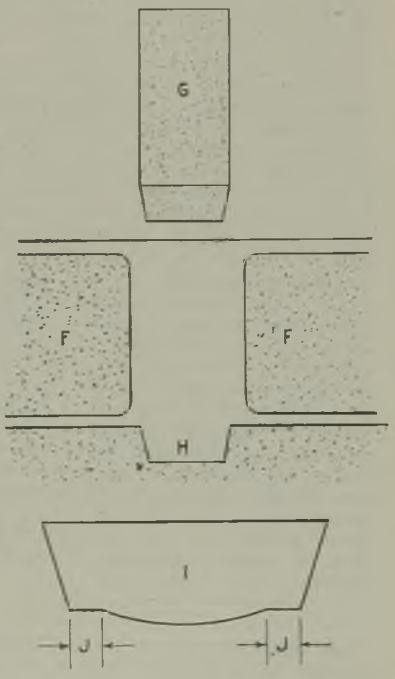

FIG. 4.

PATTERN REFINEMENTS

(*Continued from previous page.*)

fixed on the pattern at this place is recommended, and as such is a time-saving pattern refinement. "Better a flash than a crush" is a well-known phrase of the moulder, and consequently, on assembly, he often eases core prints, etc., to avoid "crushes." For repetition work this could very well be done for him on the pattern. The top halves of core seats could be made slightly bigger than the bottom ones to allow of the easy closing of the mould, as X, Fig. 2, whilst a slight chamfer at the junction of the seat and flange portion as Y would be helpful.

Often, on dry-sand moulds of medium dimensions, the top core seat is made clear all around and a layer of loam placed on top of the core so as to seal when the top is lowered in position. To ensure a perfect seal, the moulder invariably scratches out a groove D on the core in which the loam E may be placed preparatory to closing, as Fig. 3, which shows a portion of an assembled mould, with the top half being lowered in position. The groove takes time to prepare and for standard work a piece should be placed in the core-box to form this along with the remainder of the core.

It has often been noticed that moulds in which a large number of cores have been inserted contain a considerable amount of loose fine dust, such as may be rubbed off cores when they are placed one within the other, etc. This dust has to be extracted before final closing, and it often takes a considerable while to ensure that it is all removed. On certain jobs—such as some types of cylinder moulded vertically—it is possible to assemble all the subsidiary cores first and insert the main bore core last. In such cases it is advisable to resort to a pattern refinement in the form of core print used for the main core. Fig. 4 is a part section through such a cylinder. The jacket cores F are already assembled and the main box core G remains to be inserted.

All loose dust, etc., has been blown from under the jacket cores and accumulated in the print H. The depth from the top of the box makes it difficult for a man to lean over and remove this accumulation easily. To obviate this, the print H can be made as I, in which a bearing of about 1 or 1½ in. is allowed as J, whilst the centre part is slightly domed. This makes an impression into which the loose sand, dust, etc., may conveniently lodge without affecting the setting of the core, or requiring the moulder to remove it by reaching and risk damaging some part of the mould. These are but few of the many refinements which could be incorporated in pattern equipment by close co-operation between patternshop and foundry.

An American motor vehicle accessories manufacturer is planning to produce home food dehydrators after the war.

CATALOGUES RECEIVED

Cereal Core Binders. Corn Products, Limited, of Avon House, 356 to 360, Oxford Street, London, W.1, and elsewhere, have issued a 24-page, well illustrated booklet, written by Mr. A. M. Wilson, which gives much useful information on a series of proprietary brands of core binders, based on dextrine. Copies are available to readers on writing to the firm's London office.

Laboratory Apparatus. Griffin & Tatlock, Limited, of Kemble Street, Kingsway, London, W.C.2, have sent us seven very interesting leaflets. Having been a victim, the one piece of outstanding merit is an anti-vibration balance table. This will be of the utmost value to many foundry and steelworks laboratories. Another useful piece of apparatus is a balance desiccator, carrying as an improvement a funnel for the $CaCl_2$ so as to give a maximum surface associated with the removal of the saturated salt by dripping into the lowest section of the apparatus. A third newcomer is a glass tube cutter made from a cobalt, chromium, tungsten alloy giving a Vickers hardness of 850. For vitreous enamellers, there is a vibratory ball mill designed to use porcelain balls for grinding. The metallographic laboratory staff will find interest in leaflet No. 1340, which describes a polishing medium called Microid Polishing Alumina. Leaflet No. 1344 describes and illustrates an apparatus for determining the nitrogen content of steels. Finally another leaflet (No. 1342)—of interest of firms using oils—deals with an apparatus for the determination of benzole toluene and phenols. All these leaflets contain much worth while technical information.

PUBLICATIONS RECEIVED

Post-war Transport. A Report of the Joint Committee of the Association of British Chambers of Commerce and the Federation of British Industries.

This 12-page pamphlet makes a reasoned appeal for freedom from State or monopolistic control of all forms of transport in the post-war era.

British Railways—Facts and Figures. Published by the Railway Executive Committee.

After publishing two excellent pictorial pamphlets, the railway companies have this year reverted to the issuing, apparently free of charge, of a small booklet. This sustains the reader's interest, because its authors have the gift of picking out facts and figures which appeal to the curious—and who is not? The inclusion of a chronological table is new, and adds greatly to the interest of the book, whilst the graph must give real pleasure to the executive officers, as it shows clearly how they have successfully tackled the strenuous wartime conditions.

NEWS IN BRIEF

MIDDLESBROUGH CORPORATION is to obtain tenders for the construction of a purifying plant at the gas-works.

THE U.S. STATE DEPARTMENT has instructed diplomatic and consular representatives assigned to areas liberated from Axis control to expedite reports on economic conditions and trends within such areas for the guidance of both the Government and business.

"STRESSES BY ANALYSIS AND EXPERIMENT" is the subject of a lecture to be given by Prof. A. J. Sutton Pippard, M.B.E., D.Sc., to the Applied Mechanics Group of the Institution of Mechanical Engineers at Storey's Gate, St. James's Park, London, S.W.1, at 5.30 p.m. on November 3.

IN ORDER to spend a further £40,000 on fixed assets the directors of the Anti-Attrition Metal Company, Limited, are offering 250,000 ordinary shares of 2s. each to existing shareholders at 3s. 6d. a share in the proportion of one share for every seven held. Treasury permission for the issue has been granted.

EMPLOYMENT, the most pressing post-war problem, can only be solved by some kind of international co-operation, in the opinion of the National Union of Manufacturers. In a statement of trade policy the union expresses the view that there must also be a greater measure of internal co-operation than there was in the past, especially between business, labour, and the Government.

TO COMMEMORATE his golden wedding, the Council of the Institute of British Foundrymen, at a meeting held at the Queen's Hotel, Birmingham, presented Mr. F. J. Cook, M.I.Mech.E., with an antique Sheffield silver plate dish. Mr. Gardom, the president, in asking Mr. Cook to accept this present, reminded his audience that Mr. Cook was the only founder of the Institute who was still a member.

THE SCOTTISH SPECIAL HOUSING ASSOCIATION, by arrangement with G. & J. Weir, Limited, are to erect 100 improved type Weir houses in various parts of Scotland. Seventy-five of them are to be erected in mining districts in Ayrshire, Fife and Stirlingshire. The foundations are to be provided by the Association, and G. & J. Weir, Limited, hope to begin building in December, and to complete the plan by June, 1945.

AN ARGENTINE COMPANY, partly Government owned and partly privately owned, is being formed for the production of ferrous alloys and special steels. The parties concerned are the Department of Military Factories, the firm Industrias Termoelectricas S.R.L., of Rosario, and a group of private shareholders. The capital will be 500,000 pesos, and the plant will be set up in the district of Rio Tercero, in the province of Cordoba.

ADDRESSING THE Institution of Electrical Engineers at his inauguration as president, Sir Harry Railing stressed the importance of maintaining by all means at our disposal any industrial lead which Britain at present possesses. He suggested increased scientific research, application of engineering knowledge, development of efficiency in design and production, from both a mechanical and a psychological point of view, and planning ahead on a long-term scale.

SIR MILES THOMAS, vice-chairman of the Nuffield organisation, speaking at Liverpool, gave a warning that a full hour's work for a full hour's pay was essential to the success of the social insurance scheme. To meet our expenditure in twenty years' time, we must have a continual improvement of 1 per cent. each year in our productive efficiency. In other words, operating as it does at compound interest, we must establish an improvement of some 30 per cent. in 20 years.

THE COUNCIL of the London Chamber of Commerce, in a report on the Government White Paper on Employment Policy, asserts that industry and commerce have not so far had the guidance and help necessary to enable them to change over speedily from a war time to a peacetime footing. In the Chamber's view the White Paper attaches too much importance to influencing public expenditure and not enough to influencing private expenditure as a method of regulating the volume of consumption.

ON OCTOBER 12, presentations were made by the directors, staff and workers of Keith Blackman, Limited, engineers, of Mill Mead Road, Tottenham, London, N.17, to Mr. Robert W. Sharrow, drawing office chief; Mr. George Cobring, in charge of the mechanical fitters; and Mr. Tom Law, turner, who had each completed 50 years' service with the company. Mr. M. Burningham, deputy chairman and financial director, presided, and the presentations were made by Major G. F. Herron, who has been a director for 43 years.

THE BRUSH ELECTRICAL ENGINEERING COMPANY, LIMITED, Loughborough, has set up a subsidiary company in South Africa under the title of Brush (South Africa) (Pty.), Limited. This subsidiary will initially build buses and coaches and certain electrical equipment in South Africa, and will handle the sale of the following products of the company in the Union:—Turbo-alternators, transformers, switchgear, motors, generators, traction equipment, Diesel electric locomotives, battery electric vehicles and trucks. It will also superintend the distribution of Petter oil, paraffin and petrol engines in the Union.

ADDRESSING DIRECTORS of engineering firms, managers and production engineers at Newcastle-upon-Tyne on his plan for the setting up of a central organisation in the North-East to help the development of the light engineering industry, Mr. R. W. Mann, managing director of Victor Products, Limited, Wallsend, said that it would ultimately mean more employment in the area. Mr. Mann, who was speaking at the invitation of the Ministry of Supply, said that the proposed central organisation would deal with methods of production. He suggested that it would result in larger profits which would enable small firms to extend their businesses. Mr. Mann's plan, which involves financial support from engineering concerns in the area, is being considered by the undertakings concerned. Col. H. B. Leeson, managing director of A. Reyrolle & Company, Limited, Hebburn, presided at the meeting.

PERSONAL

MR. J. W. PLOWMAN, for many years London representative of Dewrance & Company, Limited, Great Dover Street, London, S.E.1, has been appointed sales manager.

MR. J. W. RODGER, director and general manager of Bruce Peebles & Company, Limited, manufacturing electrical engineers, of Edinburgh, has been appointed managing director of the company.

MR. C. W. PRICE has retired from his position as H.M. Senior Engineering Inspector of Factories in the Ministry of Labour. The post is now filled by Mr. L. N. Duguid, B.Sc., A.M.I.Mech.E.

MR. RICHARD HAYES, foreman of general services of the mechanical department of British Insulated Cables, Limited, Prescot, has retired at the age of 79, after 52 years' service. He has three sons serving the company on the works side.

MR. AND MRS. H. R. GATENSBURY, of Penkhull, celebrated their golden wedding anniversary recently. Mr. Gatensbury is the principal of Gosling & Gatensbury, Atlas Foundry, Victoria Road, Hanley, which he founded in company with the late Mr. James Gosling three months after his marriage.

MR. J. SPOONER has been appointed technical representative for the Midlands area for F. E. Rowland & Company, Limited, grinding machine manufacturers, of Reddish, near Stockport, on the termination of their Midlands agency. Inquiries and correspondence should now be addressed to the company.

MR. T. H. SUMMERSON has been appointed chairman of Thomas Summerson & Sons, Limited, railway plant makers, Darlington, in succession to Mr. S. S. Wrightson, who has retired through ill-health. Mr. Summerson is a grandson of the founder of the company, and has been joint managing director for some time.

MR. J. L. CARLYLE AND MR. C. J. GRAYSTON, who have had many years' service with George Scott & Son (London), Limited, and Ernest Scott & Company, Limited, have been appointed directors of these concerns. Both companies are associated with Henry Balfour & Company, Limited, gas and chemical engineers, of Leven, Fife, the managing director of which assumes the managing directorship of the two undertakings.

THE HON. J. K. WEIR has been appointed managing director of G. & J. Weir, Limited, engineers, Cathcart, Glasgow. MR. A. H. LAIDLAW has been appointed a director in charge of sales and contracts, and MR. JOHN DAVIDSON has been appointed secretary of the company in succession to MR. J. D. IMRIE, who has resigned from the position owing to health reasons after 45 years' service. Mr. Imrie's services are being retained by the company.

OBITUARY

MR. BERT HULBERT, who carried on business as an iron merchant at Priory Road, Dudley, has died at the age of 57.

MR. JAMES ARTHUR DANKS, chairman of Danks, of Netherton, Limited, boiler makers and engineers, has died in London at the age of 71.

MR. RALPH F. PLATT, joint managing director of Samuel Platt, Limited, King's Hill Foundry, Wednesbury, Staffs, died after a short illness, on October 10, at Tunbridge Wells.

MR. SAMUEL COLLINS, who died recently at his home in Sheffield, was employed by Cammell, Laird & Company, Limited, for 58 years before his retirement in 1932. Mr. Collins, who was 84, served in various departments, and when he retired was outside assistant to the general manager.

WE REGRET to record the death of Mr. H. L. Reason, who was President of the Institute of British Foundrymen in 1922. Mr. Reason was the first non-ferrous foundryman ever to preside over the Institute. He was a prominent freemason. For many years he has had no direct interest in the industry.

MR. HENRY W. OWSTON, rolling mills manager at the Cleveland Works of Dorman, Long & Company, Limited, has died in tragic circumstances. He was an expert on steel rolling mills, and earlier this year, in company with other officials of the firm, made an extensive tour of rolling mill plants in the United States. Mr. Owston fell from a cliff at Saltburn.

MR. ALBERT GEORGE ROYAL, who had 33 years' service with Palmers Shipbuilding & Iron Company, Limited, at their Jarrow and Hebburn shipyards, before he retired about 12 years ago, has died at the age of 71. Mr. Royal served his apprenticeship with R. & W. Hawthorn, Leslie & Company, Limited, Hebburn. He rose to foreman, head foreman and then shipyard manager with Palmers.

BRITISH STANDARDS INSTITUTION

Lord Woolton was elected president of the British Standards Institution at the annual meeting in London last week. Sir Percy Ashley was elected vice-president, and Sir William Larke succeeded Sir Percy Ashley as chairman of the General Council.

Dr. E. F. Armstrong, F.R.S., chairman of the finance committee, said that the income and expenditure for the year had increased by 28 per cent., and was now about £69,000. The sales of copies of British Standards had gone up by 39 per cent. The Government grant-in-aid was nearly double, and was now £12,900. Whilst there was an increase of some 15 per cent. in the number of subscribing members, he pointed out the need for greater support from local authorities and industry.

Sir Percy Ashley paid a tribute to Mr. C. le Maistre on his retirement after 40 years' official connection with the Institution, and to Sir William Reavell on his retirement from the chairmanship of the Engineering Divisional Council.

COMPANY RESULTS

(Figures for previous year in brackets)

Eastwoods—Dividend of 5% (same).

Colvilles—Interim dividend of 3% (same).

Babcock & Wilcox—Interim dividend of 4% (same).

Thomas Goldsworthy & Sons—Dividend of 6% (5%).

T. M. Birkett & Sons—Final dividend of 10%, making 15% (same).

Dickson & Mann—Trading profit to March 31 last, £2,201; net profit, £1,609; forward, £703 (debit balance of £906).

Smith's Stamping Works (Coventry)—Dividend on the ordinary shares of 10% and a cash bonus of 5% (nil), making 15% (10%).

Bentley Engineering—Net profit for 1943, £15,580 (£14,606); ordinary dividend of 20% (10%), free of tax; forward, £15,794 (£15,911).

Serck Radiators—Profit, £56,852 (£54,094); dividend of 3s. per £1 stock, together with a cash bonus of 2s. per £1 stock, making 25% (same), less tax.

Kayser Ellison—Net profit to June 30, after taxation, etc., £44,888 (£45,827); to depreciation reserve, £15,000 (same); staff benevolent fund, £5,000 (same); preference dividend, £3,000 (same); ordinary dividend of 17½% (same); forward, £12,855 (£12,842).

Cowans, Sheldon & Company—Net profit for the year ended June 30, 1944, after providing for depreciation and taxation, £18,161 (£21,512); dividend of 10%, less tax, £15,000 (same); to general reserve, £3,000 (£5,000); forward, £56,373 (£56,211).

Ductile Steels—Net trading profit, after E.P.T. and N.D.C. depreciation, and war risks insurance, for the year to June 30 last, £26,020 (£24,851); income-tax, £14,000 (£13,000); ordinary dividend of 10% (same); written off goodwill, £5,000 (same); forward, £8,501 (£7,731).

Parsons Marine Steam Turbine Company—Net profit for the year ended June 30, after writing off expenditure on experimental and pioneer work, and after providing for depreciation, upkeep of patents and taxation, £51,523 (£87,324); to plant replacement reserve, £25,000 (£70,000); dividend of 12% (same); forward, £21,847 (£14,339).

Renold & Coventry Chain Company—Net profit for the year to July 2, 1944, after making provision for income-tax and E.P.T. and charging depreciation, £105,098 (£97,461); to contingencies reserve, £50,000 (£45,000); preference dividends, £8,388 (same); interim ordinary dividend of 3%, £13,576 (same); final ordinary dividend of 7%, £31,677 (same); forward, £27,299 (£25,842).

Neepsend Steel & Tool Corporation—Net revenue for the year to March 31, 1944, after taxation, £109,702 (£108,217); final dividend on the ordinary stock of 9d. per 5s. unit, making 1s. 6d., plus a bonus of 1s. per 5s. unit (same); additional preference dividend of 4%, making 10% for the year; reserve for contingencies, £5,000 (same); general reserve, £20,000 (£10,000); welfare fund, £2,000; forward, £18,425 (£13,742).

NEW COMPANIES

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

Price & Edwards (Engineering), 12, Broadway Chambers, London, W.6—£1,000. J. W. Edwards and H. W. Price.

Fuelless Power Company, 4, Great Winchester Street, London, E.C.2—Engineers, etc. £5,000. J. W. and J. H. Ewart.

Hudson Wolff—Engineers, die casters, etc. £2,000. W. S. Wolff, 139, Kings Avenue, Woodford Green, Essex, subscriber.

S. J. Brierley (Wilts), 39, Trowbridge Road, Bradford-on-Avon, Wilts—Engineers, etc. £1,500. S. J. and B. J. Brierley.

Winster Engineering Company, 22b, Chapel Street, Rusholme, Manchester—£2,500. R. Trubshaw, H. White, and J. Waller.

Unifurnaces—Manufacturers of furnaces and kilns, etc. £10,000. C. F. Scott, 4, Throgmorton Avenue, London, E.C.2, subscriber.

H. Romer (London)—Engineers, metalworkers, etc. £1,000. A. H. D. Fairbarns, 11, Sheffield Street, London, W.C.2, subscriber.

Bofrey Company, 39, Sheep Street, Northampton—Engineers, etc. £250. R. C. Humphrey, E. A. Boulter, and H. H. Frisby.

Guardian Equipment Company—Manufacturers of hardware, etc. £1,000. C. G. Shaw, 85, Greenway, Chislehurst, Kent, subscriber.

Thomas Greves & Company, Cherry Street, Warwick—Agricultural engineers, etc. £25,000. Sir G. Kenning and G. Kenning, junr.

J. H. Perry & Son (Lye), Bromley Street, Lye, Stourbridge—Hollowware manufacturers, galvanisers, etc. £6,000. J. H., L. M. and D. Perry.

J. Whitaker Hutchinson & Son, 948, Wakefield Road, Bradford—Engineers, etc. £2,000. E. Hutchinson, and M. W. and S. C. Smith.

USE OF ALUMINIUM ALLOYS IN BUILDING

Work carried out for the aluminium industry during the war had shown unexpected possibilities in all kinds of buildings said Dr. E. G. West, manager of the Wrought Light Alloys Development Association, when addressing members of Birmingham and Five Counties Architectural Association on the subject of "The Value of Aluminium Alloys to the Architect." Up to the outbreak of war, aluminium was used chiefly in luxury flats and hotels. Now it was apparent that there were great possibilities for its use for houses, schools and utility buildings, permanent, temporary or prefabricated. Those possibilities had been revealed as a result of expansion during the war and partly as a result of lower costs and the awareness of architects, constructional engineers and designers of the characteristics of aluminium and aluminium alloys, especially their wide range, strength and resistance to corrosion.

Raw Material Markets

IRON AND STEEL

There has recently been a little more activity in the light-castings industry, due to some seasonal increase in business for heating apparatus, cookers, stoves, etc. Some of the work is for Government requirements, but a proportion represents an increased quota of domestic goods which have been permitted by the Board of Trade. The improvement is welcome, but as yet it has not reached large proportions; it is hoped that further expansion in business will soon become possible. In connection with the general engineering and allied foundries, including the jobbing foundries, very little change can be discerned. In the last few months they have suffered a curtailment in the demands from Government departments, and although a considerable number have remained well employed on special high-duty castings, the trade as a whole is short of work. There is a report that makers of textile machinery are going to be busier, and it is much to be hoped that other industries will be allowed to take on a limited amount of peacetime work. There is ample iron available to meet the engineering foundries' requirements. In the main, these are for low- and medium-phosphorus iron, and hematite where this is permitted, but in place of the latter in recent times considerable quantities of refined pig-iron have been used and supplies of this iron are readily available at the present time. Until recently there have been stringencies in the supply of suitable scrap for cupola use, but latterly the position has improved both in regard to selected steel scrap and heavy cast iron.

There are signs of a tightening in the coke market. Most foundries have taken advantage of the quiet position of the last few months in order to build up reserves, but some users are unfortunate in having insufficient stocking accommodation, and are compelled to depend on week-to-week deliveries. These foundries may find themselves in a difficult position when the winter complicates the supply problem.

Both for their own requirements and also for the satisfaction of the needs of the re-rolling mills, steelmakers are turning out substantial tonnages of billets, blooms and sheet bars. The sheet mills are well covered for current needs, but the call for prime billets is in excess of the supply, and re-rollers are prepared to buy any kind of defective material which can be used for their purpose.

Small bars, light and medium sizes of structural steel, etc., are all in steady demand, and this branch of the industry will be kept busy up to the end of the year. On the other hand, interest in heavy joists and channels is at a very low ebb; the plate mills are in need of orders for the first time since 1939, and supply of colliery and railway material is on a fixed quota basis. The market for special steel also reflects the dwindling output of war material, but wire-drawers are provided with full employment and sheet mills are fairly busily engaged on the lighter gauges.

NON-FERROUS METALS

Copper consumption in this country, although still quite heavy judged from a peacetime basis, is well below the level of the peak of war production. As there are no large-scale civilian releases to take the place of the steady decline in war orders, the demand continues to fall off. The prospects for commercial production are definitely brighter, as the official policy seems to be moving in this direction, if only very slowly. With the high priority now given to the building and repair industry, the copper and brass tube mills should be placed with a fair amount of activity in this connection. On the basis of present consumption, the copper supply position remains very satisfactory. In the United States, also, there is a downward trend in the amount of copper required for war purposes. A few months ago a very tight position prevailed, and the Government were calling for every ton of the metal that could be produced, but now the supply appears to have outpaced the demand, and the time of fuller undertaking of civilian orders seems not so far distant.

In the case of tin, there is still the need for conservation of supplies, but the requirements of essential industries are being covered quite satisfactorily. At the annual meeting of the Malayan Chamber of Mines, Mr. J. H. Rich said that the Government were fully aware of the need for early action with regard to rehabilitating the Malayan tin industry. It was an urgent problem how much mining machinery might reasonably be included now in a manufacturing programme for which priority could be asked.

There has been a considerable reduction in the war demand for lead, and a more liberal tonnage has recently been released for the production of lead pipes. At the same time, it is not likely that there is any great surplus in this country, as shipments are governed mainly by cargo space considerations.

CURRENT PRICES OF IRON, STEEL AND NON-FERROUS METALS

(Delivered, unless otherwise stated)

Wednesday, October 25, 1944

PIG-IRON

Foundry Iron.—CLEVELAND No. 3: Middlesbrough, 128s.; Birmingham, 130s.; Falkirk, 128s.; Glasgow, 131s.; Manchester, 133s. DERBYSHIRE No. 3: Birmingham, 130s.; Manchester, 133s.; Sheffield, 127s. 6d. NORTHANTS No. 3: Birmingham, 127s. 6d.; Manchester, 131s. 6d. STAFFS No. 3: Birmingham, 130s.; Manchester, 133s. LINCOLNSHIRE No. 3: Sheffield, 127s. 6d.; Birmingham, 130s.

(*No. 1 foundry 3s. above No. 3. No. 4 forge 1s. below No. 3 for foundries, 3s. below for ironworks.*)

Hematite.—Si up to 3.00 per cent., S & P 0.03 to 0.05 per cent.; Scotland, N.-E.Coast and West Coast of England, 138s. 6d.; Sheffield, 144s.; Birmingham, 150s.; Wales (Welsh iron), 134s. East Coast No. 3 at Birmingham, 149s.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, 140s. 6d., delivered Birmingham.

Scotch Iron.—No. 3 foundry, 124s. 9d.; No. 1 foundry, 127s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, 174s.; South Zone, 176s. 6d.

Refined Malleable.—North Zone, 184s.; South Zone, 186s. 6d.

Cold Blast.—South Staffs, 227s. 6d.

(NOTE.—*Prices of hematite pig-iron, and of foundry and forge iron with a phosphoric content of not less than 0.75 per cent., are subject to a rebate of 5s. per ton.*)

FERRO-ALLOYS

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

Ferro-silicon (5-ton lots).—25 per cent., £21 5s.; 45 per cent., £25 10s.; 75 per cent., £39 10s. Briquettes, £30 per ton.

Ferro-vanadium.—35/50 per cent., 15s. 6d. per lb. of V.

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

Ferro-titanium.—20/25 per cent., carbon-free, 1s. 3½d. lb.

Ferro-tungsten.—80/85 per cent., 9s. 8d. lb.

Tungsten Metal Powder.—98/99 per cent., 9s. 9½d. lb.

Ferro-chrome.—4/8 per cent. C, £46 10s.; max. 2 per cent. C, 1s. 3¾d. lb.; max. 1 per cent. C, 1s. 4¼d. lb.; max. 0.5 per cent. C, 1s. 6d. lb.

Cobalt.—98/99 per cent., 8s. 9d. lb.

Metallic Chromium.—96/98 per cent., 4s. 9d. lb.

Ferro-manganese.—78/98 per cent., £18 10s.

Metallic Manganese.—94/96 per cent., carb.-free, 1s. 9d. lb.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms and Slabs.—BASIC: Soft, u.t., 100-ton lots, £12 5s.; tested, up to 0.25 per cent. C, £12 10s.; hard (0.42 to 0.60 per cent. C), £13 17s. 6d.; silico-manganese, £17 5s., free-cutting, £14 10s. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £15 15s.; case-hardening, £16 12s. 6d.; silico-manganese, £17 5s.

Billets, Blooms and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £13 17s. 6d.; basic hard, 0.42 to 0.60 per cent. C, £14 10s.; acid, up to 0.25 per cent. C, £16 5s.

Sheet and Tinplate Bars.—£12 2s. 6d. 6-ton lots.

FINISHED STEEL

[*A rebate of 15s. per ton for steel bars, sections, plates, joists and hoops is obtainable in the home trade under certain conditions.*]

Plates and Sections.—Plates, ship (N.-E. Coast), £16 3s.; boiler plates (N.-E. Coast), £17 0s. 6d.; chequer plates (N.-E. Coast), £17 13s.; angles, over 4 un. ins., £15 8s.; tees, over 4 un. ins., £16 8s.; joists, 3 in. × 3 in. and up, £15 8s.

Bars, Sheets, etc.—Rounds and squares, 3 in. to 5½ in., £16 18s.; rounds, under 3 in. to ⅝ in. (untested), £17 12s.; flats, over 5 in. wide, £15 13s.; flats, 5 in. wide and under, £17 12s.; rails, heavy, f.o.t., £14 10s. 6d.; hoops, £18 7s.; black sheets, 24 g. (4-ton lots), £22 15s.; galvanised corrugated sheets (4-ton lots), £26 2s. 6d.; galvanised fencing wire, 8 g. plain, £26 17s. 6d.

Tinplates.—I.C. cokes, 20 × 14 per box, 29s. 9d. f.o.t. makers' works, 30s. 9d., f.o.b.; C.W., 20×14, 27s. 9d., f.o.t., 28s. 6d., f.o.b.

NON-FERROUS METALS

Copper.—Electrolytic, £62; high-grade fire-refined, £61 10s.; fire-refined of not less than 99.7 per cent., £61; ditto, 99.2 per cent., £60 10s.; black hot-rolled wire rods, £65 15s.

Tin.—99 to under 99.75 per cent., £300; 99.75 to under 99.9 per cent., £301 10s.; min. 99.9 per cent., £303 10s.

Spelter.—G.O.B. (foreign) (duty paid), £25 15s.; ditto (domestic), £26 10s.; "Prime Western," £26 10s.; refined and electrolytic, £27 5s.; not less than 99.99 per cent., £28 15s.

Lead.—Good soft pig-lead (foreign) (duty paid), £25; ditto (Empire and domestic), £25; English, £26 10s.

Zinc Sheets, etc.—Sheets, 10g. and thicker, ex works, £37 12s. 6d.; rolled zinc (boiler plates), ex works, £35 12s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £30 10s.

Other Metals.—Aluminium, ingots, £110; antimony, English, 99 per cent., £120; quicksilver, ex warehouse, £68 10s. to £69 15s.; nickel, £190 to £195.

Brass.—Solid-drawn tubes, 14d. per lb.; brazed tubes, 16s.; rods, drawn, 11⅝d.; rods, extruded or rolled, 9d.; sheets to 10 w.g., 11½d.; wire, 10½d.; rolled metal, 10½d.; yellow metal rods, 9d.

Copper Tubes, etc.—Solid-drawn tubes, 15½d. per lb.; brazed tubes, 15½d.; wire, 10d.

Phosphor Bronze.—Strip, 14½d. per lb.; sheets to 10 w.g.; 15½d.; wire, 16½d.; rods, 16½d.; tubes, 21½d.; castings, 20d., delivery 3 cwt. free. 10 per cent. phos. cop. £35 above B.S.; 15 per cent. phos. cop. £43 above B.S.; phosphor tin (5 per cent.) £40 above price of English ingots. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 10d. to 1s. 4d. per lb.; rolled to 9 in. wide, 1s. 4d. to 1s. 10d.; to 12 in. wide, 1s. 4½d. to 1s. 10½d.; to 15 in. wide, 1s. 4½d. to 1s. 10½d.; to 18 in. wide, 1s. 5d. to 1s. 11d.; to 21 in. wide, 1s. 5½d. to 1s. 11½d.; to 25 in. wide, 1s. 6d. to 2s. Ingots for spoons and forks, 10d. to 1s. 6½d. Ingots rolled to spoon size, 1s. 1d. to 1s. 9½d. Wire, round, to 10g., 1s. 7½d. to 2s. 2½d., with extras according to gauge. Special 5ths quality turning rods in straight lengths, 1s. 6½d. upwards.

NON-FERROUS SCRAP

Controlled Maximum Prices.—Bright untinned copper wire, in crucible form or in hanks, £57 10s.; No. 1 copper wire, £57; No. 2 copper wire, £55 10s.; copper firebox plates, cut up, £57 10s.; clean untinned copper, cut up, £56 10s.; braziery copper, £53 10s.; Q.F. process and shell-case brass, 70/30 quality, free from primers, £49; clean fired 303 S.A. cartridge cases, £47; 70/30 turnings, clean and baled, £43; brass swarf, clean, free from iron and commercially dry, £34 10s.; new brass rod ends, 60/40 quality, £38 10s.; hot stampings and fuse metal, 60/40 quality, £38 10s.; Admiralty gunmetal, 88-10-2, containing not more than ½ per cent. lead or 3 per cent. zinc, or less than 9½ per cent. tin, £77, all per ton, ex works.

Returned Process Scrap.—(Issued by the N.F.M.C. as the basis of settlement for returned process scrap, week ended Oct. 21, where buyer and seller have not mutually agreed a price; net, per ton, ex-sellers' works, suitably packed):—

Brass.—S.A.A. webbing, £48 10s.; S.A.A. defective cups and cases, £47 10s.; S.A.A. cut-offs and trimmings, £42 10s.; S.A.A. turnings (loose), £37; S.A.A. turnings (baled), £42 10s.; S.A.A. turnings (masticated), £42; Q.F. webbing, £49; defective Q.F. cups and cases, £49; Q.F. cut-offs, £47 10s.; Q.F. turnings, £38; other 70/30 process and manufacturing scrap, £46 10s.; process and manufacturing scrap containing over 62 per cent. and up to 68 per cent. Cu, £43 10s.; ditto, over 58 per cent. to 62 per cent. Cu, £38 10s.; 85/15 gilding metal webbing, £52 10s.; 85/15 gilding defective cups and envelopes before filling, £50 10s.; cap metal webbing, £54 10s.; 90/10 gilding webbing, £53 10s.; 90/10 gilding defective cups and envelopes before filling, £51 10s.

Cupro Nickel.—80/20 cupro-nickel webbing, £75 10s.; 80/20 defective cups and envelopes before filling, £70 10s.

Nickel Silver.—Process and manufacturing scrap; 10 per cent. nickel, £50; 15 per cent. nickel, £56; 18 per cent. nickel, £60; 20 per cent. nickel, £63.

Copper.—Sheet cuttings and webbing, untinned, £54; shell-band plate scrap, £56 10s.; copper turnings, £48.

IRON AND STEEL SCRAP

(*Delivered free to consumers' works. Plus 3¾ per cent. dealers' remuneration. 50 tons and upwards over three months, 2s. 6d. extra.*)

South Wales.—Short heavy steel, not ex. 24-in. lengths, 82s. to 84s. 6d.; heavy machinery cast iron, 87s.; ordinary heavy cast iron, 82s.; cast-iron railway chairs, 87s.; medium cast iron, 78s. 3d.; light cast iron, 73s. 6d.

Middlesbrough.—Short heavy steel, 79s. 9d. to 82s. 3d.; heavy machinery cast iron, 91s. 9d.; ordinary heavy cast iron, 89s. 3d.; cast-iron railway chairs, 89s. 3d.; medium cast iron, 79s. 6d.; light cast iron, 74s. 6d.

Birmingham District.—Short heavy steel, 74s. 9d. to 77s. 3d.; heavy machinery cast iron, 92s. 3d.; ordinary heavy cast iron, 87s. 6d.; cast-iron railway chairs, 87s. 6d.; medium cast iron, 80s. 3d.; light cast iron, 75s. 3d.

Scotland.—Short heavy steel, 79s. 6d. to 82s.; heavy machinery cast iron, 94s. 3d.; ordinary heavy cast iron, 89s. 3d.; cast-iron railway chairs, 94s. 3d.; medium cast iron, 77s. 3d.; light cast iron, 72s. 3d.

(Note.—*For deliveries of cast-iron scrap free to consumers' works in Scotland, the above prices less 3s. per ton, but plus actual cost of transport or 6s. per ton, whichever is the less.*)

SITUATIONS

FOUNDRY SUPERINTENDENT.—A vacancy caused by retirement will shortly occur in the Foundry of a well-known old-established Engineering Works in Leicestershire, with a weekly output of 60 tons grey iron, light and medium castings, of a semi-repetition nature, and 3 tons non-ferrous; a permanent post for a thoroughly qualified man between 35 and 45 years of age, competent to take full control; preference would be given to a man capable of introducing the production of malleable iron (blackheart) castings on a repetition basis; all applications will be treated with the strictest confidence.—Box 708, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

HEAD FOUNDRY FOREMAN wanted by Lancashire engineering firm; accustomed to light and medium castings; must be good organiser, and thoroughly acquainted with modern methods, metal mixing, rate fixing, etc.; permanent position, with good salary, for suitable applicant.—Full details of age, experience and salary expected, to Box 730, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

HEAD FOREMAN wanted, to take charge of Foundry manufacturing Non-ferrous Ingots; live, permanent, progressive position for a practical and energetic person prepared to use foresight and initiative; must be familiar with non-ferrous melting practice.—Write Box Z.216, WILLINGS, 362, Grays Inn Road, London, W.C.1.

THE BRITISH CAST IRON RESEARCH ASSOCIATION.

The Council invite applications for the post of MANAGER of the Intelligence Department. Commencing salary £500 to £1,000 per annum, according to qualifications and experience.—Applications should be sent to the SECRETARY of the Association, Alvechurch, Birmingham, from whom a memorandum relating to the appointment may be obtained.

SALES.—Advertiser, excellent connections copper, brass, gunmetal and bronze ingots, Birmingham area, open to take up Representation; only first-class firm with good reputation considered; already representing leading aluminium ingot manufacturers.—Box 732, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

PATENT

THE Proprietors of the Patent No. 343,066, for "Improvements in or relating to Fittings for Reinforced Tubing," are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for the purpose of exploiting the same and ensuring its full development and practical working in this country.—All communications should be addressed in the first instance to HASELTINE, LAKE & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

MACHINERY

WANTED, to purchase for post-war work, a pair of modern Cupolas; suitable to melt 8 or 10 tons an hour; preferably complete with motor-driven fan for a.c. current.—Box 738, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

WANTED. — Secondhand MIXER; capacity 15-20 gallons; suitable for mixing foundry mould wash to creamy consistency; with or without electrical gear, 415 volts, 3-phase, 50 cycles.—Offers to K. & L. STEELFOUNDERS & ENGINEERS, LTD., Coborn Works, Letchworth, Herts.

WANTED.—Pneulic Cupola; about 4 tons per hr. — State price and full particulars to Box 734, FOUNDRY TRADE JOURNAL, 3, Amersham Road, Wycombe.

1,200 cub. ft., vertical, 4-cylinder BROOM & WADE Air Compressor; cylinders 14 in. by 14 in.; 100 lbs. pressure; driven through reduction gearing from 200 h.p. CROMPTON PARKINSON slip ring motor, 3,000 volts, 3-phase, 50 cycles, 730 r.p.m., with oil-immersed starting gear, fitted with automatic unloader

500 cub. ft., vertical, twin cylinder, 2-stage, ROBEY Air Compressor; 100 lbs. pressure; complete with intercooler, auto unloader; 5½ ft. by 15 ft. Air Receiver; direct coupled to 100-h.p. BRUCE PEEBLES S.R. Motor, 400 volts, 3-phase, 50 cycles, 350 r.p.m., with liquid starter.

130 cub. ft., vertical, twin cylinder Compressor, by BRACKETT; 100 lbs. pressure; complete with auto unloader; Air Receiver, 1 ft. 3 in. by 2 ft. 8 in.; gear driven from 34-h.p. Motor, 400 volts, 3-phase, 50 cycles, 940 r.p.m., with starter.

175 cub. ft., vertical, single cylinder, 2-stage, Compressor, by TILGHMAN; 100 lbs. pressure; complete with intercooler and auto unloader; belt drive.

130 cub. ft., vertical, single Compressor, by BROOM & WADE; 100 lbs. pressure, belt drive.

50 cub. ft., vertical, twin cylinder Compressor, by AEROGRAPH; 100 lbs. pressure; fitted with auto unloader; belt drive.

260 cub. ft., horizontal, 12 in. by 18 in., INGERSOLL RAND Compressor; 60 lbs. pressure; belt drive.

All the above Compressors are water-cooled and can be offered with Motors to suit your voltage.

45 cub. ft., vertical, single cylinder Air Compressor; 200 lbs. pressure; belt drive.

8 cub. ft., vertical, single cylinder Air Compressor; 200 lbs. pressure; gear driven by 3 h.p. CROMPTON PARKINSON Motor, 440 volts, 3-phase, 50 cycles, 1,430 r.p.m.

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FOR SALE.—Unused Muffle Furnace, by Selas Gas Engineering Co.; Gas Light & Coke Co. design; max. temperature 1,250 deg. C.; internal size 8 by 5 by 3½ high, external 19 by 27 by 21 high.—SANDIRON HOUSE, Beauchief, Sheffield, 8.

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ELECTRIC Conveyor Furnace; suitable for vitreous enamelling, annealing or stoving; length 75 ft.; firing space 8 in. high, 6 in. wide; three automatically controlled heating zones; accuracy ± 5 deg.; temperatures 0 to 900 deg. C.; five speeds between 6 and 15 hours, but easily adaptable for other speeds; may be seen working; London area.—Box 712, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

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