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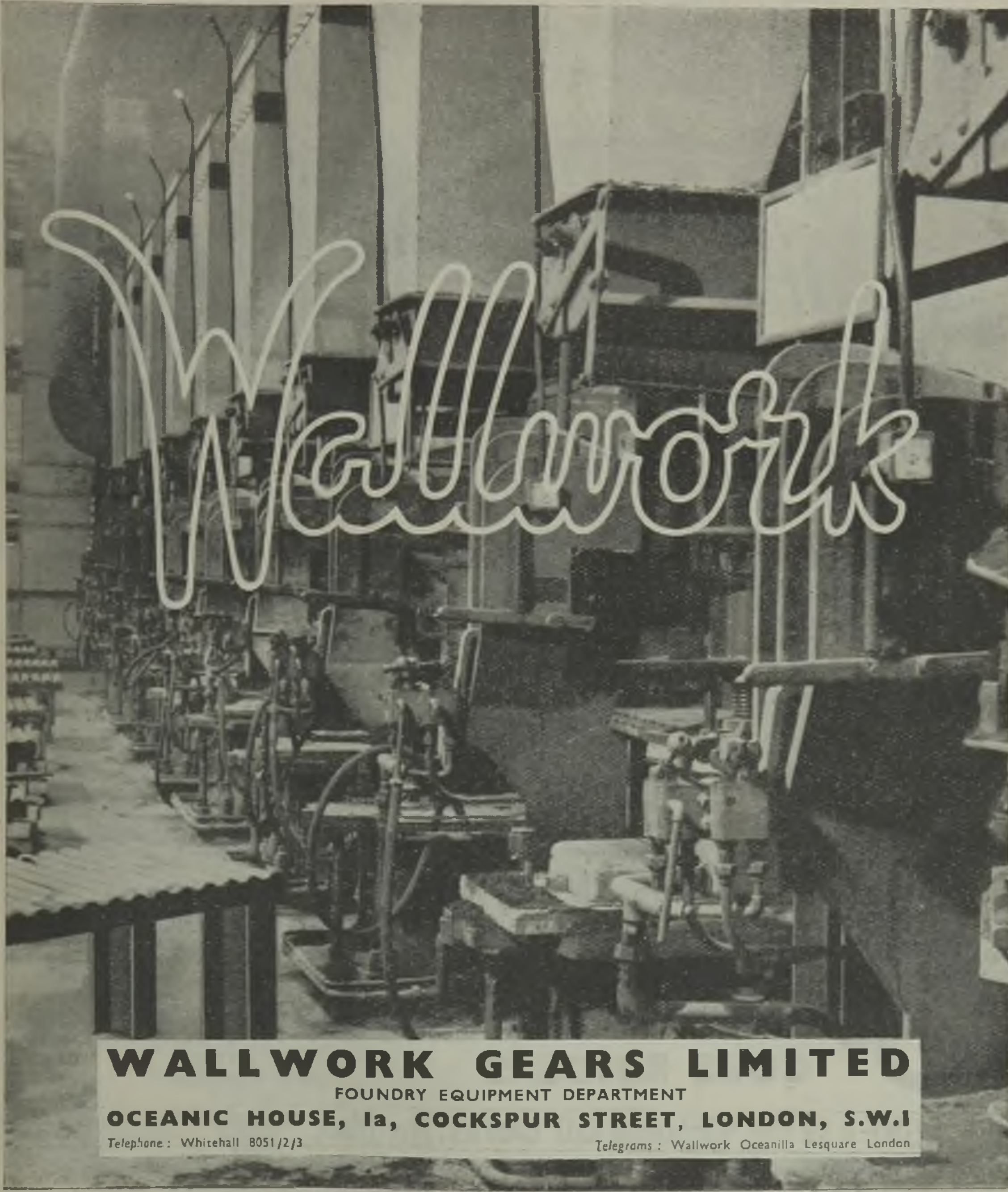
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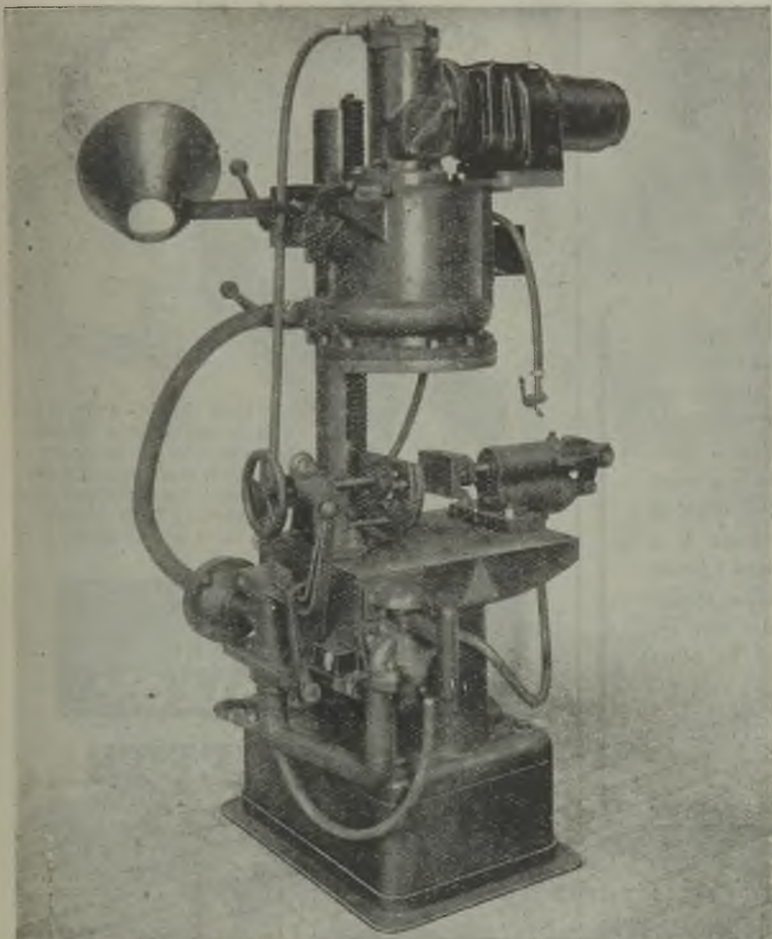

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FOUNDRY TRADE JOURNAL

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WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

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The Twenty-third Study

"House Construction," being No. 1 of Post-war Building Studies by an Interdepartmental Committee, has recently been published for the Ministry of Works. It has interest for the foundry industry, as it includes a survey of over 500 "cast-iron" houses constructed according to the Thorncliffe system and built in 1927. These are reported to be of adequate strength and stability, and carry normal maintenance costs. The major objection raised by the tenants is that they are said to be too hot in summer and too cold in winter. This is due to the computed heat transmission coefficient for the walls with asbestos cement lining being 0.46, which is considerably below that of an 11-in. unventilated cavity brick wall. In one group, however, the asbestos cement was replaced by ½-in. wood fibre, giving a coefficient of 0.29. This is rather better than that provided by an 11-in. unventilated cavity brick, and the houses were said to be comfortable and not subject to condensation. The ground floors carry 9-in. brickwork as party walls, and are thus satisfactory from the sound insulation angle, but the first-floor partitions (studding lined both sides with asbestos sheet) are deemed to be too light and generally inadequate for efficient sound insulation. The fibre board lined rooms introduce a serious personal fire hazard. Deterioration through rusting is not considered to be serious, but what is apparently important in this enlightened age is that the wall linings provide harbourage for bed bugs, and there is no easy method of removing the sheets for disinfestation.

These houses utilise about 7 tons of cast iron—equal to about 9,500 bricks—and cost, in 1927, about £15 more than brick houses with comparable accommodation. Later the cost of pig-iron rose and cast-iron houses became uneconomical to build. Given suitable handling appliances—for the plates weighed 2 cwts. each, four semi-skilled men could erect the skeleton at the rate of one pair of houses per week. Finally, if cast-iron walled houses are to find a place in the post-war housing scheme, better thermal insulation must be provided by the discovery of a suitable lining or other means and the external finish must be improved. These should not be too difficult for the modern scientist and architect, which leaves the problem as one based on cost and speed of erection. No mention is made in the Report of ancillary matters, such as rainwater goods, stoves and grates, flushing cisterns, baths, and refrigerators, in which the foundry industry has a preponderating interest, but promise is given of the future publication of twenty-two additional studies. Included amongst these are reports from the British Plastics Federation; the Paint Research Association; the Institution of Civil Engineers; the Institution of Structural Engineers; the Institution of Mechanical Engineers; the British Coal Utilisation Research Association; the Institution of Electrical Engineers; the British Non-Ferrous Metals Research Association; the Royal Institute of British Architects; and the Institution of Gas Engineers. It is devoutly to be hoped that amongst these various bodies the foundry industry possesses at least some good friends, if not enthusiasts, for their products, as apparently no provision is envisaged for helping themselves.

That important section of the foundry industry which caters for the building trades seems destined to play a minor role in the post-war housing scene. If, however, attention is drawn to the actual value of castings forming an integral part of the normal house, it is surely sufficiently high to warrant a twenty-third study! If the paint and plastic manufacturers can rise to the occasion, then surely the foundry industry ought to have something worth while to contribute to the subject. Only quite recently, cooker manufacturers have had to stress to ministerial departments the insulating properties of vitreous enamel and its relation to fuel economy.

Contents

The Twenty-third Study, 1.—Notes from the Branches, 2.—Publication Received, 2.—A Thermocouple Method for the Measurement of Liquid Steel Casting-Stream Temperatures, 3.—Fractured Worm, 6.—The Laboratory and the Foundry, 7.—Cementation of Iron and Steel with Silicon, 10.—Institute Elects New Members, 11.—A New House Organ, 12.—Mould Drying, 13.—Foundry Inquests—V, 13.—Questionnaire on Post-War Reconstruction, 13.—Scaling Properties of Steel, 14.—Don't Use Coal, 14.—A Scottish War Factory, 14.—International Monetary Fund, 15.—Patents Enquiry, 15.—Ironfoundry Fuel News—1, 15.—The State and Industry, 15.—Iron and Steel Institute, 15.—News in Brief, 16.—Control of Mica, 16.

NOTES FROM THE BRANCHES

LONDON BRANCH—EAST ANGLIAN SECTION

A party of 31 members participated in a visit to the Nacton Works of Crane, Limited, Ipswich, on April 20. Mr. H. H. Shepherd, F.R.S.A., introduced the party to the guides, who conducted them around the various departments. The tour of the works included the grey and malleable iron foundries and core shops, the metal pattern shop, the annealing section and the laboratory.

After the inspection the visitors were entertained at tea, during which Mr. R. E. Dunnett, the works manager, expressed the hope that the members had enjoyed the tour of the works, which necessarily had to be curtailed owing to the short time at their disposal. Mr. A. F. Hammond on behalf of the members proposed a vote of thanks to the management for having accorded their permission to inspect the works and for the kind reception, and to the guides for their help and patience in explaining the various points of interest throughout the tour. Mr. H. H. Shepherd briefly replied.

Annual Meeting

The annual general meeting was held later in the day at the Lecture Hall of the Central Library, Ipswich. The President (Mr. F. Tibbenham) being unable to attend, Mr. C. H. Kain occupied the chair, and there were 20 members and 8 visitors present. After the minutes of the previous annual general meeting had been read, confirmed and signed, Mr. A. N. Sumner, the honorary secretary, presented his annual report, in the course of which he said six meetings had been held, and presented a diversity of subjects ranging from foundry radiography, for which the author had received a Diploma of the Institute, to that ever important subject of fuel conservation in the foundry. The section was indebted to Mr. J. W. Gardom for two of the addresses, dealing with mechanical foundry aids, and manganese steel founding, respectively, whilst the second meeting of the session was held jointly with the Institution of Production Engineers, when coloured sound films showing some aspects of arc welding were presented. The final meeting was addressed by Mr. F. Thomas on the subject of sand control.

The membership strength of the Section had been well maintained, as since the last annual meeting one member only had lapsed or resigned, three had transferred to other Branches, and seven new ones had joined, making a nett increase of three members and bringing the total for the Section to 59 members and one member firm.

Students of the foundry practice and science class at the Ipswich School of Engineering had now completed the three years of the course. Five of the original fifteen first-year students had succeeded in satisfying the necessary requirements qualifying them to sit the City and Guilds of London Institute foundry practice and science examination on May 1 and May 2. The Technical Education Committee had met twice, and although a few new students started the course last session, it was felt that unless more students were forthcoming for the coming session the class would have to be discontinued through lack of numbers. For similar reasons a foundry process class intended for supplementary endorsement of the Higher National Certificate had to be abandoned at the beginning of last session. In view of this, although the Advisory Committee fully appreciated the difficult circumstances, it was hoped that those responsible in the local firms for the welfare of foundry and metallurgical apprentices would do all they possibly could to promote an increase in the number of potential students for the coming session.

Fuel Economy Visits

The members of the East Anglian panel of the Ironfoundry Fuel Economy Committee had, with the co-operation of the firms concerned, made a number of visits throughout the area. Reports on their findings had been presented, but as yet there had been no official recommendations as a result of them.

The following officers were then elected:—President, Mr. C. H. Kain; senior vice-president Mr. D. Carrick; junior vice-president, Mr. A. F. Hammond; honorary secretary, Mr. A. N. Sumner; councillors, Mr. A. H. Horton, Mr. W. L. Hardy, and Mr. L. Davey to fill the vacancy occurring on Mr. Hammond accepting higher office.

Mr. J. E. Newson, of the Manganese Bronze & Brass Company, Limited, then introduced the Non-ferrous Committee's slides and notes entitled "An Atlas of Defects in Non-Ferrous Castings." The members participating in the discussion agreed on the whole with the classification of the defects, but the general consensus of opinion was that a standard photographic presentation should be aimed at, and that even though a full diagnosis was not the object of the atlas, that the full casting and method of casting should be shown to enable concrete suggestions as to the cause of the defects and the method of correction to be made.

The secretary announced that the Section would next meet on May 18 in the Library Lecture Hall at 6.45 p.m. to hear an address by Mr. R. F. Coates on "Views on Foundry Training."

PUBLICATION RECEIVED

Memorandum on the Design of Welded Joints. Published by the Advisory Service on Welding, Department of the Director-General of Scientific Research and Development, Ministry of Supply, Berkeley Court, Glentworth Street, London, N.W.1, as Welding Memorandum No. 11.

This eminently practical 28-page booklet describes how the properties of welded joints can vary and how the strengths are calculated. There are a number of well-chosen examples of welds and weld groups subjected to direct, bend and combined stresses which demonstrate the method of application. It is issued free to those of our readers who write to the Ministry.

A THERMOCOUPLE METHOD FOR THE MEASUREMENT OF LIQUID STEEL CASTING-STREAM TEMPERATURES*

A simple and successful method for measuring the temperature of the casting stream in the foundry

By D. A. OLIVER, M.Sc., F.Inst.P. and T. LAND, M.A.
(Research Department, William Jessop & Sons, Ltd., Sheffield)

The influence of casting temperature on the quality of ingots and foundry castings is widely recognised, and in many steelworks and foundries routine observations on the casting stream are made with optical pyrometers. Such measurements are made for record purposes rather than for temperature control, so that the repetition of unsuitable temperature conditions may be avoided.

The optical pyrometer has given good service in the foundry with which the Authors are particularly concerned, but its accuracy is severely limited. The temperature measured with an optical pyrometer is not the true temperature of the metal, and a correction of about 130 deg. C. is usually added to the pyrometer reading. The reading obtained depends not only on the temperature of the metal, but also on such factors as the steel composition, the degree of oxidation of the surface and the smoke which may be present between the metal stream and the observer. It is clearly desirable to devise a more accurate method of measurement, either to supersede the optical pyrometer or at least to give under experimental conditions more exact information about the correction to be applied to optical-pyrometer readings in different circumstances.

When the metal is poured over the lip of a ladle, the normal quick-immersion technique using a platinum thermocouple is quite satisfactory, and accurate temperature measurements can readily be made. When the metal is bottom-poured, however, the velocity of the moving stream is such that any tube put into the stream merely splays metal in all directions. It is clearly necessary to measure the temperature at some point where the metal flow is unimpeded and is constricted by a short tubular ring. The present Paper describes the development of a method based on this principle.

Early Attempts to Measure Casting-Stream Temperatures

The first "temperature ring" was made of arc-furnace electrode graphite, and the details are shown in section in Fig. 1. The thermocouple was protected by a silica tube, which projected about 1 in. from the graphite in the narrow part of the funnel. The graphite ring was mounted in a stout steel frame, so that it could be placed on a casting box over an ingot for the preliminary experiments. The greater part of the ingot was cast straight through the casting box, without passing through the graphite funnel; when the metal in the ingot reached the ingot head, the ladle was moved across and the remainder of the steel was cast through the "temperature ring." The thermocouple was connected to a Tinsley high-speed amplifier and recorder, and the record obtained is shown in Fig. 2, which also records the previous dip in the furnace and (unsuccessfully) in the launder.

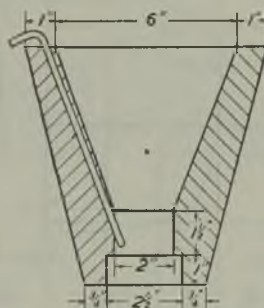

FIG. 1.—SECTION OF GRAPHITE FUNNEL WITH THERMOCOUPLE IN POSITION.

The results were most encouraging, although several possible improvements were apparent. The silica sheath survived intact, although it was somewhat bent, and the thermocouple was undamaged. The graphite ring was considerably eroded by the flowing metal, and some alternative material seemed to be indicated.

As a result of the first experiment, a new assembly was tried. It consisted of a "trumpet top" attached to a 2-in. ladle nozzle. This combination was built into a sand mound in place of the usual runner-box. The nozzle was drilled with a $\frac{1}{4}$-in. hole at an angle of about 35 deg. to the horizontal, and a silica tube containing the thermocouple wires was introduced through the hole, protruding $\frac{3}{4}$ in. into the casting stream. When the steel was cast the silica sheath was broken and no reading was obtained. However, later experiments suggested that this assembly with slight modifications might still prove suitable for casting-stream measurements on uphill cast ingots.

* This Paper is published by authority of the Steel Castings Research Committee of the Iron and Steel Institute. The views expressed in it are the Authors', and are not necessarily endorsed by the Committee as a body.

A Thermocouple Method

Final Design of Apparatus

The early attempts suggested a design which has given very good results. The basis was a standard runner-box, rammed with "compo," consisting of a conical refractory lining, $\frac{3}{4}$ in. thick, 10 in. deep, tapering to a minimum internal diameter of $2\frac{1}{2}$ in., and provided with a cylindrical cast-iron case. The refractory lining was drilled 1 in. from the bottom with a $\frac{1}{4}$-in. hole at an angle of about 35 deg. to the horizontal, and a 1-in. hole was drilled at the appropriate point in the cast-iron case. The two components of the runner-box were assembled with a steel rod

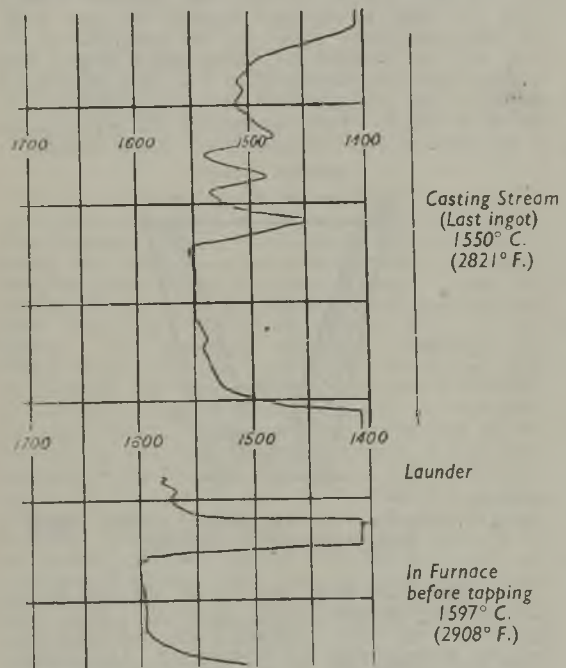

FIG. 2.—TRACING OF FIRST RECORD OF TRUE CASTING-STREAM TEMPERATURE.

in place of the thermocouple tube, rammed with compo and dried out. The complete assembly is shown in section in Fig. 3.

The thermocouple tube was a silica sheath $4\frac{1}{4}$ in. long, $6\frac{1}{2}$ mm. in external diameter and 0.7 mm. in wall thickness. The platinum/platinum-rhodium thermocouple wire was 0.5 mm. in dia. and insulated in fine twin-bore silica tubing. The head of the thermocouple unit was a standard two-way porcelain connector cemented to the silica tube. The thermocouple unit could be placed in the runner-box just before casting; it was held in position with a little "Sairset" cement. About $\frac{3}{4}$ in. of the silica tube protruded into the casting stream. It was quickly found advisable to cover the thermocouple head and about a foot of the compensating lead attached to it with asbestos tubing to protect them from splashes of hot metal.

It was found that about two out of three determinations were satisfactory with this arrangement, the chief cause of failure being that the ladle operator sometimes interrupted the casting stream during casting, so that the thermocouple did not reach a steady temperature. Occasionally the silica tube broke or the bending of the tube caused a short-circuit in the thermocouple, but the majority of observations were quite

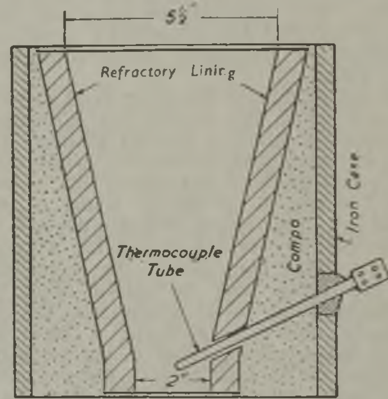

FIG. 3.—SECTION OF RUNNER-BOX ADAPTED TO TAKE THERMOCOUPLE.

satisfactory. Typical records are shown in Figs. 4 and 5.

A conical refractory lining as used in the runner-box has been fitted in a steel frame and used successfully to measure the casting-stream temperature during the casting of an ingot. A difficulty which sometimes arises in such measurements is that the swinging of the ladle may cause the thermocouple to be momentarily exposed every few seconds, so that it never reaches a steady temperature. This trouble can be overcome by steadying the ladle with long poles, as is usually done in the foundry.

Accuracy.—The accuracy depends first on the thermocouple being immersed in the liquid steel for a sufficient time to enable it to attain a steady temperature. In Fig. 4 the time (12 secs.) was scarcely long enough, but in Fig. 5 15 secs. sufficed to give a perfectly satisfactory record. It appears that the method in its present form is applicable only to castings of greater weight than 5 cwts.

Another possibility of error is that the refractory lining may cool the steel before it reaches the thermocouple. Approximate calculations suggest that the cooling is unlikely to exceed 3 deg. C. for the 7-cwt.

castings investigated, and is more likely to be less than 2 deg. C. This source of error has therefore been neglected.

In quick-immersion temperature measurements in the furnace it is usually considered necessary for the silica sheath to be immersed for at least $1\frac{1}{2}$ in. from the hot junction to obviate errors due to heat conduction towards the cool part of the sheath. The greater efficiency of heat transfer in a fast-moving

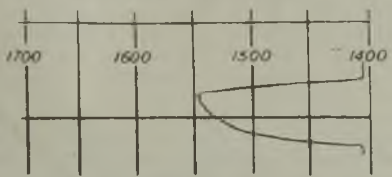

FIG. 4.—TRACING OF FIRST RECORD OF CASTING-STREAM TEMPERATURE USING ADAPTED RUNNER-BOX.

stream appears to reduce this depth of immersion considerably, and $\frac{3}{4}$ in. of tube protruding into the flowing stream appears to be adequate.

The accuracy of the combined amplifier and recorder is of a high order ($\pm$ 2 deg. C.). The constancy of the amplification depends only on the permanence of a single resistor, and the overall precision is checked by reference to a Weston standard cell incorporated in the amplifier.

Applications

To illustrate the value of the method a series of measurements was made using the "temperature ring" and simultaneously observations were made with a calibrated disappearing-filament optical pyrometer. Temperature measurements were also made in the furnace before tapping. In this way the emissivity

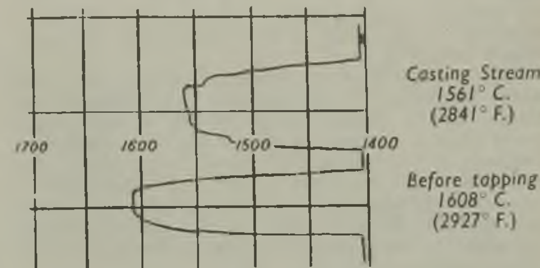

FIG. 5.—TRACING OF TYPICAL PAIR OF RECORDS SHOWING FURNACE TEMPERATURE AND CASTING-STREAM TEMPERATURE.

and the ladle cooling of the steel were measured, two quantities of particular interest to the Foundry Steel Temperature Sub-Committee.

The measurements were made on a nickel-chromium-molybdenum steel which was, at the time of these experiments, in regular production under

TABLE I.—*Temperature Measurements in the Furnace and during Casting.*

Cast No.	Time.	Furnace Dip. Deg. C.	Power. Kw.	Tapped. Time.	Castings. No.	Castings. Ring couple. Deg. C.	Castings. Optical. Deg. C.	Remarks.
*A*498	11.18	1,625	—	—	3	1,560	1,435	
*A*510	11.15	1,600	1,050	11.28	3	1,570	1,422	
*A*520	11.56	1,623	600	12.12	3	1,550	1,390	Ladle about 600 deg. C.
*A*528	9.55	1,592	1,000	10.25	3	1,560	1,420	
	10.06	1,619	1,000	—	6	1,562	1,420	
	10.21	1,621						
*C*429	11.39	1,580	1,500	11.53	3	1,560	1,425	
	11.50	1,602	1,500					
*A*537	11.46	1,610	900	12.03	3	1,555	1,438	0.30 per cent. carbon steel.
	11.56	1,603	1,250					
*A*539	13.03	1,560?	1,400	13.22	5	1,562 to 1,568	1,418	0.30 per cent. carbon steel.
	13.15	1,615	1,200					
*A*541	11.25	1,580 to 1,592	1,200	11.47	3	1,555	1,420	
	11.36	1,617	750		7	1,555	1,415	

A Thermocouple Method

closely standardised conditions. A typical analysis was as follows:—C, 0.40 per cent.; Mn, 0.60; Si, 0.25; Ni, 2.5; Cr, 0.80; and Mo, 0.65 per cent. The steel was made in a 12-ton basic electric-arc furnace, and cast from a ladle lined with fireclay bricks. The metal was poured from the bottom of the ladle through a magnesite nozzle with a fireclap stopper end, previously boiled in tar.

The optical pyrometers, manufactured by the Cambridge Instrument Company and by Hartmann and Braum, were calibrated within 24 hrs. of each observation against a tungsten ribbon-filament lamp standardised at the National Physical Laboratory. The ladle was heated by a gas burner to a temperature of approximately 650 deg. C. before tapping. The metal was held in the ladle for 10 min. before casting. The majority of observations were taken on the third 7-cwt. casting.

The experimental results are given in Table I.

Ladle Cooling

Ladle cooling readings obtained with the alloy steel are set out in Table II, which also includes two results on carbon steels (A537 and A539). The ladle was of normal design capable of holding 14 tons of molten steel. In these experiments the average content of metal was approximately 10 tons.

TABLE II.—*Ladle Cooling Readings.*

Cast No.	Tapping Temp. Deg. C.	Casting-stream Temp. Deg. C.	Ladle cooling. Deg. C.
*A*510 ..	1,617	1,570	47
*A*520 ..	1,620	1,550	70
*A*528 ..	1,626	1,561	65
*C*429 ..	1,608	1,560	48
*A*537 ..	1,615	1,555	60
*A*539 ..	1,627	1,565	62
*A*541 ..	1,622	1,555	67

The average value of the temperature drop between furnace and ladle was 60 deg. C., the range of variations being 23 deg. C., *i.e.*, ± 12 deg. C. The Authors have pointed out in a previous Paper that there is likely to be this range of uncertainty in furnace temperature measurements; in addition there is an uncertainty of at least 5 deg. C. in estimating the change in temperature between the last dip measurement in the furnace and the commencement of tapping. The results therefore can be considered concordant within anticipated limits.

One of the Authors has published a mathematical analysis of the ladle cooling of liquid steel, stating that the figures given in the Paper should be multiplied by a constant factor to be determined experimentally. The value of the ladle cooling calculated from the published tables is 78 deg. C. for

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the conditions of the experiments, so that the constant factor in this case is 0.7. It remains to be seen, however, whether this value is equally valid for a wide range of conditions.

Conclusions

A simple and successful method has been devised for measuring the temperature of the casting stream in the foundry. It can be applied to castings of more than 5 cwts. in weight with only slight modification of standard foundry practice. It appears essential to employ some type of high-speed temperature recorder in view of the short time available for the measurement. The method appears to be suitable for the investigation of emissivities and the ladle cooling of liquid steels under foundry conditions.

FRACTURED WORM

A sequence of excruciating blunders led to the death of a foundry worker at a cupola hoist. To start with, the design of the hoist was thoroughly bad, as it consisted simply of a cage, without balance-weight or safety gear, hung on a wire rope carried to the drum. The drum was driven through an inadequate worm and worm-wheel from fast and loose pulleys. The "well" was of open lattice steel-work fitted with a rise-and-fall gate. There were many points of access to moving parts. There had been a breakdown some time previously caused by fracture of the worm which had then been replaced by mechanics while the cage rested on the ground.

On the occasion of the accident, when the cage refused to move, three factory hands, suspecting the worm had broken again, first removed the inspection cover over it and then, finding that in fact it was fractured, proceeded to remove also the adjacent bearing caps with a view to replacing it. They had not first shored up the cage, which this time was not on the ground but about seven feet up. As soon as they lifted the bearing cap the worm freed itself completely at the fracture or at the worm-wheel and the cage fell free to the bottom. One of the three men by some unexplainably maladroit contrivance had thrust his head and shoulders through the steel framework beneath the cage and was fatally trapped.

There had apparently never been any systematic examination made, and for this and for the failure to provide proper protective enclosure the firm was prosecuted, but legal proceedings seem relatively trivial in the face of such a concatenation of ineptitudes culminating in fatality.

A wartime gain to the foundry industry is recorded by the "Iron Age" in an article in the February 17 issue, which describes the pressure die-casting of fuse bodies. Prior to this development, which uses a high purely zinc alloy (Zomak), it was normal practice to machine these bodies from brass bars.

THE LABORATORY AND THE FOUNDRY

Applying science to the whole field of foundry work

By D. FLEMING

(*Concluded from page* 354.)

In the opening remarks the questions were asked: What is proposed to be done about the gaps in foundry knowledge? Why is progress not faster and how best can the acquisition of foundry knowledge be speeded on its way?

In summary, the Author believes that the industry should realise that the answer lies in the whole-hearted application of science to the foundry—founding must become an applied science. If this is so, then it follows that the technicians must be foundrymen and their laboratories must be foundry-laboratories. The early man making his copper castings fathered the practical foundryman, the metallurgist and the chemist, but each has travelled far and learnt much. Industry must reweld the best of each section's knowledge and method of approach together again to produce its foundry technicians. Industry does not want its laboratories to be stuffed by invading chemists or metallurgists, but by foundry technicians, who are foundrymen first, but at the same time foundry chemists and foundry metallurgists because foundry chemistry and foundry metallurgy are two of their rightful provinces. The invaders must be absorbed—they are family relatives, anyway—but they must, if they are to remain, honour the family branch they seek to enter and which supports them and become "foundrymen first."

Two Messages

To those in charge of foundry laboratories the Author would say: "If you have not already done so—become foundry minded. The foundryman is a worthy man—you will find his problems sufficient to tax your skill and reasoning power to the utmost, however well developed that may be, true collaboration with him cannot but increase your respect for the man and his achievements amid a field of many unknowns, which latter will give you an endless variety of intriguing problems such as to satisfy any man. You cannot pull your weight, however, unless you can speak the foundryman's language and are face to face with the essence of each problem. You cannot get to grips with foundry problems if you remain aloof in the laboratory amid theories and figures. Accept the challenge and get down to the job, or if you control a department which is engaged in work for many fields besides that of the foundry, see that you have a capable liaison officer who can perform this duty efficiently on your behalf. Also see that the young people you are training to control foundry laboratories in the future are foundry minded—send them into the foundry as a major and necessary part of their training, and send them too to the Institute of British Foundrymen."

To the foundrymen the message is: "Help your technical men to become foundry minded and then accept their help wholeheartedly, lay your problems before them with all the facts disclosed. Do not keep half the data up your sleeve—if they are worth their salt they revel in the solution of problems, and will ferret into the subject like dogs after a bone until they can produce a useful answer. Remember they are not ferreting to undermine you but to help you. the true technician like any man of science is only happy among problems, he does not want to supplant you, he does not envy you, you are too busy running the whole show and getting on with the job and have too little time left for the problems which are his special metier—last but not least bring your technicians here."

It is perhaps difficult for the Institute to do more than advise in fields dependent on attracting youth to the foundry. For instance, in many aspects of foundry education where financial status and working conditions outside the technician's province play so great a part, but this matter of science and the foundry is one where the attitude of members is all important. It is the attitude of the foundryman to the laboratory, what he demands of the technical man and what he will teach him, where necessary to achieve real co-operation that will decide how quickly the future will bring the right type of foundry technician and more rapid progress. If the influx of science into the foundry has caused the rapid progress of the past decade or so, as undoubtedly it has, then it is felt that the only logical course to pursue is to work wholeheartedly for a rapid and controlled development of foundry science by foundry technicians, and not to remain content with a position where the application of sceince is sporadic and depends on the personal enthusiasm of a small number of chemists, metallurgists and foundrymen alike, who often have to battle not only with a foundry problem, but with the scarcely veiled disapproval of many foundrymen. Let everybody make a more living thing of one of ideals of the Institute: "Science Hand-in-Hand with Labour."

Vote of Thanks

MR. J. HILL (Manchester), in proposing a vote of thanks, said he agreed with the statement that there had been many differences of opinion between the working foundryman and technicians, yet perhaps the position was not quite as black as the Paper seemed to indicate. As a matter of fact, possibly, it would be a much better course to pursue by summing up the present position of affairs rather than to appeal for closer co-operation between the two sections of

The Laboratory and the Foundry

workers. There were really three different types of foundry in this country, or even in the world. One type of foundry operations was that in which the moulding operation involved a highly skilled technique and the metallurgical operation was subservient to the moulding operation. In such a case the foundryman was just as competent to deal with the metallurgical operation as the chemist or some other kind of scientist. The metallurgist, as he was recognised at the present time, would not be attracted to such a type of foundry. The second type of foundry was one in which the moulding operation and the metallurgical operation were equally as important. He had not visited any such foundry in which the services of both workers were not fully appreciated at their true value. The third type of foundry was conducted by chemists and engineers with the foundryman somewhere in the background. Such a foundry would probably be turning out two or three different kinds of castings, and the main task was to keep a careful watch over the inside of the metal, so that the success of the particular process was entirely dependent upon the ability of the metallurgist, the chemist and the engineer. It was probably correct to state that the industry as a whole quite appreciated this point of view. If the different types of men engaged in the control of the industry simply threw bricks at one another, as it were, then the prospects for the post-war development could not be regarded as being very rosy. His own opinion was that there had been a great advance from the stage where there was general antagonism one to the other. Of course, there was always the likelihood of bad castings being produced, and possibly mutual recriminations, and there would always have to be some superior over-ruling authority to pronounce a final decision. In making these remarks, they must not be understood as under-rating the high quality of the Paper, though he did consider that those connected with foundry work generally were a little more enlightened than might be concluded from its tone.

Mr. R. S. Turner seconded the vote of thanks, saying that much courage was necessary in order to present it before a Branch of the Institute, and particularly in the case of a young man. Nevertheless, he did not think the situation was as black as the Author painted it.

The vote of thanks was carried unanimously by acclamation.

"The Missing Technician"

Mr. D. Fleming, in responding, said his thanks were due to both Mr. Hill and Mr. Turner for their appreciation of his effort in producing the Paper. With respect to their criticism, he only wished he could feel that the lack of antagonism was so complete as they would wish him to believe. Mr. Hill obviously belonged to the new school of thought. He (the speaker) did not suggest that this antagonism still existed throughout the whole of the industry. Actually, he had endeavoured to show where it originated and perhaps he had somewhat over-stressed the point. He was not making a plea for merely better relationships between chemists and foundrymen, but for an entirely new brand of technician who was a foundry technician, and not simply a chemist or a metallurgist, one who was familiar with the whole of the foundry province.

There was a considerable number of, as yet, unascertained factors concerned with the foundry world: at any rate, if there were not, then his own education had been sorely neglected. Foundry work should be done by foundrymen, and unless foundrymen became more enlightened, then foundries would be more and more controlled and run by metallurgists and engineers.

He had laid down the lines for the preparation some 12 months previously, and since then there had been a number of Papers read which covered a somewhat similar field of thought; as a matter of fact, he thought that two of them appeared at the same time in The Foundry Trade Journal. One was a Paper on "Research and Development," by Mr. Nicholls, while the other was entitled "Is the Chemist Really Necessary?" by Mr. Stott. With all due respect to the latter, he treated the chemist entirely as a chemist, and discussed the fact that he might by examination of faulty castings confirm his superiors' opinion. What he, the speaker, wished to see in the foundry was not merely just a man who had his hands in the sand, but was just as much occupied with the technical side of the industry. It was not to be understood that the foundryman as such did not fulfil his duty, but far too much of his time was devoted merely to making castings. He was not required to solve problems which were really staring him in the face; he required a fellow-worker beside him to help him to solve such problems and to obtain a solution for them.

DISCUSSION

Mr. C. Waddington (Southport) enquired what view Mr. Fleming had formed concerning the small foundry, and what was Mr. Fleming's opinion of the experimental foundry as an aid to co-ordination between the laboratory and the foundry in a case of big mass production.

The Economics of the Small Concern

Mr. Fleming said that in the case of the small foundry he assumed Mr. Waddington's enquiry turned rather upon the economics of the position. In the case of a very small business, no matter of what kind, it could not be run at a high economic efficiency. If it was very small, and there was a very small staff, and if the price was low, then the quality would be low. If the quality was high, then the price of the article produced must rise.

Take the extreme example of the one-man shop. That one man must be his own managing director, his own receiving clerk, his own core-making department, his own moulding department, his own fettling department, his own sales organiser, etc. The point he, the speaker, wished to stress was that he must also be his own technician. This was not an argument against the employment of a technician any more than it was an argument against him being his own moulder, coremaker, etc., but obviously he could not reach a high state of efficiency in any of those fields. The problem was rather bound up with the fact that there was a certain size of factory below which it was not economic to go when dealing with really high-quality material. The small foundry could produce very good castings, and would continue to do so, but in regard to the really top flight of foundry work the small foundryman could not hope to hold his own in view of the ever-increasing demands which would prevail in the future.

With regard to the experimental foundry, most foundries of any considerable size did possess such a department in some form or other. It was customary for most foundrymen to set apart some of their productive time in order to carry out experimental work, and no doubt more experimental work would have to be done in a mid-department between the laboratory and the foundry proper, either in the laboratory itself or on the foundry floor of the organisation. By all means there should be an experimental department if the organisation was big enough to maintain one, otherwise the procedure would remain as it practically always had been, namely, to tackle a problem which arose in the foundry itself.

Antagonism on the Ebb

MR. LONGDEN (Manchester) had listened to the reading of Mr. Fleming's Paper with a great deal of interest. He could recall the same type of lecture being given before the Institute for many years previously. He did not wish to dissuade the lecturer from taking up his point of view, because he was really trying to probe the position of affairs right down to basic facts, and he would most certainly arrive at a perfectly logical conclusion in the long run. Nevertheless, continued Mr. Longden, he thought there was not so much antagonism between what might be termed the trend of the foundryman, the chemist, the metallurgist, or even the analyst. As a matter of fact, the foundry was one big laboratory in which developments were always occurring in every case.

There seemed to be something at the back of Mr. Fleming's mind; he appeared to feel that he was not getting a square deal from the foundryman. Every statement which had been made seemed to imply that the foundryman did not look at things in the correct spirit. Well, perhaps his upbringing was a little different from that of other people's; his training was usually assumed to be 90 per cent. on the practical side as against 10 per cent. of what was usually referred to as theory. Nevertheless, the foundryman certainly did possess a considerable amount of theoretical knowledge of the trade, and much more so than was generally assumed. Was there a feud, or was there an attempt, on the part of the chemist or the metallurgist to establish who should be in control of the foundry? It was very difficult, in the first place, at any rate, to define what was a metallurgist, though the dictionary interpretation of him would be that he was trained in the art of producing metals. But the manipulation of metal, with what might be termed manual dexterity due to practice, was also educational in man.

Then with regard to small foundries, it must be borne in mind that good castings were being produced by them and would continue to be produced. Great advances were certain to be made in the future, and those advances would involve co-operation with the metallurgical side of the work. It must not be assumed that the foundryman would remain inarticulate. Looking back now for 25 years he could assure Mr. Fleming that co-operation between all concerned with foundry practice was greater at the present time than it had ever been before, and that mutual understanding was bound to increase in the future.

MR. G. C. STUDLEY (Bramhall, Cheshire) thought that the answer with respect to the small foundry was that it should enter into membership with its appropriate research association; any necessary technical instruction could be obtained from that quarter.

A High Percentage

MR. E. J. L. HOWARD did not agree that the foundry chemist or metallurgist should have devoted the whole of his time to the study of foundry conditions. It was far better for the chemist or the metallurgist to be trained in an engineering works for the purpose of obtaining a general view of the industrial requirements. When all was said and done, the foundry industry was mainly engaged in the making of castings for the engineering trade. If the chemist or the metallurgist was solely engaged in the foundry he would not be able to realise the requirements of that industry. The case of the small foundry was a somewhat difficult proposition to solve because in the North-West area alone there were 300 foundries, and only 35 of them were what might be regarded as large works producing 50 tons of castings per week or more, there were about 100 foundries producing about 20 tons of castings per week, while the remainder were small undertakings producing less than 20 tons. What was to be done with regard to them?

MR. H. HAYNES (Ashton-under-Lyne) thought there was a good deal of substance in what Mr. Fleming had stated in his Paper concerning the position of the chemist and metallurgist in regard to the other members of the foundry personnel, though in the foundry with which he was associated there were now five chemists employed, and everyone worked in co-operation with them. The tendency to belittle the scientist was absolutely wrong, and he had proved it to be so within his own experience. Complete success in foundry practice could only be consummated by willing co-operation between all parties.

MR. FLEMING, referring to the point raised by Mr. Howard, namely, that the metallurgist should have a wide field of experience, said he was in entire agreement with him. The man who became a foundry technician should undoubtedly have quite a wide train-

The Laboratory and the Foundry

ing and experience in metallography, and physics generally. If that wide field of knowledge was to become effective for foundry purposes he must necessarily devote considerable time to study in his early days of matters which were definitely not enclosed within the four walls of the foundry itself. Once he entered the foundry then he should get into very close touch with its practice, and he and the foundry foreman should have thoroughly harmonious association with one another, and arrive at a complete understanding of one another's point of view.

Mr. Longden seemed to think that he was under the impression the foundryman was not having a square deal. It was a matter for regret if he had created such an impression, because even at the present time he was working in the very closest co-operation with a foundry foreman. It was as the result of the benefits arising from that association that he wished to stress the benefits of co-operation between all concerned.

Graded Metallurgists

Mr. N. Greenwood (Stockport) read the following written communication from Mr. H. J. Young (Manchester):—

An analysis is a measurement. Its accuracy is limited by the method used and the operator using it. Having found out the composition of a sample of cast iron, the next step is to ascertain its microstructure. Let us imagine that a sample has been fully analysed and, also, that its structure has been revealed and photographed. Where are we then? The position is similar to having a piano and a piece of music, but nobody who can play. Moreover, as we all know, there are bad pianists, better pianists, good pianists and geniuses. It is exactly the same in metallurgy. Everything depends upon what practical use the particular metallurgist concerned is capable of making of the results obtained in the laboratory. As with pianists, so with metallurgists—some are bad, some better, some good and some are geniuses.

The official notice of this meeting describes this Paper and mentions "the re-association" of the foundryman and analyst, and appeals "for co-operation." The inferences to be drawn from these words are responsible for thus contributing to the discussion.

In a Paper before this Institute in 1916, he wrote: "Scientific control is practicable, economical and urgently needed. It can be carried out only by the co-operation of three men—each thoroughly trained in his profession and possessing sufficient knowledge to give him respect for that of his neighbour—namely, the foundryman, the metallurgist and the engineer." Co-operation is something which cannot be asked for or compelled. It can only be earned.

The ancient couplet comes to mind: "I do not like thee, Dr. Fell, the reasons why I cannot tell." Obviously, Dr. Fell starts with a pretty bad handicap as

(*Continued at foot of next column.*)

CEMENTATION OF IRON AND STEEL WITH SILICON

Research on the cementation of iron and steel with silicon is reported in "Metallurgia Italiana," by B. Mancini, who points out that iron and steel can be cemented with silicon by heating the material to 1,000 deg. C. in SiC and Cl, the latter only being introduced when the reaction temperature is reached so that it attacks neither the material under the treatment nor the plant. With carbon steel, the penetration of the silicon is at a rate of 0.5 mm. per 2 hrs. The rolling skin does not affect the action, but scale and surface inclusions formed during heat treatment must first be removed by pickling or sandblasting. Any internal stresses present are intensified by working the metal, and should be eliminated before treatment. Reheating does not produce any change in the properties of the treated material. Hardness is 80 to 85 Rockwell B, which precludes ordinary machinery, but the material can be ground dry, when almost no sparks are produced. The thermal conductivity of cemented castings exceeds that of mild steel and of non-rusting steel.

Although the elongation is distinctly reduced, tubes can be drawn if suitable precautions are taken.

By this treatment, the corrosion resistance is increased so much that after a 24-hr. treatment in 10 per cent. boiling sulphuric acid there is only a 3 per cent. reduction in weight, while ordinary and non-rusting steels are completely dissolved in 18 and 30 hrs. respectively. But if the original material contains sulphur the final corrosion resistance is not so marked. Resistance to nitric and hydrochloric acids is respectively greater and smaller than to sulphuric acid. The cemented material is magnetic, non-scaling above 1,000 deg., and shows good wear resistance. In contact with other metals an insulating film of Si is formed on the surface, it is stated. If cementation is merely superficial, the reduction in Si concentration from the surface inwards is very uniform. Exfoliation of the surface occurs only on exceeding the elastic limit of the matrix.

The "Iron Age" of February 10 carries an interesting article showing how pieces of broken drill can be removed from the holes they have made in such material as crankshafts by the simple expedient of exploding in the hole a small charge of dynamite. Apparently, the broken piece of drill follows the explosion, and leaves the hole with considerable speed. Obviously, it is a job to be undertaken in the open air, exercising considerable precautions.

(*Continued from previous column.*)

far as the Co-operation Stakes are concerned. These remarks are made solely in order to present the experience of many years' intimate association with foundrymen—by one who was first a chemist, then an analyst, then a metallurgist, and, now, Heaven knows what else than a lover of foundry work.

INSTITUTE ELECTS NEW MEMBERS

At a meeting of the Council of the Institute of British Foundrymen, held at the Waldorf Hotel, Aldwych, London, W.C.2, on April 15 last, the following were elected to the various grades of membership:—

As Subscribing Firm Members

Acme Iron Founders, Limited, Box 5639, Johannesburg (representative, R. J. Spargo), iron and brass founders; Air Conditioning & Engineering Company, 33, Wepener Street, Booysens, Johannesburg (representative, J. M. Stones), general engineers; Alpha Harris Engineering Company, Limited, Cnr. Ramsey and Wepener Streets, Booysens, Johannesburg (representative, U.C. Few), electrical and general engineers; Andrew, Restieaux & Company, 150, Albert Street, Johannesburg (representative, J. Andrew), manufacturing metal merchants; Perfection Piston M.F.G. (Pty.), Limited, 25, Main Reef Road, Roodepoort (representative, G. E. de Brito), engineers and founders; Scaw Alloys, Limited, P.O. 6334, Johannesburg (representative, J. Hancock), engineers and founders; Victor Kent (Transvaal) (Pty.), Limited, Invicta House, Sauer Street, Johannesburg (representative, F. Langford), mining merchants; Jarrow Metal Industries, Limited, Western Road, Jarrow (representative, T. A. Bird), steelfounders; G. Blair & Company, Limited, 34, Grainger Street, Newcastle-upon-Tyne, 1, (representative, W. Turnbull), steelfounders and engineers; Washington Steel Founders, Limited, Washington, Co. Durham (representative, J. Johnson), steelfounders.

As Members

J. Band, managing director, R. Hunter & Company, Johannesburg; G. Beaumont, foundry manager, Rosedowns & Thompsons, Hull; C. J. Bloodworth, proprietor, W. J. Bloodworth & Sons, Stroud, Glos; H. S. Brammer, designing engineer, East Rand Engineering Company, Limited, Germiston, S.A.; C. B. Brown, director, Charles Perks, Limited, Wednesfield; K. A. B. Corber, chief metallurgist, J. & E. Hall, Limited, Dartford, Kent; A. H. Dutton, foundry manager, Lancashire Steel Corporation, Manchester; C. C. Evans, works manager, Taylor & Bodley (Exeter), Limited; S. L. Finch, foundry methods engineer, K. & L. (Steelfounders), Limited, Letchworth; W. G. Funnell, foundry manager, J. Starkie Gardner, Limited, London; T. A. Hammersley, joint managing director, Marco Construction & Engineering Company, London; G. L. Hancock, branch manager, David Brown & Sons, Limited, Peniston; A. J. M. Hodges, production engineer, Marcus H. Hodges & Sons; R. Hodgson, foreman patternmaker, R. Hunter & Company, Johannesburg; R. E. W. Hughes, steelfoundry manager, Cornthwaite & Jane (1938) (Pty.), Limited, Johannesburg; S. T. Jazwinski, chief metallurgist, K. & L. (Steelfounders), Limited, Letchworth; R. D. Lee, foundry foreman, J. Starkie Gardner, Limited, London; B. Levy, proprietor, B. Levy & Company, patternmakers, London; W. G. Mochrie, technical representative, Tyseley Metal Works, Limited; A. R. Palmer, managing director, The Northern Diecasting Company, Limited, Manchester; W. A. Potter, metallurgical chemist, Sandholme Iron Company, Burnley; L. Rowley, proprietor, Bair & Crawford, Glasshead, Cape Colony; B. Schieldrop, director; Coleman Foundry Equipment, Stotfold, Beds; J. R. F. Shand, M.B.E., managing director, J. H. Shand, Limited, Bristol; H. D. Spence, foreman patternmaker, H. J. Maybrey & Company, London; Z. Stokowiec, superintendent, D. Brown & Sons (Hudd.), Limited; G. T. Vicary, metallurgist, National Smelting Company, Bristol; J. W. Wheeler, adviser on sand and die-casting production, British Aircraft Commission; B. R. Wilding, chief metallurgical chemist, Aero Engines, Limited, Bristol; W. Wilson, foundry manager, Le Grand, Sutcliffe & Gell, London; J. G. Bailes, foundry manager, Wm. Jessop, Limited, Sheffield; A. B. Bill, foundry foreman, Ley's Malleable Castings Company, Limited, Derby; E. D. Brown, works engineer, Austin Motor Company, Limited, Birmingham; F. Jackson, works manager, Newman Hender & Company, Limited, Woodchester, Glos; R. A. Miller, technical adviser, Foundry Services, Limited, Birmingham; W. Montgomery, chief chemist and metallurgist, H. Balfour & Company, Leven, Fife; R. O. Patterson, foundry superintendent, Babcock & Wilcox, Limited, Glasgow; A. N. Sumner, chief metallurgist, Reavell & Company, Limited, Ipswich; E. Curran, joint managing director, E. Curran & Company, Limited, Cardiff; C. T. Snushall, chief inspector and radiologist, Northern Aluminium Company, Newport; A. G. Barnard, metallurgical chemist, H. B. Barnard & Sons, Birmingham; E. G. Cox, director, J. Tomey & Sons, Limited, Birmingham; C. Daleymount, foundry foreman, Hamworthy Engineering Company, Poole; S. Evans, foundry manager, Service Engineers, Limited, Stoke-on-Trent; R. H. Goodwin, foundry manager, H. Goodwin, Limited, Bloxwich; P. F. Hall, foundry manager, Hamworthy Engineering Company, Poole; J. V. Smith, chief engineer, Fisher & Ludlow, Limited, Birmingham; H. F. Taylor, M.Sc., senior metallurgical engineer, Naval Research Laboratory, Washington, D.C., U.S.A.; J. Williamson, foundry manager, Dean, Smith & Grace, Limited, Leeds; N. C. Ashton, director, N. C. Ashton, Limited, Huddersfield, H. J. G. Goyns, assistant works manager, Jarrow Metal Industries; F. A. Woolley, chief chemist and metallurgist, Midland Motor Cylinder Company, Birmingham.

As Associate Members

C. Amitage, patternmaker, Parker Foundry, Derby; F. Bailey, moulder, Central Engineering Works, Johannesburg; A. E. Ball, time-study engineer, Phosphor Bronze Company, Birmingham; J. N. Bartlett, junior foreman, Steel Foundry, Ajmer, India; A. G. Bolli, foundry foreman, Britannia Iron and Steel Works, Bedford; T. Bothwell, moulder, Wright, Boag & Company, Johannesburg; W. Brown, brass moulder, H. Sampson & Son, Limited, Bristol; E. Byrne, charge hand, Vulcan Foundry Company, Limited, Newton-le-Willows; A. Cairns, chemist, Rolls-Royce, Limited; M. R. Choudari, M.A., M.Sc., mechanical superintendent, Government Electrical Department, Bezwada, India; L. W. Cleaver, mechanical draughtsman, Kelly & Cleaver, London; T. Collighan, foreman patternmaker, Vaughan Crane Company,

Institute Elects New Members

Manchester; C. J. Cross, works chemist, Britannia Iron and Steel Company, Bedford; J. H. Day, patternmaker, Eclipse Tube Mill Liners, Johannesburg; W. W. Doughty, foreman moulder, Coneygre Foundry, Tipton; J. Dunning, metallurgical laboratory assistant, National Gas & Oil Engineering Company, Limited; W. H. East, moulder, Harrison & Company (Lincoln); M. Evans, director, Village Foundry and Die Castings Works, Johannesburg; C. R. M. Frost, managing director, Autopart Engineering Company, Limited, Exeter; J. Fry, foreman, H. Sampson & Sons, Limited, Bristol; G. Godfrey, chief draughtsman, Wright, Boag & Company, Johannesburg; S. C. Gudgin, planning clerk, Crane, Limited, Ipswich; F. Haley, assistant foreman, Chas. Haley & Company, Limited, Bradford; A. Hancock, assistant foreman, R.O.F.; C. Hayton, patternmaker, York; E. R. Hodgson, B.Sc., metallurgist, Crofts Associated Industries, Limited, Bradford; A. E. Lane, iron moulder, Stothert & Pitt, Limited, Bath; L. Levy, technical representative, Foundry Services, Limited, Birmingham; A. Milner, assistant foreman, Hepworth & Grandage, Bradford; S. R. Milner, moulder, L.M.S., Crewe; D. McHugh, engineers' patternmaker, Babcock & Wilcox, Glasgow; R. Naylor, moulder, Manlove Alliott, Nottingham; W. J. Nicholas, journeyman, H.M. Dockyard, Portsmouth; B. Pidermann; foreman moulder, J. Barwell, S.A. Pty., Johannesburg; K. V. Ramadoss, Sup. Mech. & Elect. Works, Bellary, India; A. Reynolds, foreman, C.W.S., Wolverhampton; J. L. Rice, assistant foundry manager, Rice & Company, Limited, Northampton; R. T. Rounce, foundry estimator, Langley Alloys; J. W. Scott, moulder, Eclipse Tube Mill Liners, Johannesburg; L. Smith, metallurgist, Smelting Company, Limited, London; W. A. Smith, foreman, Hepworth & Grandage, Limited, Bradford; S. J. H. Squire, inspector, H.M. Dockyard, Devonport; R. S. F. Swan, foreman, Meigh High Tensile Alloys, Cheltenham; G. S. A. Tait, metallurgist, Wright, Boag & Company, Johannesburg; G. Taylor, moulder, P. & A. Campbell, Bristol; J. Thwaites, chargehand moulder, Modern Foundries, Halifax; R. Tonge, moulder, Union Steel Corporation, Vereeniging, S.A.; G. W. Toyne, moulder, Harrison & Company, Limited, Lincoln; J. W. Trueman, assistant to superintendent, Stanton Ironworks Company, Limited; F. Davies, steel moulder, Brown, Lenox & Company, Pontypridd; F. Fowler, coremaker, Brown, Lenox & Company; A. H. Hope, moulder, Brown, Lenox & Company; J. R. Jones, moulder, Brown, Lenox & Company; O. Jones, steel sample passer, Brown, Lenox & Company; B. J. Maus, coremaker, Brown, Lenox & Company; D. J. Morgan, moulder, Brown, Lenox & Company; E. Towns, moulder, C. W. Taylor & Son, Limited, South Shields; J. H. Morgan, steel moulder, Brown, Lenox & Company; J. D. Arthur, student engineer, Ashmore, Benson, Pease, Stockton; W. Barclay, assistant foreman moulder, Harland & Wolff, Limited, Glasgow; P. Anderson, assistant foreman, T. Summerson & Sons, Darlington; W. P. Boughey, foundry foreman, H. W. Lindop & Sons, Walsall; W. W. Currie, assistant foreman, T. Summerson & Sons, Darlington; A. Donaldson, metallurgical chemist, Carron Company, Scotland; D. W. H. Evans, patternmaker, Bristol Aero Company, Limited; J. Gilmour, moulder, Rolls-Royce, Limited; J. W. Kinsman, inspector, H.M. Dockyard, Chatham; Lieut. J. L. Mitchell, apprentice ironfounder, Grahamston Iron Company, Scotland; J. McGillivary, engineer, J. Dougall & Sons, Limited, Bonnybridge; R. S. Reader, assistant foundry manager, Brightside Foundry & Engineering, Sheffield; H. Shore, foundry chargehand, Ley's Malleable Castings, Derby; O. S. Talintyre, assistant metallurgist, Head, Wrightson & Company, Thornaby; T. H. Vokes, progress superintendent, Langley Alloys, Limited; J. W. Watson, student moulder, National Steel Foundry, Leven; E. Wheeler, foundry engineer, Austin Motor Company, Limited, Birmingham; L. S. Wilson, student foundry moulder, T. Summerson & Sons, Darlington; J. Woodhouse, student moulder, T. Summerson & Sons; F. Acton, coreshop superintendent, Midland Motor Cylinder Company, Birmingham; T. W. Merrington, moulder, W. Shaw & Company; R. J. Scott, foreman moulder, N. E. Marine Engineering Company, Limited.

As Associates

J. Brigg, metallurgical assistant, Glacier Metal Company, Limited, London; S. Burrell, laboratory assistant, Bradford; E. P. Drummond, secretary, Industrial Council for the Engineering Industry, Johannesburg; J. M. Goymour, assistant metallurgist, Reavell & Company, Limited, Ipswich; P. A. Green, foundry production apprentice, English Electrical Company, Limited, Bradford; D. F. Knight, metallurgist, Winget Foundry, Rochester; C. S. Leather, apprentice patternmaker, International Combustion, Limited, Derby; G. A. Marley, managing clerk, Williams Alexandra Foundry.

As Associates (Student)

C. Higton, apprentice moulder, Aiton & Company; W. E. Davies, apprentice coremaker, Brown, Lenox & Company; R. C. Green, apprentice steel moulder, Brown, Lenox & Company; J. G. Strachan, apprentice moulder, Torry Foundry, Aberdeen; W. G. Calder, metallurgist, Glenfield & Kennedy, Kilmarnock; B. N. Milroy, foreman moulder, Pease & Partners, Middlesbrough.

A NEW HOUSE ORGAN

Although the publishers of "Foundrymen's News Letter"—Harry W. Dietert Company, 9330, Roselawn Avenue, Detroit, 4, Michigan, U.S.A.—say that the publication is not intended as a "house organ," but rather as an informal and semi-technical paper, the reviewer fails to appreciate the difference. He does, however, welcome this new publication, as its first issue gives an enlightened review of what happens at mould and core surfaces at pouring temperatures—surely an interesting subject. Moreover, with the resources available to the issuing house, a high standard is ensured. Readers desiring to be placed on the mailing list should write to Detroit.

MOULD DRYING

According to Mr. L. J. Connell, writing in the "G.E.C. Journal" on the subject of radiant and inductive heating to industrial processes, in many cases it is unnecessary to dry the whole of the mould; it is sufficient to dry the surface skin to a depth of 1 in. or less. This is often done by means of a gas torch, but the method is not altogether satisfactory because success is dependent upon the skill and experience of the operator and there is no means of checking that the work has been done effectively without spoiling the mould. With inexperienced operators, the percentage of reject castings is high, and automatic drying equipment is therefore attractive.

Lamp heating may be used successfully for certain types of mould, but it will be apparent that, if drying is to be reasonably uniform, the surface of the mould

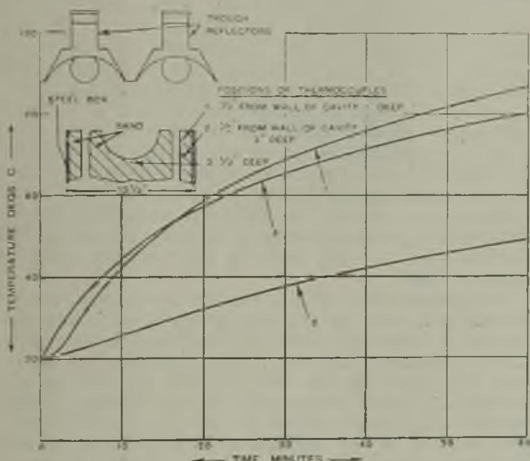


Fig. 1.—Lamp Heating for Drying Foundry Moulds. Temperature Curves, Showing that the Method is Suitable provided the Moulds are Free from Deep Cavities.

must be free from deep cavities which are in shadow. The relation between temperatures at exposed parts of the surface of a mould and parts in shadow is illustrated by the heating curves in Fig. 1. Lamp heating would not have been suitable for the particular mould used in the experiment, as the sides and bottom of the vertical cavities would not have dried. For shallow moulds, however, it is very suitable and lends itself well to association with mechanised foundry methods.

In one mechanised foundry, more than 30 plants are installed over conveyors and are drying several different types of mould satisfactorily to a depth of $\frac{1}{16}$ in. in times of about 5 min. In other cases, drying times may be as long as 30 to 45 min., depending on the type of sand and its moisture content, on the depth of drying required and on the shape of the mould.

FOUNDRY INQUESTS—V.

By "Coroner"

Patterns from which large pods of sand have to be carried in the top, such as bedplates, certain types of gearcases, etc., are often lifted from the mould with the top, so as to affect a better draw of this pod, after turning over. Whilst giving a better draw to the pod, this method may result in other troubles. When lifting the top, unless the pattern had been sufficiently sapped previous to the top being rammed, or if only a very little taper was imparted to it, and it was of considerable depth, the possibility is that the friction of the pattern with the mould would tend to pull the joint somewhat, which if not noticed and rectified at once may cause a waste through a crush on assembly.

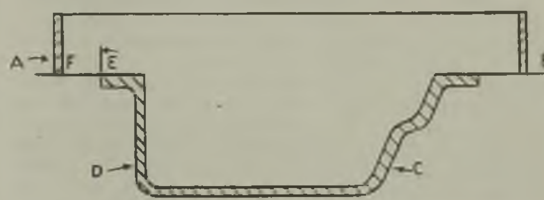


Fig. 1.

Fig. 1 is a sketch of the type casting referred to, and one which recently gave trouble. The joint of the mould is along line AB. While the side C will lift easily, side D, being almost perpendicular, is very liable to start the joint from E to F. This may be only the slightest amount, but if not rectified the whole of the side D is liable to be pressed in on closing, causing a broken mould, or, if it is not sufficient for this, a casting with a thin side as the casting which caused this investigation.

QUESTIONNAIRE ON POST-WAR RECONSTRUCTION

The Council of Ironfoundry Associations has agreed to co-operate with the Ministry of Supply and the Board of Trade in issuing to the ironfoundry industry a questionnaire covering some preliminary information on certain practical issues that will arise after a European armistice.

The questionnaire was prepared with the assistance of a sub-committee of the Council, and the information asked for will enable the Government departments concerned to take necessary steps in order to assist the industry in its post-war reorganisation. It is therefore in the interest of ironfoundry owners and companies operating ironfoundries to answer the questions as completely as possible and to the best of their ability.

The returns should be sent to the Secretary of the Council, 2, Caxton Street, Westminster, London, S.W.1, as soon as possible, and in any case not later than May 31.

SCALING PROPERTIES OF STEEL

In a Paper which Mr. A. Preece and Dr. R. V. Riley have prepared for presentation to the Iron and Steel Institute, research work done on the scaling properties of steels in furnace atmospheres at 1,150 deg. C. it outlined. Whilst this temperature is somewhat on the high side for most foundry applications, there are some cases where they do obtain, and in such cases the following summary will be of interest.

The rate of oxidation and the character of the oxide formed in furnace atmospheres at 1,150 deg. C. were examined for a selection of carbon and alloy steels. An account is given of the important influence of sulphur dioxide and free oxygen in the furnace atmosphere in governing the process of oxidation. It was found that each of the alloy steels behaved in a characteristic manner, and generalisations are difficult. The formation of sulphide complexes at the scale-metal interface observed in earlier experiments at 1,000 deg. C. also occurred at 1,150 deg. C., and they behaved in a similar manner by inducing intercrystalline penetration of scale into the metal in all the steels except those containing appreciable quantities of silicon, chromium and aluminium. With these three latter types of steels preferential oxidation of the alloying element produced a protective oxide film, and continued oxidation was possible only under conditions of temperature and furnace atmosphere where the film became unstable. Factors which influence the instability of these films are discussed.

DON'T USE COAL

Amongst a group of documents received from the Ironfoundry Industry Fuel Committee is Report No. 3, which carries this rather startling caption, together with a sub-title reading "for cupola lighting, mould and core drying, space heating." The Report is based on some data gathered by Mr. N. C. Blythe, of the Midland Electric Manufacturing Company, Limited.

The sound argument he uses is based on the relative abundance of coke as compared with coal. For the burning of the latter a modicum of blast is normally required, and methods are revealed as to how this is effected. Copies are available from Mr. J. Bolton, the secretary of the Committee, at St. John Street Chambers, Deansgate, Manchester, 3.

The U.S. War Production Board have announced that the supply of pig-iron has improved to the extent where restrictions can be removed on specifications for the types of cast-iron ware permitted for manufacture. The new order will make available a large number of sizes of domestic utensils.

Tooling Economy.—A pamphlet issued by the Machine Tool Control, Ministry of Supply, 35, Old Queen Street, London, S.W.1, shows by illustrations and letterpress how very considerable economies can be made by meticulous care in grinding, and precision work is now deemed essential. This pamphlet is available to our readers on request to the Ministry.

A SCOTTISH WAR FACTORY

CLOSING OF ORDNANCE SIDE

The Ministry of Supply's comments on the report issued in October, 1943, by the Select Committee on National Expenditure concerning a factory near Glasgow have been published in a White Paper. The Ministry states:

"The report relates to complaints about a factory near Glasgow built and owned by the Ministry and managed by a well-known Glasgow firm as agents, and as one of a group of four factories managed or privately owned by that firm. It consists of two parts, a steel-making and forging side and an ordnance or finished machine-shop side, and the complaints related solely to the ordnance side. The Committee recommended that the ordnance side of the factory should be closed.

"It has become necessary for some time past for the Ministry to consider the future production programme, not only of the machine-shop in question, but also of the other three factories operated by this firm, two of which, like the one in question, are agency factories. Changes in Army requirements of weapons had recently made it clear that only a part of the plant in the four factories could be kept in full operation for the Ministry of Supply. It was accordingly decided, as announced on November 15, 1943, to concentrate production in two of the factories, and arrangements were made to terminate gun production in the finished machine-shop at the end of the year or early in January, 1944.

"In paragraph 4 of the report the Committee emphasises the need for forward planning of future production at a factory where the manufacture of a given store is coming to an end. This necessity has always been recognised by the Ministry, but changes of programme are often necessitated by the changing conditions of war, and when, as in this case, such changes are sudden it is not practicable to give Supply Ministries the period of notice necessary to allow a smooth transition to alternative manufacture."

Cutting Oils and Coolants

The Ministry of Fuel and Power has issued a bulletin described as a "Plan for the Economical Distribution, Application and Reclamation of Cutting Oils and Coolants." It deals with receiving, storing and redistribution of oil in the works; the applications of oil, recovery and reconditioning. While it is urged that every economy should be exercised in the use of oil, it is also emphasised that in so doing "production must not suffer." Apparently this is Technical Bulletin No. 2, and it would be convenient for reference if this were indicated on the cover, instead of the conclusion having to be drawn from the fact mentioned in the foreword, that the general plan was outlined in the "first Bulletin." Although it does not appear to be indicated, presumably copies of "Industrial Bulletin, No. 2, Oils," may be obtained free on application to the Ministry.

INTERNATIONAL MONETARY FUND

An international monetary fund of between eight and ten billion dollars (£2,000,000,000 to £2,500,000,000), which would facilitate international trade, contribute to the maintenance of employment and real income, and promote exchange stability, is visualised in a White Paper published recently. It consists of a joint statement by experts of the United and Associated Nations who have taken part in the initial discussions and whose consensus of opinion is that the most practical method of assuring international monetary co-operation is through the establishment of such a fund.

Member countries would subscribe in gold and local funds amounts to be agreed totalling around £2,000,000,000 for such nations, or £2,500,000,000 for the world as a whole. A member would be entitled to buy another member's currency from the fund in exchange for its own currency under certain conditions. The fund is not intended to provide facilities for relief or reconstruction or to deal with international indebtedness arising out of the war.

Sir John Anderson, the Chancellor of the Exchequer, said in the House of Commons that the White Paper was a statement of principle on the establishment of an international monetary fund which was the result of study at the expert level. It in no way committed the governments concerned. He emphasised that there had been no acceptance by the Government of the principles.

PATENTS ENQUIRY

The President of the Board of Trade, replying to a question in the House of Commons, said he had appointed a committee to report on what changes, if any, were desirable in the Patents and Designs Act, in the practice of Patents Office and courts in relation to matters arising therefrom, and to submit an interim report on the initiation, conduct and determination of legal proceedings under the Patents and Designs Act.

Members of the committee would be Mr. Kenneth Swan, K.C., chairman; Mr. Hubert A. Gill, past-president, Chartered Institute of Patent Agents; Mr. James Mould, member of Patents Bar; Capt. B. H. Peter, managing director, Westinghouse Brake & Signal Company, Limited; Dr. David Pye, F.R.S., Provost, University College, London: Mrs. Joan Robinson, University Lecturer in Economics, Cambridge; Mr. H. L. Saunders, Assistant Comptroller, Patent Office: and Dr. A. J. V. Underwood, consulting chemical engineer.

The committee would also submit an interim report on the provisions of the Patents and Designs Acts for the prevention of the abuse of monopoly rights, and suggest any amendments of the statutory provisions or of procedure which in their opinion would facilitate the expeditious settlement and the reduction of the cost of legal proceedings in patent cases and encourage use of inventions and the progress of industry and trade.

IRONFOUNDRY FUEL NEWS—I

In this first announcement in this series, ironfounders might perhaps be reminded of the assistance which is available to them in their efforts to save fuel. Inquiries from ironfounders can be addressed to the hon. secretary of the appropriate Regional Panel of the Ironfounding Industry Fuel Committee (names and addresses were given in THE FOUNDRY TRADE JOURNAL for May 27, 1943), or direct to the Committee's Fuel Officer, Mr. W. J. Driscoll, B.Sc. (Eng.), A.M.I.Mech.E., Alvechurch, Birmingham. If it is thought desirable an endeavour will be made to arrange for a Panel member to visit the works concerned to discuss any questions of fuel economy on the spot.

Regional Panels are, of course, paying visits to ironfoundries as part of their normal programme, but in view of the number of foundries involved some method of selection has to be adopted. If your foundry has not yet been visited, will you not show your eagerness to help by inviting your Panel to send someone along to check over your cupolas, drying stoves, etc.? If some plant outside the scope of the Panels is concerned, *e.g.*, shop heating boilers, your Panel can obtain expert technical assistance through the regional organisation of the Ministry of Fuel and Power, with which it co-operates closely.

THE STATE AND INDUSTRY

Speaking at the Wolverhampton Production Exchange, Sir Bernard Docker made a strong plea for a charter to trade with the support, and not the interference, of the State. We had planning and control to contend with, and we even heard cries of "nationalisation." He would liken these plans and controls to eggs. They also were good for a short time after they were laid. Many people had got the mistaken idea that these plans and controls were the mainsprings of our effort. In their rambling they had so brought the word "plan" into disrepute that he would banish it from our post-war vocabulary.

"Organise if you like, but please spare us any more disembodied plans," said Sir Bernard Docker. "Let us organise our affairs, but let them be organised by those whose affairs they are and not by the servants they employ. You don't use the men who keep the books to run the business. We must prepare our arrangements to get back our export trade, without which we are as nothing. We must decide now what it means to get the machine under way. We must tell the Government what we want of them."

IRON AND STEEL INSTITUTE

The annual general meeting of the Institute is to be held at the offices of the Institute, 4, Grosvenor Gardens, London, S.W.1, on Thursday, May 11, at 10.45 a.m. and 2.30 p.m. Mr. James Henderson, retiring President, will be in the chair and will be followed later by Mr. Arthur Dorman, President-Elect.

NEWS IN BRIEF

CALLENDER'S CABLE & CONSTRUCTION COMPANY, LIMITED, have removed their Bristol office to 123, Victoria Street, Bristol 1.

THE UNITED STATES STEEL CORPORATION has declared an unchanged dividend of $1 per common share for the second quarter of 1944.

MR. EDWARD RUSSELL GITTINS, The Homestead, Mayfield Road, Timperley, representative for metal works, is paying a first and final dividend of 12s. 5¼d. in the £.

PRODUCERS' PRICES of borax and boric acid have been advanced as follows:—Commercial quality (99½ per cent.), granulated, borax £34, boric acid £62 net per ton, carriage paid in Great Britain, in bags, minimum 1-ton lots.

THE FIRST INSTALMENT of the £30,000,000 hydro-electric power scheme for the Highlands will start in 18 months, according to Dr. Isaac MacIver, member of the Hydro-Electric Board Amenities Committee, speaking at Fort William recently.

WORK IS IN HAND at Blaydon-on-Tyne Ironworks, on the construction of parts for the erection of a steel house designed by Mr. Donald Brown, an engineer, of Blaydon. The Ministry of Works has granted Mr. Brown a special licence and released the necessary material to build the house, and a free site has been allowed by Blaydon Urban Council. A six-roomed house, it is estimated, would cost about £450. With a single unit of plant, Mr. Brown declares, nine houses could be built daily.

FOLLOWING NEGOTIATIONS between representatives of Vickers-Armstrongs, Limited, and the trade unions concerned, it has been arranged that all Saturday afternoon and Sunday labour shall cease after this week-end. Overtime will continue on three nights of the week up to 7 p.m. The working week is reduced to 53 hours. An official of the Amalgamated Engineering Union said that the new agreement had arisen mainly out of the workpeople's desire to get rid of Sunday work, and to some extent because of a shortage of fuel which had necessitated economies and a reduction of working.

BILSTON CORPORATION—the Mayor, Aldermen, Councillors and executive officials—were entertained at luncheon this week by Col. S. J. Thompson, Mr. W. J. Thompson, and Mr. H. B. Thompson, joint governing directors of the companies of John Thompson Engineering Company, Limited, Ettingshall, Bilston. Col. Thompson said he did not want the people of Bilston to think that the firm had no interest in the civic life of the town. All firms should be interested in the life of the town in which their works were situated. Col. Thompson spoke of the possibility of there being an amalgamation in the near future of Bilston, Coseley and Sedgley, three adjoining districts, to form a county borough for local administration purposes.

THE TRADING RESULTS of 3,300 war-contracting firms are analysed in the Civil Appropriation Accounts. Of the 1,300 larger concerns, it is disclosed that 2 per cent. suffered losses, 25 per cent. showed profits up to 15 per cent., 35 per cent. showed profits between 15 and 30 per cent., and 38 per cent. showed profits of over 30 per cent. All these big firms, says the report, have £50,000 capital or over. The smaller firms tend on the average to show higher returns on capital employed, but a larger proportion (9 per cent.) show losses. Negotiations for reductions have been opened with 434 firms, leading to settlements with 149. Under these settlements refunds of over £4,700,000 are estimated to be due in adjustment of prices for supplies, the report states.

PRESIDING AT THE annual meeting of Hadfields, Limited, Mr. P. B. Brown (chairman and managing director) said that many changes had taken place in the nature of the work the company had been engaged upon during the past year. A considerable number of contracts had been curtailed or suspended. It was, however, satisfactory to have the assurance that these changes in programme were mainly due to the fact that ample stocks of many classes of munitions had already been accumulated. They were now producing large numbers of light and intricate alloy steel castings to be used in the construction of aircraft. These castings were subjected to the most stringent examination and testing before acceptance, and were proving to be more efficient and less costly than the parts that had hitherto been made as forgings.

CONTROL OF MICA

The Minister of Supply has made the Control of Mica (No. 3) Order, 1944. It revokes and remakes in consolidated form, with amendments, the Control of Mica (No. 2) Order and Direction No. 1 made under that Order. Licences are still required for all acquisitions of mica (other than built-up mica and mica in powdered form) in excess of an aggregate worth of £5 in any one calendar month, and for its treatment, use and consumption. Up to £5 worth of mica may be acquired without licence in any one period of one calendar month, but the disposer must make a monthly return of such unlicensed transactions in specified form to the Controller of Mica. Built-up mica may now be dealt in without licence, and it may also be used as an electrical insulator without licence, but a licence is still required to treat, use, or consume it for other purposes. Powdered mica continues to be exempt from licence.

Inquiries concerning the Order should be addressed to the Ministry of Supply, Mica Control, 6, Carlton House Terrace, London, S.W.1.

MR. ERNST BIANCO WESTMAN died on Saturday, April 15, at his home in Kenley, Surrey, in his 85th year. Mr. Westman first came to England from Sweden in 1883, and started business on his own in Swedish iron and steel in 1887, at the same address as that now occupied by the firm of Ernst B. Westman, Limited, namely, 39, Lombard Street, London, E.C.3.


STANTON
DALE
Refined PIG IRON
for High Duty
Castings by Morris Motors Limited.
Casting by Baker Perkins Limited
Castings by Ruston Hornsby Limited
Casting by David Brown & Sons (Hudd.) Ltd.
Castings by Ruston Hornsby Limited
Casting by Oxford & Cowley Ironworks Ltd.
DALE
DALE
DALE
THE STANTON IRONWORKS COMPANY LIMITED
NEAR NOTTINGHAM.

COMPANY RESULTS

(Figures for previous year in brackets)

Heatrae—Net profit, £11,312 (£14,277); dividend of 12½% (same); forward, £7,368 (£8,752).

Allen West—Net profit to January 31 last, £49,873 (£50,839); ordinary dividend of 7½% (same).

Range Boilers—Net profit for 1943, £12,904 (£11,392); dividend of 20% (15% plus 5% bonus).

Brush Electrical Engineering Company—Net profit for 1943, £175,002 (£118,130); dividend of 9% (8%).

Halesowen Steel—Profit for 1943, £20,121 (£19,783); to general reserve, £15,000 (nil); ordinary dividend of 25% (same); forward, £20,396 (£28,150).

Breedon & Cloud Hill Lime Works—Net profit to January 31 last, £20,877 (£20,446); to general reserve, £10,000; dividend of 27½% (25%); forward, £7,191.

Central Provinces Manganese Ore—Trading profit for 1943, £713,209 (£668,235); final dividend of 1s. 6d., free of tax, making 2s. 3d. (same); forward, £128,302 (£123,495).

Ewart & Son—Net profit for 1943, £44,261 (£12,510); 21 months' dividends on the preference shares, bringing payments to December 31, 1940, £14,098, net; forward, £7,713 (£3,051).

C. & W. Walker—Trading profit to January 31 last, £8,261 (£19,302); preference dividend, £1,537 (£1,500); ordinary dividend of 10% (same); no bonus (5%); forward, £17,235 (£15,276).

Anderson-Grice Company—Gross profit, £41,284; depreciation, £3,043; taxation, £33,801; war damage insurance, £561; ordinary dividend of 2s. 6d. per share, £2,062; written off patent and manufacturing rights, £1,000; forward, £1,430 (£1,012).

J. W. Singer & Sons—Profit for the year ended January 31 last, after deducting debenture interest and providing for taxation, £8,309 (£9,943); preference dividend, less tax, £600; ordinary dividend of 10%, less tax, £1,114; forward, £22,853 (£16,258).

Smith & McLean—Profit for 1943, £56,300 (£50,676); to reserve, £10,000 (same); supplementary depreciation and obsolescence, £20,000 (same); preference dividend, £3,125; ordinary dividend of 11% (same), and a bonus of 4% (same), £15,000; forward, £74,513 (£66,337).

Newey & Tayler—Dividends from subsidiary companies and other receipts, less expenses, including the balance brought in, £24,479; preference dividends, less tax, £4,501; interim dividend of 2½% on the ordinary shares, £3,250; final dividend of 7½% on the ordinary shares, £9,750; forward, £6,978.

John Thompson Engineering—Profit for 1943, £106,621 (£101,123); final ordinary dividend of 12% (same) and a special bonus of 5% (same), making 22½% (same); to general reserve, £30,000 (same); dividend reserve, £15,000 (£10,000); pensions, £5,000 (same); forward, £55,350 (£52,937).

John Summers & Sons—Net profit for 1943, after providing for depreciation and taxation, £451,173 (£458,191); war damage insurance, £23,210; to general reserve, including £43,681 covering debenture stock redeemed in December, 1943, £160,000; to war contingencies reserve, £50,000; dividends on ordinary stock, £215,000; forward, £188,146 (£185,183).

PERSONAL

Mr. A. J. Boyd has been elected a director of Associated Electrical Industries, Limited.

Mr. James Gaul has retired after 38 years' service at the Mond Nickel Works, Clydach, Swansea Valley.

Mr. Sydney Trollope, who retired recently after many years as secretary of the Wolverhampton and District Engineering Society, has been presented by the members with an illuminated testimonial and a cheque.

Mr. C. E. Holmstrom, a special director of Firth-Vickers Stainless Steels, Limited, has succeeded Mr. Colin Laycock as president of the Sheffield Chamber of Commerce. Mr. Laycock has held the office for four years.

Mr. Ronald M. Paterson, of A. R. Brown, McFarlane & Company, Limited, Glasgow, iron and steel merchants and exporters, has been appointed a director. Mr. Paterson has been connected with the firm for many years.

Mr. T. W. Edwards, commercial manager and secretary of the Park Gate Iron & Steel Company, Limited, has been nominated for the sixth successive time for the presidency of the Rotherham and District Chamber of Commerce.

Mr. G. W. H. Turton, for the last 25 years works manager of John Cashmore, Limited, Great Bridge, Tipton, steel and iron stock-holders and machinery merchants, has been appointed chairman of Coseley Urban District Council, on which he has served for the last seven years.

CONTRACTS OPEN

The date given is the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Belfast, May 8—Iron castings, cast-iron pipes, etc., for the Town Council. The Engineer and Manager, Gasworks, Ormeau Road, Belfast.

Manchester, May 10—7,000 lineal yds. of 4-in. spun-iron concrete-lined socket and spigot water pipes (equal to B.S.S. Class C schedule for cast-iron pipes). The Secretary, Waterworks Offices, Town Hall, Manchester, 2.

Sir Frederick Ness Henderson died at Crosbie House, Monkton, Ayrshire, recently, aged 81. He was educated at Albany Academy and at Glasgow University before entering the shipbuilding industry. Formerly he was chairman of David & William Henderson & Company, Limited, shipbuilders and engineers, of Partick, Glasgow, and he was chairman of the North-West Rivet, Bolt and Nut Factory, of Airdrie, and of the Employers' Insurance Association, Limited. Among his directorates were those of A. & J. Inglis, Limited, shipbuilders and engineers, and J. & A. Stewart, Limited. He was for a period president of the Shipbuilding Employers' Federation and the Clyde Shipbuilders' Association.

Raw Material Markets

IRON AND STEEL

There has been little or no change recently in the general position affecting supplies to the foundries. Essential consumers are assured of having adequate stocks of pig-iron, but, owing to the curtailment in its manufacture, licences are being watched carefully and new permits for fresh tonnage are issued only when stocks are inadequate to meet the applicants' requirements. The aim of the Control is to distribute the iron available uniformly, so that some consumers will not have large supplies while others are restricted.

Many of the engineering and speciality foundries continue to be well employed in the manufacture of castings under Government contracts, such as components of tanks, aircraft, machine tools, etc. The demand generally is not anything approaching that of twelve months or more ago; no doubt since that time heavy stocks have been built up. However, replacements will be essential and the general engineering foundries can look forward to reasonably good working conditions. They have no difficulty at the moment in securing all they require in special grades, such as low- and medium-phosphorus and refined irons, and, where absolutely essential, hematite is supplied, although the Control are watching supplies of the latter particularly closely, and only for essential purposes will it be sanctioned. Cast-iron and steel scrap is in strong demand, but supplies are inclined to be stringent.

No improvement can be discerned in the demand for light castings and, unless unforeseen circumstances obtain, this position is likely to remain until the end of the war, as at the moment there seems no prospect of the Board of Trade increasing the quotas for domestic castings. Export is out of the question, and the building trades, who are generally large consumers of light castings, are not wanting heavy tonnages.

As the re-rollers continue to be very active and have substantial order-books, it is most important that there is a continuity of supplies of billets, blooms and sheet bars. Much of their business is of an urgent character and, generally, they are fully booked for weeks ahead on light angles, tees, special sections, strip, and the usual run of steel bars. Deliveries of raw material have not been so heavy or so regular of late, but there are signs of the position becoming better. Recently, re-rollers have had to make inroads into stocks in order to get maximum output. The rollers of sheets are extremely busy, as sheets have come into the picture again after a short lull, so that good deliveries of sheet bars are essential. In addition to prime billets, re-rollers are willing buyers of most grades of seconds, crops, and any other form of steel which can be re-rolled.

The demand for steel plates and sheets continues to be an outstanding feature of the trade. There are big demands on the mills for this class of material for shipbuilding, wagon, locomotive and tank manufacture and many other war industries. Sheets in all grades and gauges are required for a multiplicity of uses and a heavy programme is in front of the mills. Structural steel requirements are not so complicated or exacting, but there remains a good demand for shipbuilding sizes and for light and medium sizes of sections and joists.

NON-FERROUS METALS

Activity in the non-ferrous metal trade is concentrated almost entirely on the production of material for the continuation of the war effort. Although there has been a slight easing in various directions, notably in the release of limited quantities of zinc for galvanising purposes, the Control have not made any large-scale civilian concessions. There now seems to be no difficulty in supplying all the metal that is required, and generally there is a considerable reduction from the peak production of a year or so ago.

Copper consumption, although still very heavy, is substantially less than it was last year. Much of this falling off is accounted for by reduced activity in the brass industry owing to the reduction in output of shells, small arms ammunition, etc. In the United States, on the other hand, there has been increased activity at the brass mills, and production stands at the highest figure for many months. American domestic copper output has been stated as continuing on its downward trend, and generally the position regarding supplies seems to be much tighter than it is in this country.

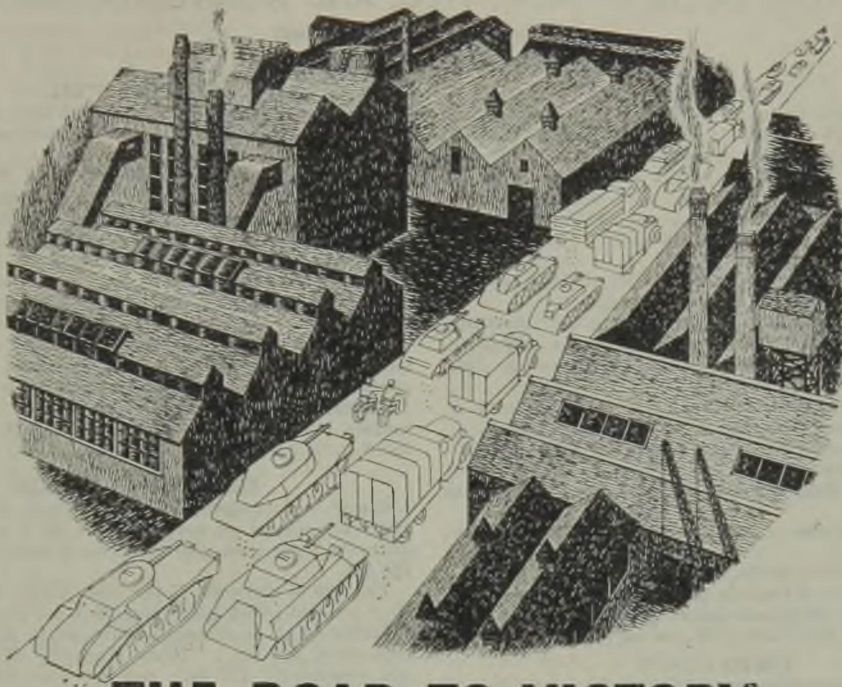
The tin supply situation is relatively satisfactory. Since the loss of the East Asian ore deposits, the outputs of the alternative sources of supply open to the United Nations have been stepped up to a remarkably high level. The United States has been obtaining most of its requirements from Bolivia, and the ore has been treated at the Longhorn tin smelter at Texas City. In the immediate post-war years it is likely that ore will be sent to the Longhorn smelter from the Far East, as it may be several years before the smelters in Malaya and the Dutch East Indies are repaired and in full operation.

OBITUARY

MR. WILLIAM HERBERT SOLLORS, late of Worthington-Simpson, Limited, Newark-on-Trent, died on April 21.

MAJOR A. L. S. WOOD, managing director of R. & A. Main, Limited, and joint managing director of Glover & Main, Limited, died recently.

MR. OLIVER E. DAVIES, assistant blast-furnace manager for many years at the Cleveland Works of Dorman, Long & Company, Limited, died at Redcar recently. He had been employed by the company for about 50 years.



CURRENT PRICES OF IRON, STEEL AND NON-FERROUS METALS

(Delivered, unless otherwise stated)

Wednesday, May 3, 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.—No. 1 (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.; Scuth 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.; 45/50 per cent., £27 10s.; 75/80 per cent., £43. 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.—4/6 per cent. C, £59; max. 2 per cent. C, 1s. 6d. lb.; max. 1 per cent. C, 1s. 6½d. lb.; max. 0.5 per cent. C, 1s. 6¾d. 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, 8g. 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, 16d.; rods, drawn, 11⅜d.; rods, extruded or rolled, 9d.; sheets to 10 w.g., 10⅞d.; wire, 10⅝d.; rolled metal, 10¼d.; yellow metal rods, 9d.

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

Phosphor Bronze.—Strip, 14d. per lb.; sheets to 10 w.g., 15d.; 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 Apr. 29, 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. length, 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 MANAGER (non-ferrous) desires change; life-long practical experience in all classes of non-ferrous metals in loam, dry and green sand; also chill-cast rods and bushes and white-metal to specifications; modern moulding machine experience; accustomed to costs, sales, buying and estimating; first-class references.—Box 472, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

FOUNDRY GENERAL MANAGER, M.I.Brit.F., Inter. B.Sc. (Eng.), etc.; age 39; ex-Service; metallurgist; repetition expert; grey and malleable castings; practical foundryman; patternmaker; take entire charge all foundry departments; sound engineer and maintenance; accustomed organisation layout, rate fixing, costs, production control, sales; keen, energetic; excellent record; available short notice to progressive firm; war and post-war developments; moderate commencing salary pending results; Midlands essential; principals only.—Box 460, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

METALLURGIST, Chemist, Foundry Technician, desires Senior Executive Position with firm in North of England, preferably Tyneside; sound knowledge and considerable experience in cast-iron and bronze founding; light alloy founding and refining; die casting, etc.; Admiralty and A.I.D.; POWDER METALLURGY, original research and production.—Box 464, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

PATTERNSHOP MANAGER (age 39 years) seeks similar position; 15 years' experience in executive position; good organiser and planner; highly specialised knowledge of piston trade.—Box 470, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

HEAD FOREMAN.—Practical; iron-foundry; seeks re-engagement; disengaged; highest references.—Box 474, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

FOUNDRY MANAGER required; preferably with experience in steel and bronze founding; degree or higher national certificate essential; age not over 35 years; managerial abilities and sound practical knowledge—condition; applicants to supply full particulars as regards education, positions occupied, and salary required, Box 458, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

MANAGER wanted by an old-established firm for Foundry producing general engineering castings up to 5 tons, large engine cylinders, and high-duty alloys; good laboratory and metallurgical control already available; practical foundry experience essential; early engagement or post-war considered; a salary of four figures will be paid to first-class man.—Box 438, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

REPRESENTATIVE wanted by Midland Steel Foundry producing Light Castings (1 lb. to 56 lbs.) in both Carbon and Alloy Steels.—Apply in first instance by writing GABRIEL & Co., LTD., Birmingham.

SITUATIONS—*contd.*

HEAD FOREMAN INSPECTOR required by large modern Steel Foundry on high priority work; this is a permanent position, and one of considerable responsibility; applications are requested from men between 30 and 40 years of age, with first-class experience in inspection of steel and non-ferrous products, and full knowledge of A.I.D. procedure; applications should state age, experience, and salary required.—Box 462, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

FOREMAN required to take charge of small but modern Foundry in East of Scotland producing intricate castings in high grade and special irons. Technical knowledge on up-to-date foundry and laboratory control practice, in addition to practical experience, essential.

Apply in confidence, giving full particulars, qualifications, previous appointments, age and salary expected, to ASSISTANT REGIONAL CONTROLLER, Ministry of Labour and National Service, 33, Stockwell Street, Glasgow, C.1.

PATENTS

THE Proprietors of the Patent No. 461716, for Improvements in Metallic Screens, Stencils and the like and Formation thereof, are desirous of entering into arrangement, by way of licence and otherwise, on reasonable terms, for purpose of exploiting the same and ensuring its full development and practical working in this country.—Address all communications in the first instance to HASELTINE, LAKE & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

THE Proprietors of the Patent No 514300, for Method of and Apparatus for Cutting, 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.

THE Proprietors of the Patent No. 518838, for Improvements in or relating to Torque Transmitting Universal Joints, 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

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