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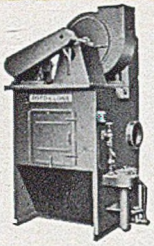

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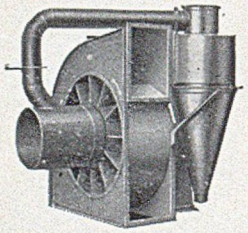

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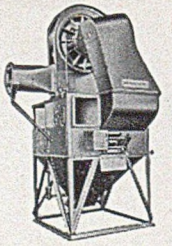

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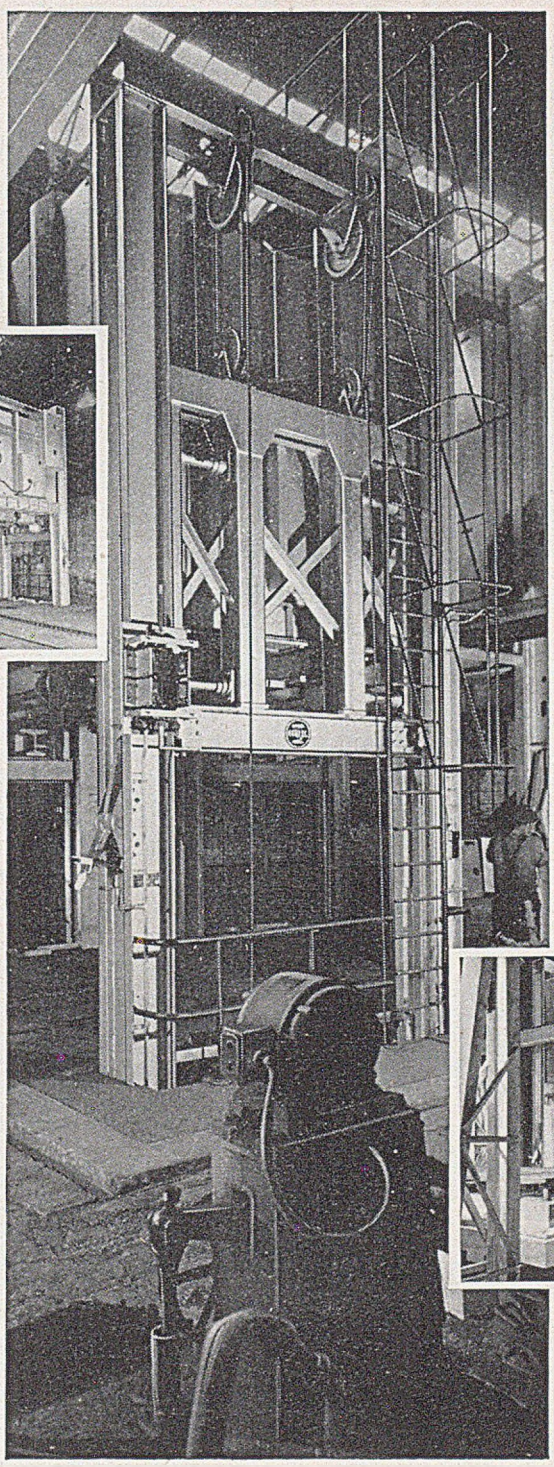

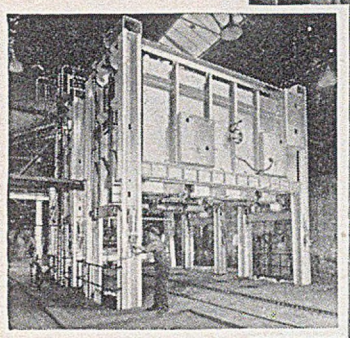

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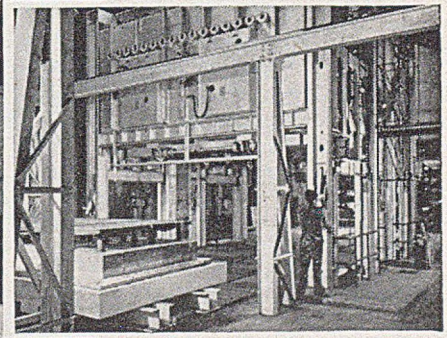

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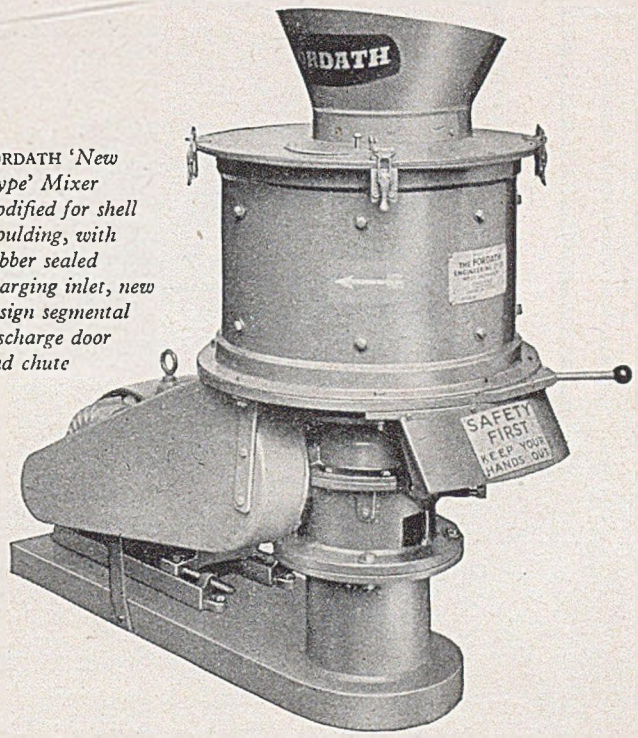

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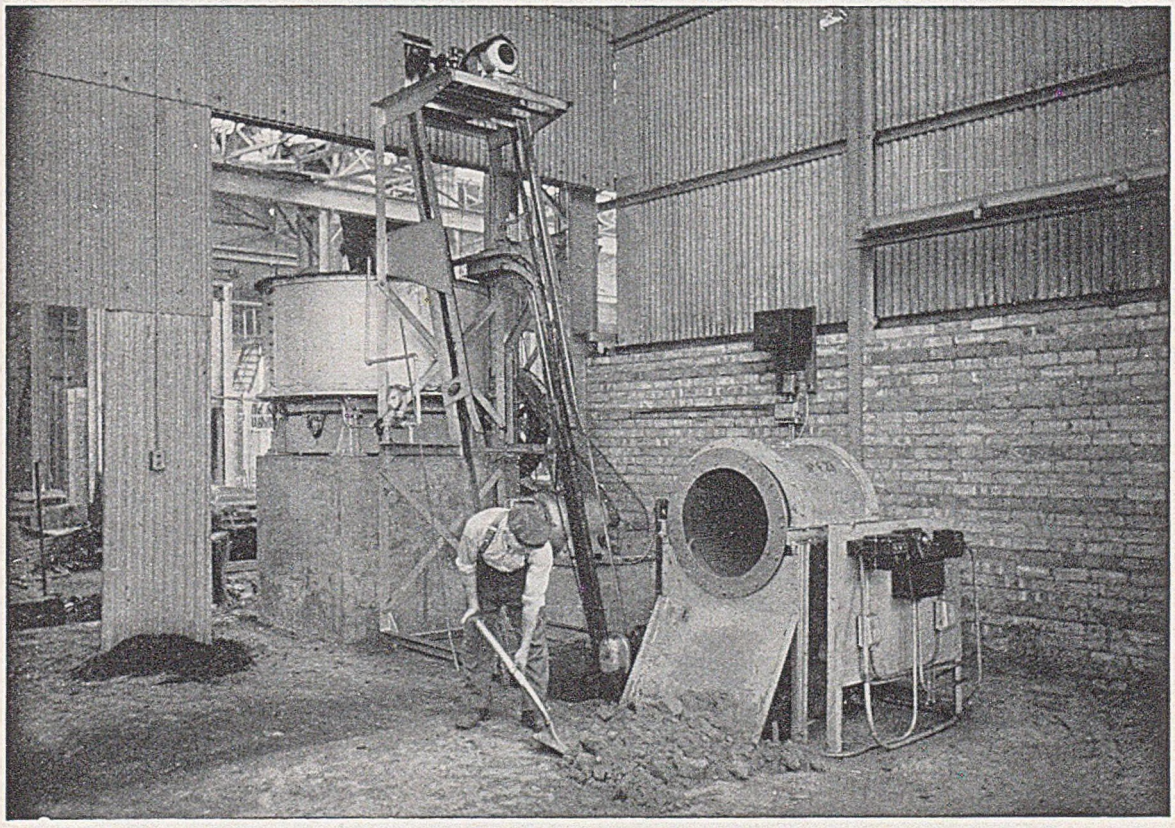

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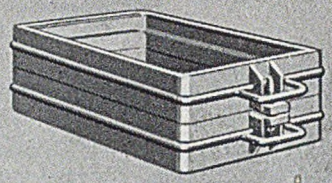
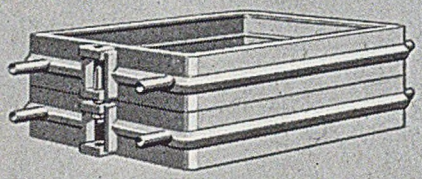
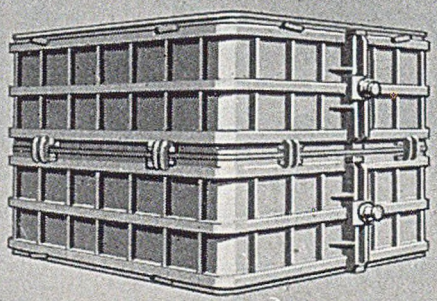


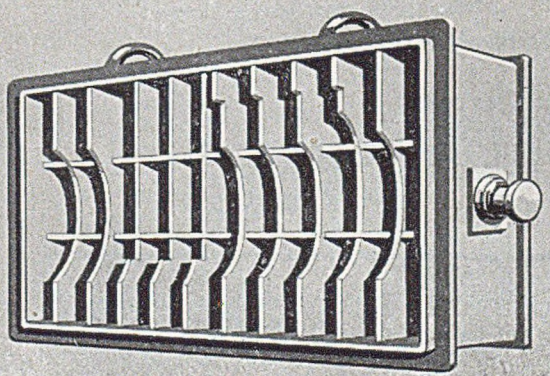
LIGHT WORK - 1 MAN LIFT



MEDIUM WORK - 2 MEN LIFT



MEDIUM WORK - CRANE LIFT



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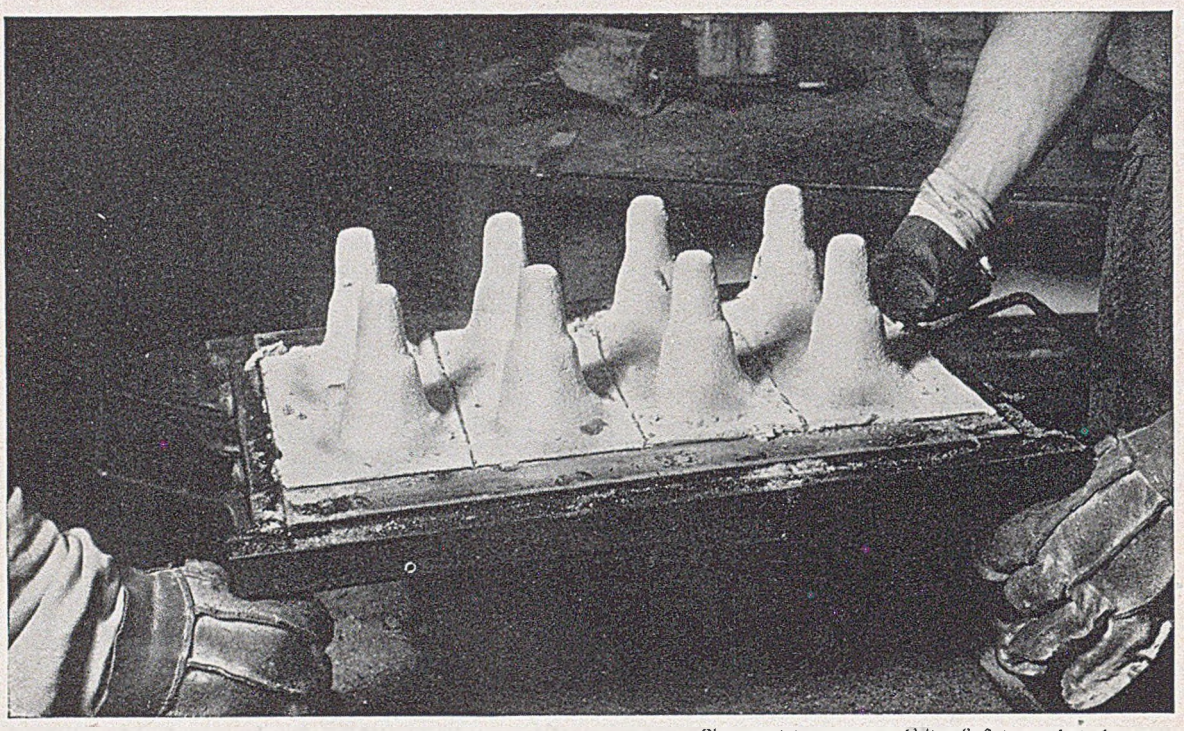

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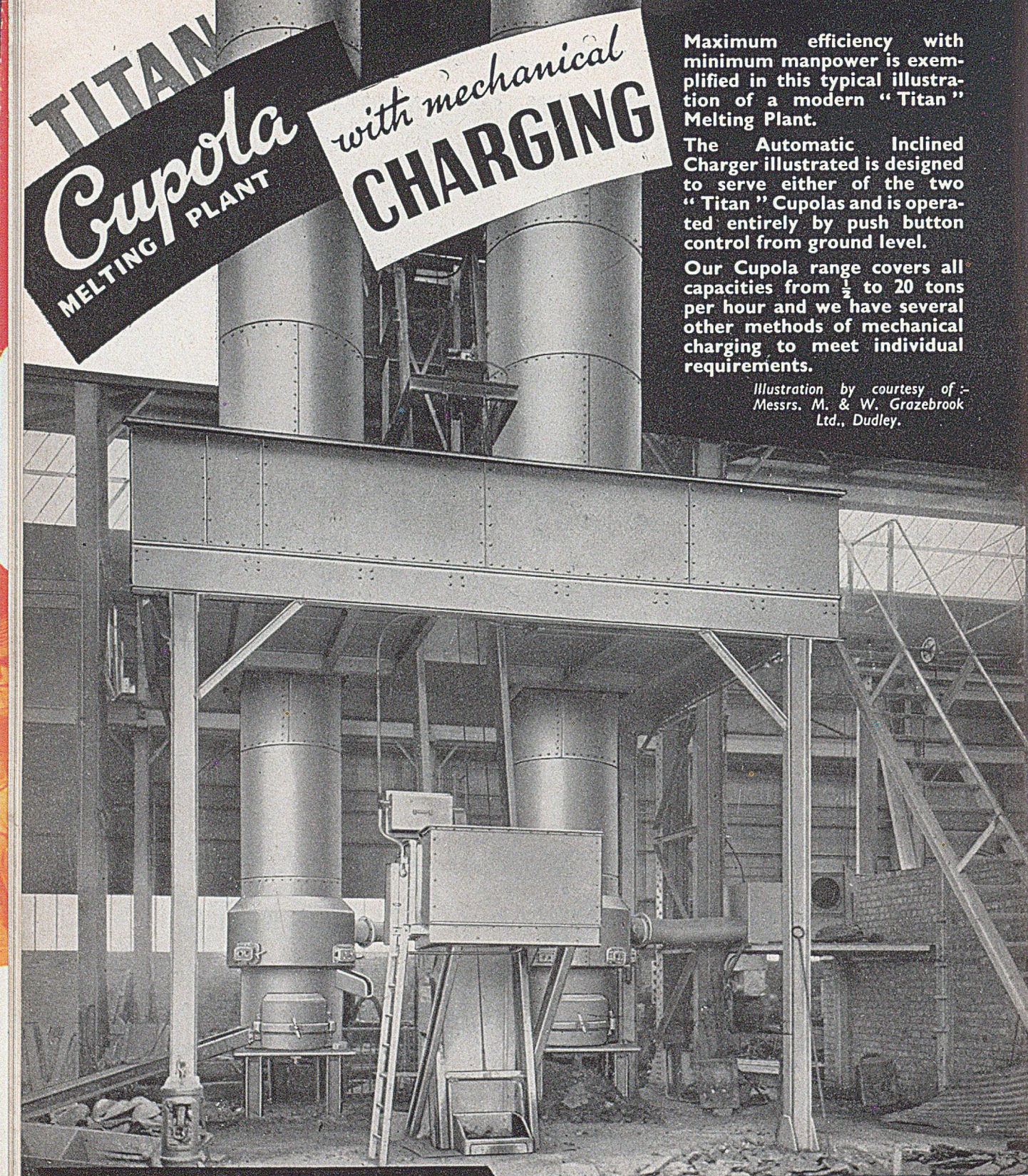

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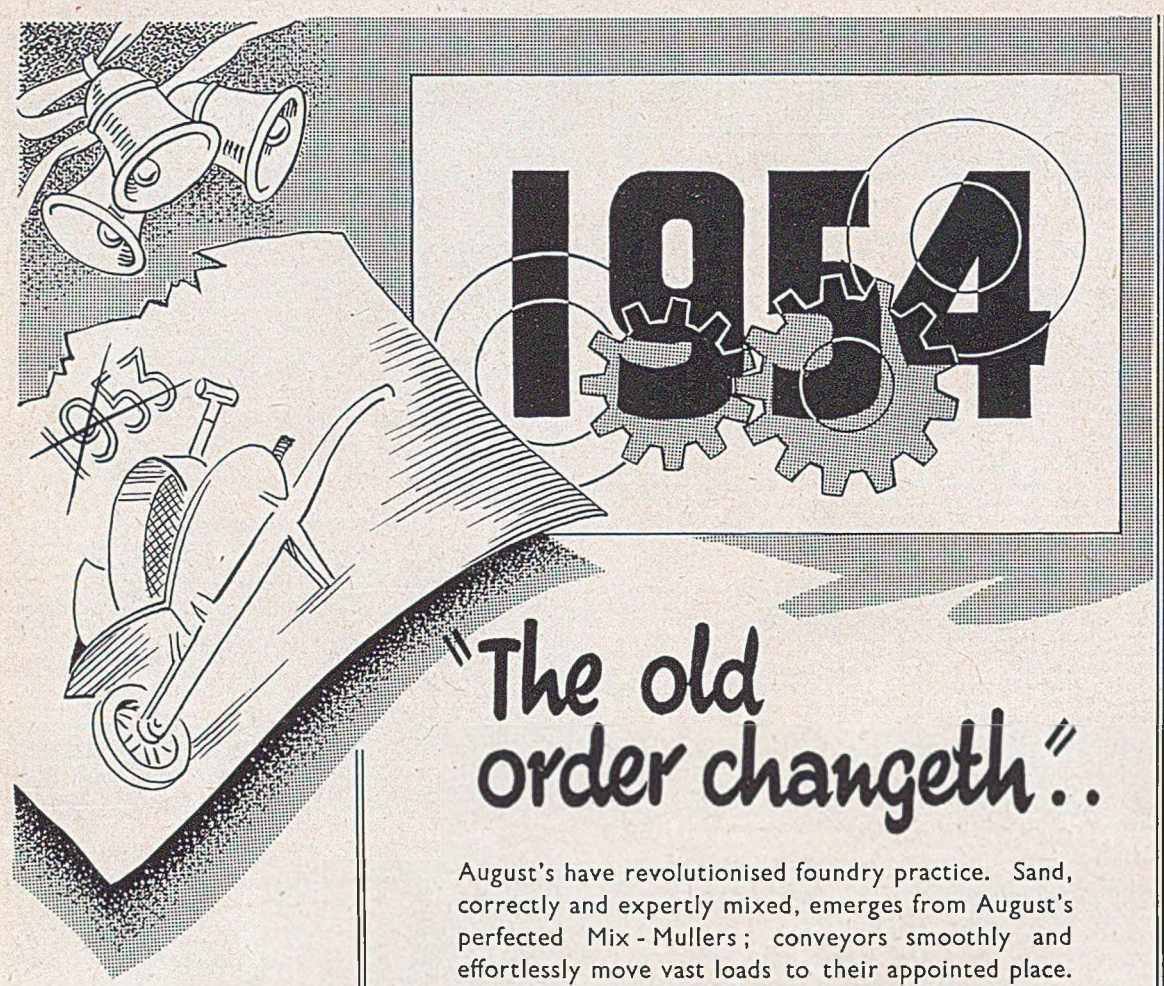

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In Retrospect

The passing year has been outstanding for the foundry industry. Invention, development, technology and social activities have shown an ever-increasing tempo. Affecting the iron and steel foundry owners in the early part of the year were the terms under which the iron and steel industry was to be returned to private enterprise and it was enacted that the manufacturers of ferrous castings should all come within the ambit of the Iron and Steel Board. This aroused much controversy at the time, but the foundry industry felt reasonably happy about it when the personnel of the Board were announced. During the year there has been a plethora of congresses, conventions, seminars, symposia and the like. Blackpool, Paris, Scarborough, Ashorne Hill, Cheltenham, and London have had gatherings of foundrymen to advance various phases of technique, practice, economics, training and productivity, plus, of course, embellishment of the social life of the industry.

The year has been noteworthy for technical developments. The shell-moulding method has swept through industry like a forest fire and it is stated by those who should best know that no fewer than 1,000 foundries are either actually in production or carrying out experiments. The master patternmakers have told us that they are now often called on to make equipment for making shell-moulded components for jobs previously manufactured as die-castings. Quite impressive, too, is the progress made in cupola practice, where hot-blast installations and similar plant are going into production. The makers of builders' castings have engineered a new process for making gutters, and have utilized the centrifugal process for the manufacture of pipes. Towards the close of the year, the provision of floating refractory segments for use in bale-out furnaces in the die-casting shops registers a worth while development of technological and hygienic significance. There has been in recent years a growing tendency for foundries to buy their patterns from outside suppliers. This has made the master patternmakers conscious of their growing importance and, there is a strong desire amongst these craftsmen to create a co-operative association through which their aspirations and opinions could find expression. This movement shows every appearance of coming to fruition during the coming year and we wish it every success.

The various organizations within the industry have shown great vitality and have given an ever-increasing service to their members. The Institute of British Foundrymen, which next year celebrates the 50th anniversary of its foundation, has attained a record membership and is now probably the largest metallurgical association in Europe. The Victorian Division of the Institute of Australian Foundrymen has now been integrated with the Institute to the undoubted benefit of both. At home, new sections have been created with centres at Luton/Bedford and Northampton. These additions mean that science and technology are being brought to the actual foundries in two-

In Retrospect

dozen areas. This country is indeed well served and areas which deem themselves to be neglected will have to resort to "circles" for the dissemination of knowledge.

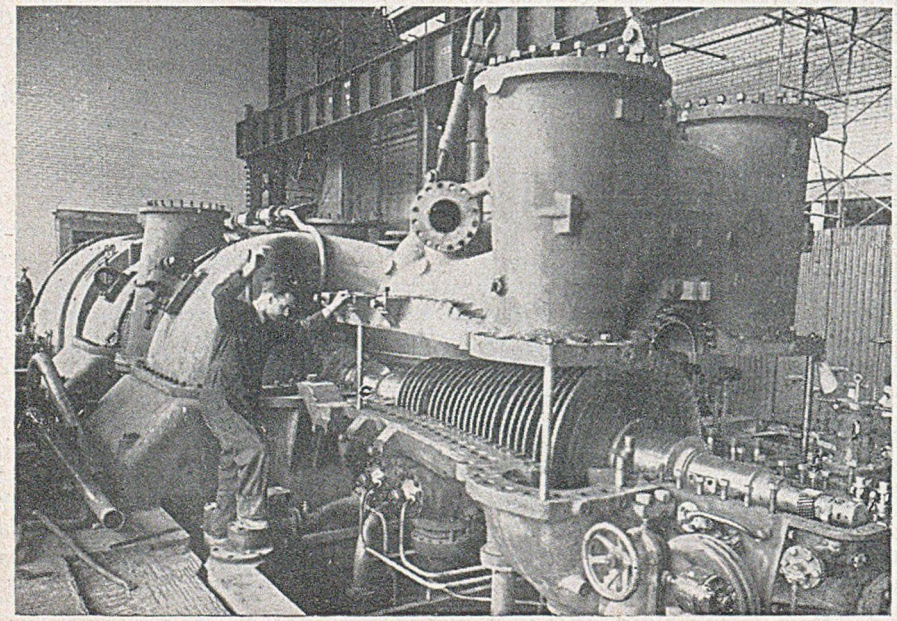
The employers' associations, headed by the Council of Ironfoundry Associations, have had much work to do in connection with the Regulations for health and safety in foundries and it was indeed fortunate that the industry was adequately organized to give expression to the views of the owners and managers. The British Steel Founders' Association has been very active. It promoted a very useful customer/supplier conference in London and the newly-formed research association has done commendable work in reducing the dust hazard from grinding machines. This problem has also had the attention of the British Cast Iron Research Association, so two different systems are now available to the industry. The latter body has also reported the results of work of its operational research team and now that extensive experience has been gained we hear on all sides of material benefits that have resulted from the team's visits. The Association of Bronze and Brass Founders was not quite so busy as in 1952, when it was devoting much time to the highly successful Harrogate productivity conference, but towards the end of the year the Association announced the services it is proposed to give from funds received under the "Conditional Aid" grant. The Foundry Trades Equipment and Supplies Association is increasing both in membership and importance. It has been active during the year in matters of the dust control from grinding wheels in co-operation with the B.S.F.A., in the preparation of an export booklet, in the question of portable drying stoves and on the standardization of steelfoundry ladles. The year for all of us has indeed been a busy one.

Shell-moulding Bibliography

Since the method of casting metals by the Croning or shell-moulding process became known outside Germany, after the war, its versatility, precision and economy have continued to excite interest. A great deal of research has been carried out and many papers and articles have been published. The Sheffield City Libraries in February, 1953, brought out a list of selected references to various publications on this subject. So great was the demand that a revised and enlarged second edition has recently been issued, with 105 references. Supply is limited, but a copy of this No. 61 Research Bibliography of the Sheffield City Libraries will be sent free of charge to interested organizations on application to the City Librarian.

Liquid Fuels

A course of evening lectures on "Liquid Fuels, their Properties and Utilization," will be delivered by G. F. J. MURRAY, B.Sc., on Tuesday evenings at 7 p.m., at the Northampton Polytechnic, St. John Street. London, E.C.1, commencing on January 5. The course will cover fuel oil and other liquid fuels; layout of liquid fuel storage and burning systems; applications of liquid fuels in large steam-raising plant and their use in metallurgical furnaces; use of fuel oil in marine boilers; recent work on high- and low-temperature corrosion and deposits on oil-fired boiler plant; and oil as applied to gas production.



Lowering into position the high-pressure casing of a new 30 mw. turbo-alternator at Huddersfield Power Station. This 5¾-ton casing, one of several castings supplied by the David Brown Foundries Company, Penistone, was cast in their mk. VIII, chrome-molybdenum steel, for which is specified a yield point of 18 tons per sq. in. (min.) and an ultimate tensile strength of 35 tons per sq. in. (min.). These castings are designed for a steam pressure of 600 lb. per sq. in. and a temperature of 450 deg. C.

Mammoth Aluminium Wheel

By J. R. Harrison

An account of methods adopted for casting four aluminium-alloy half-wheel castings of finished net weight 2,250 lb. each for which L.33 material was used. The work taxed the melting capacity of the foundry which accepted the commission. However, using a combination of floor moulding with cores and chills, their efforts were crowned with success and all castings proved sound. The methods described epitomize the value of a logical approach to jobs of this nature, eliminating snags by careful calculation and reasoning in advance.

In describing the methods employed by the Author's foundry (R. C. Harrison & Sons (Brass Founders), Limited, Leicester) to produce four aluminium-alloy half-wheel castings shown in Figs. 1 to 8, it should be made clear that the previous largest aluminium casting made by the firm weighed 800 lb. but in this case a total of 3,310 lb. of metal had to be melted, which taxed to the utmost the melting capacity of the plant, and no fewer than 13 furnaces, ranging from pit-fired types, bale-out furnaces, 400-lb. capacity tilting furnaces, and two open-flame-type rotary furnaces were employed. It will thus be realized that it was no easy job to melt the metal, and co-ordinate these furnaces to have them all ready at the same time, without overheating. Fortunately, with the exception of two which were gas-fired, all the furnaces used oil fuel and therefore could be kept under close control.

Design and Equipment

These castings measure 15 ft. from end to end, and 7 ft. 6 in. across by 1 ft. 6 in. deep and weigh fully fettled 2,250 lb. each. The four halves when completed (two are shown assembled in Fig. 1) are bolted together to form a drum or pulley 15 ft. dia. by 3 ft. deep and weighing finished approximately 8,000 lb. It is keywayed on to a revolving 6-in. dia. steel shaft, machined on the outer face and flanges, the boss being bored, faced and keywayed. These faces therefore had to be clean and sound. The metal thickness varied from $1\frac{3}{8}$ in. on the outer circumference to spokes $1\frac{1}{4}$ in. thick, the boss section being $4\frac{1}{2}$ by $8\frac{1}{2}$ in. It will readily be seen from this that heavy chilling was necessary to make sure the casting was sound. The amount of machining allowance was left to the foundry, and it was decided to allow $\frac{3}{8}$ in. on outside and side flanges, with $\frac{1}{4}$ in. on the bolting faces and boss.

Equipment and Methods

The pattern and corebox equipment was supplied by the customer, but was made by an outside local firm of patternmakers. However, the foundry personnel were given a completely free hand to have it made entirely to their requirements; advantage was taken of this and the closest possible co-operation was obtained from the patternmakers.

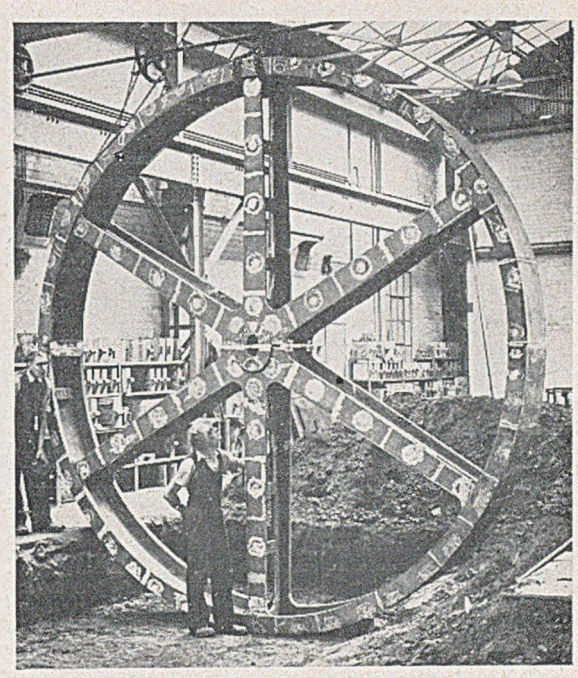


FIG. 1.—*Two of the Half-wheels assembled, giving an Idea of the Size and Comparative Fragility of this Project.*

Planning the production method was undertaken in close consultation with the moulders and coremaker, and it was decided to make the whole job from cores, as no moulding box was available. Even if one could have been obtained, the crane only had a maximum lifting capacity of 5 tons, and the top box-part alone in cast iron without sand would weigh at least 5 tons. After deciding on the pattern coreboxes and the method of running and feeding, but before any start was made by the patternmaker, a 1 : 8 scale model of the pattern and coreboxes were made by the founders, and scale-model castings were produced in DTD.424 alloy from these, under as near as possible the same conditions as would be experienced with the actual full-scale casting.

Experiences With Scale Model

Careful measurement of the first model casting showed no contraction at the two ends, that is, it remained the same size as the pattern, this in spite of the cores being released as quickly as possible. A further casting was then made with two tie-bars linking each end with the centre boss; this proved to have the desired effect of holding-in the ends. Normal and uniform contraction then took place, and it was decided to incorporate these tie-bars on the actual casting. After these experiments, manufacture of the pattern and coreboxes was commenced, as shown in Figs. 2 and 3. The pattern was simply

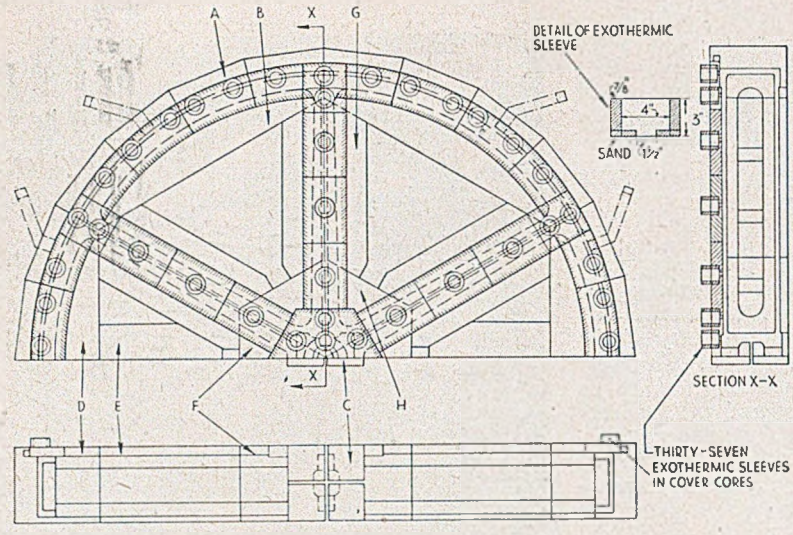


FIG. 2.—*General Layout of the Moulding Equipment for the Large Half-wheel Casting. Details of its Construction are shown in Fig. 3.*

a frame with the outside blocked in, bottom and top open, the half circle being built up of 12 flats; this enabled the 12 outer cores marked on the plan to be produced on flat aluminium plates without any packing sand. The method of splitting up the cores, as shown in Fig. 3, enabled all the cores to be turned out on flat machined plates, the only packing sand used being to support one end of the six spoke cores. It will be seen from the illustration that all chills were incorporated in the cores, 256 in all being required. Those chilling the bottom part of the wheel were made of aluminium and those at the top part near the ingates were of cast iron. It is the writer's experience that aluminium chills should be used with caution and never where there is an appreciable flow of metal over them or near ingates, this on account of the danger of fusion or complete melting away of the chills.

All chills were coated with a proprietary brand of core-coat which was painted or sprayed on at the time of painting the cores; a total of 5½ tons of core-sand was required to make the 59 cores. Silica sand was used according to the following mixture:

112 lb. Silica sand
22 lb. Mansfield red sand.
3 lb. Cereal (containing oil).

Cast aluminium-alloy grids were used, with cast prongs to support the cores. These were rescued at the knock-out and used for all four castings.

Moulding Procedure

The mould was made in a casting pit excavated in the foundry floor, a dead-level bed being struck up. The pattern was placed on this, and rammed up in black sand and strickled-off level. The pattern was then withdrawn, the mould painted with a core dressing, and then left to air-dry for about a week, whilst the moulder helped the coremaker to make the cores. Two days before the completion of the cores, and prior to coring up, gas heating grids were placed in the mould, which was then covered over with corrugated iron, and well skin-dried for two days. Thereby moisture pick-up by the cores, and chills during the coring-up period (which took three days) was prevented. The coring-up was done by the moulder and coremaker assisted by a labourer, the 12 outer rim cores being placed in first, followed by the four downgate cores; these connected to the ring runner formed in the outer-rim cores. The two largest curved cores, marked "B" were then lowered into position, the centre of these being positioned by a

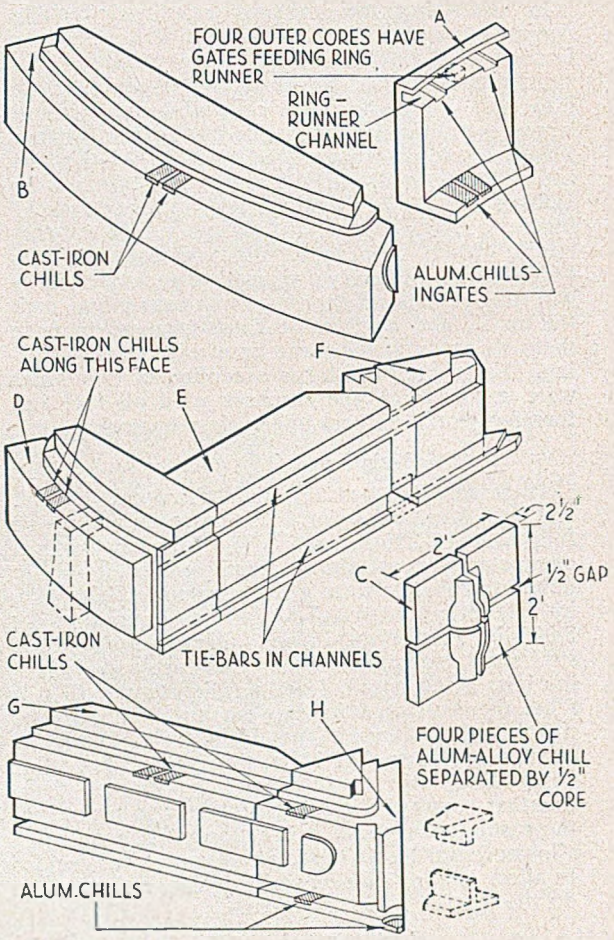


FIG. 3.—*Details of the Pattern Equipment and of Ancillary Production Measures, including Chills (cross-reference is made to Fig. 2).*

string line placed across the mould. The centre-spoke cores came next, followed by the cores to form the boss. Very accurate alignment was necessary for the centre-spoke cores, otherwise the remaining cores forming the outer spokes could not be got into their correct places. When all the main cores were in position the metal thickness was checked by gauges, joints between cores were sealed and the core lifting holes filled in, then these places were skin dried by gas torch. The cover cores were next carefully fitted in, numbered, taken out and stacked nearby, this was to prevent condensation on the chills during the night supposing the mould had been left closed up.

Preparing for Casting

As the casting operation took the whole of the foundry's melting capacity, the mould could only be poured on a Saturday without interfering with other work. An early start was made on Saturday morning, the first operation being to dry out any condensation in the chills, this being done by a powerful gas torch, and taking 1¼ hours. The cover cores were then replaced in their respective positions, extra exothermic sleeves being placed on each exothermic riser already rammed up in the cover cores (see Fig. 2 and 3). The runner boxes —37 in all—were then placed in position, lined with sand and well dried. Cover cores were weighted down. There then only remained the lowering in of the four large aluminium chills which formed the outside of the boss, these were not put in until 30 min. before casting, and were well heated and put in hot, having first been well sprayed with a proprietary coating as used on gravity dies.

It will be seen by the illustrations that the four

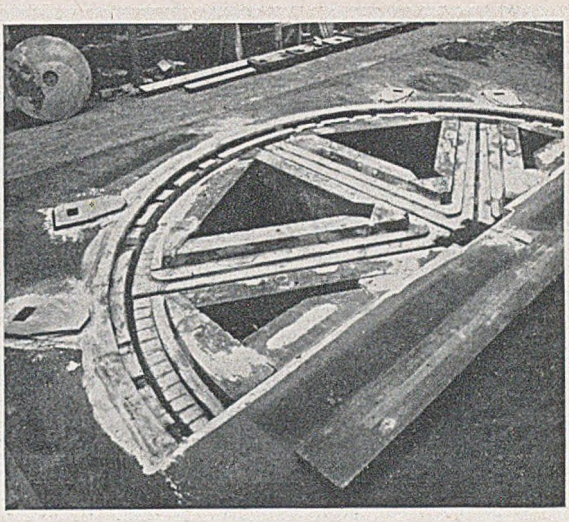


FIG. 4.—*Half-wheel Mould prepared in the Foundry Floor and all except Cover Cores and Risers in Position. Note (left-hand side and top) the Two Pairs of Ingates.*

aluminium chills used to chill the boss were divided both vertically and horizontally with oil-sand cores ½ in. wide; these cores crumbled away by the heat of the metal after casting and therefore enabled the boss to contract, also permitting the chills to be removed easily when the casting had cooled down.

Pouring Procedure

Two ladles were used for pouring, one of 2½-tons capacity, and one of 1½-tons. These were

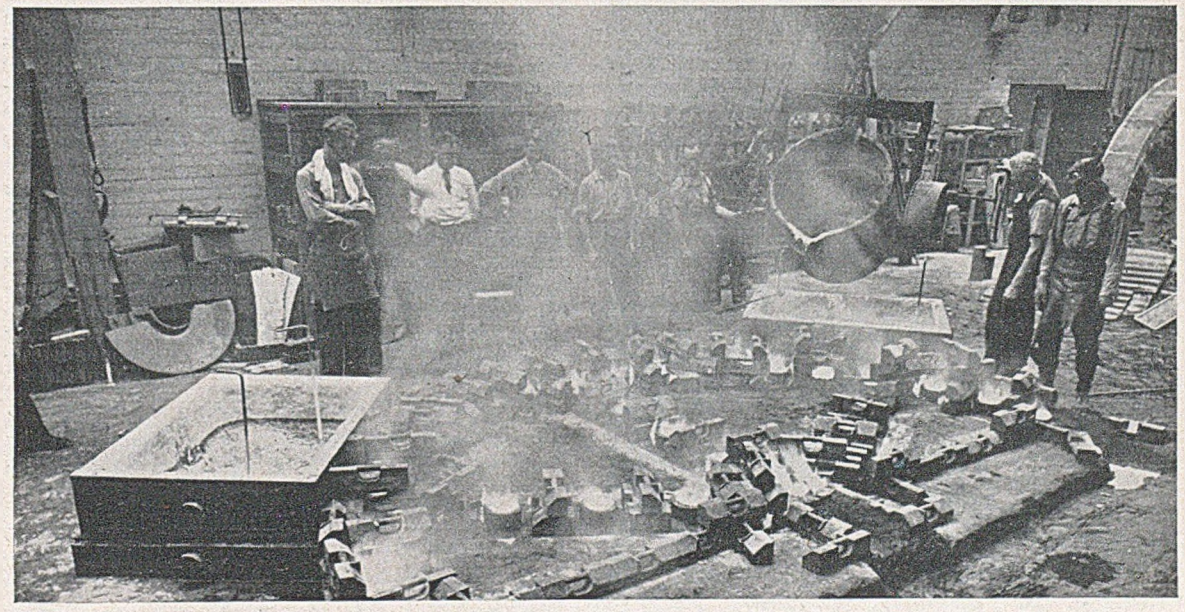


FIG. 5.—*Completion of Pouring a Half-wheel. The Large Runner Boxes employed and the Exothermic Reaction of the Feeder Heads can be appreciated.*

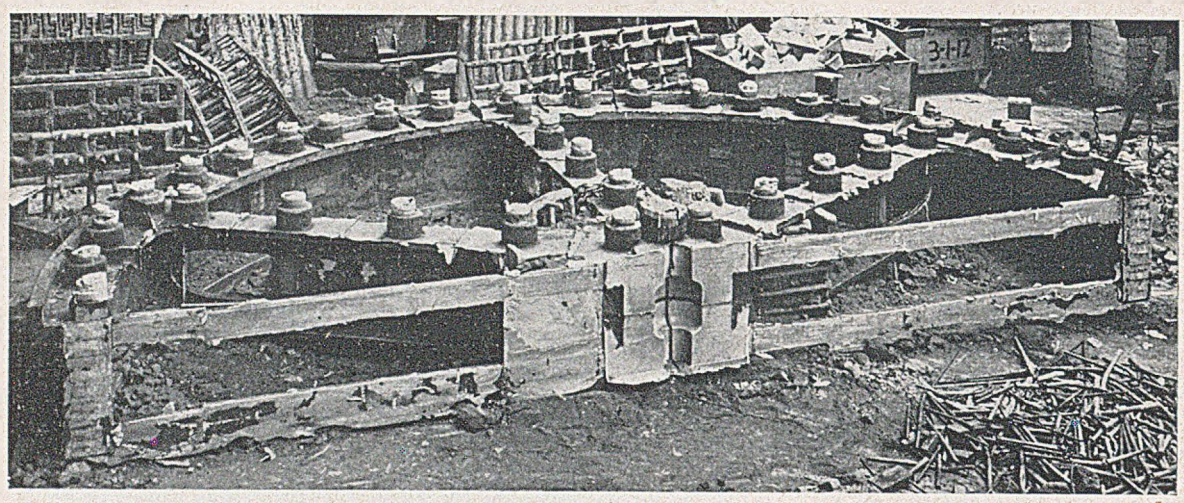


FIG. 6.—*Half-wheel Casting stripped from the Mould, but with Feeders still attached. Note the Segmental Division of the Centre Boss by ½ in. Cores.*

dried and heated to a good red heat by the oil burners of two tilting furnaces, which were simply swivelled over and directed into the top of the ladles—a method which proved ideal for this purpose. The metal was weighed out for each furnace according to the capacity of the crucible and melting, all 13 furnaces being regulated to bring their charge up to 800 deg. C., as far as possible all at the same time. Each crucible was then thoroughly degassed with a proprietary brand of tablets containing 50 per cent. grain refiner, and 50 per cent. hexachlorethane degasser. These were used to the extent of ¼ per cent. for a 10-min. period. The dross was then skimmed off and the metal then transported in carrying ladles and poured into the casting ladles, which by this time were ready hanging in the two cranes used for casting the job. Just prior to pouring the metal into the casting ladles, 3 per cent. by weight of modifying salts was put in the bottom of each, the metal being then poured on to these salts whilst one man stirred, keeping the salts under the metal for at least 10 min. By this time, the metal temperature had dropped to 750 deg C. It was then necessary to wait a further 10 to 15 min. for the temperature to drop to 700 deg., at which the metal was poured; two stoppers were used in each runner box. Approximately half of the metal to be poured was run into the runner boxes, the stoppers were then opened, the mould taking 50 sec. to fill. Three overflows were provided at a slightly lower level than the risers to prevent these from overflowing. An extra furnace containing 250 lb. of metal was kept in reserve for topping up the exothermic sleeves; this was necessary on the larger risers for 30 min. after casting.

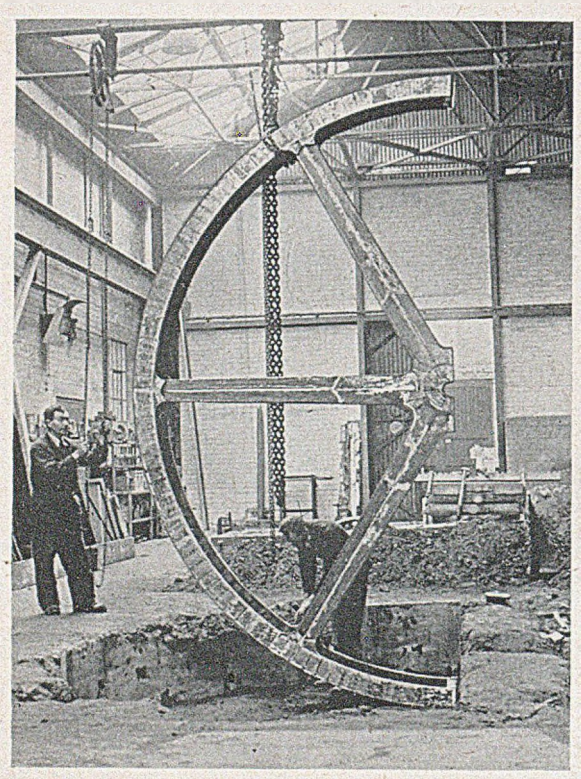


FIG. 7.—*An Impression of the Mammoth Size of the Wheel is conveyed by this Illustration, which shows the Underside; Chill Marks are clearly visible.*

Knocking-Out

Immediately after casting, preparation had to be made to break away parts of the cores to allow

TABLE I—*Test Results (dia. of bars, 0.564 in.).*

Breaking load (tons).	Ultimate stress (tons per sq. in.).	Elongation (per cent.).
2.92	11.68	9
3.04	12.16	11
3.12	12.48	7
3.06	12.24	7

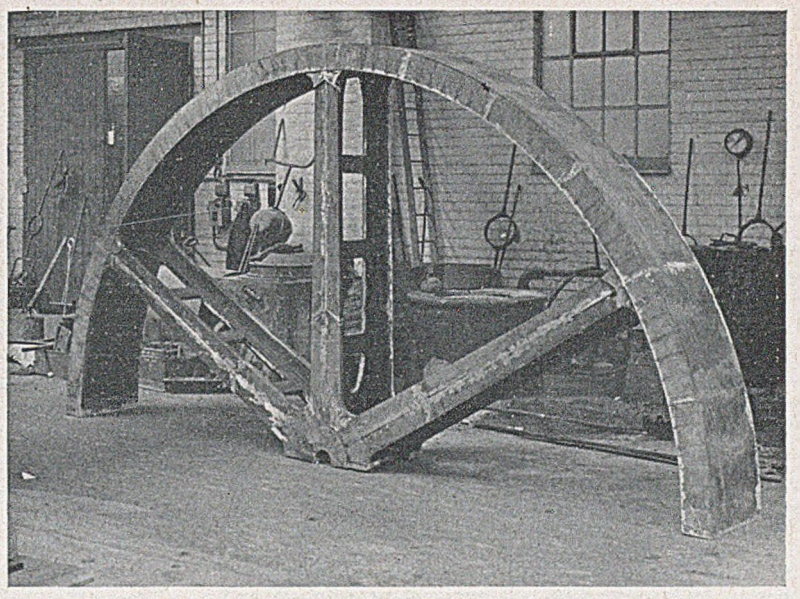


FIG. 8.—*Additional View of a Finished Half Wheel, revealing the Design and Proportions of the Rim and Spokes.*

contraction to take place. This operation took eight men more than an hour in loosening the sand around the core grids to enable contraction to take place evenly. The four castings after fettling showed no defects, and had a close-grained structure; standard DTD test-bars were taken from each ladle just prior to pouring and the mechanical properties shown in Table I were obtained.

It will be seen from these figures that modification of the alloy was complete and that in spite of the many furnaces used the final results were eminently satisfactory. It has already been stated that 3,310 lb. of metal was melted for each casting, this amount was accounted for as follows:—Runners and risers 392; tie-bars and flash 276; surplus metal 218; metal melting loss, etc., 166; finished fettled casting, 2,250 and test-bars 8 lb., thus giving an approximate yield of 68 per cent.

Increases of Capital

INJECTION MOULDERS, LIMITED, London, S.W.1, increased by £48,000, in £1 ordinary shares, beyond the registered capital of £52,000.

GEORGE KENT, LIMITED, meter manufacturers, of Luton, increased by £150,000, in 10s. ordinary shares, beyond the registered capital of £800,000.

KEY ENGINEERING COMPANY, LIMITED, London, E.C.4, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £20,000.

COVENTRY GAUGE & TOOL COMPANY, LIMITED, increased by £600,000, in 10s. ordinary shares, beyond the registered capital of £400.000.

ANDERSTON FOUNDRY COMPANY, LIMITED, Glasgow, increased by £45,000, in £1 ordinary shares, beyond the registered capital of £135.000.

SHOTTON BROS., LIMITED, metal manufacturers, etc., of Oldbury (Worcs), increased by £30,000, in £1 shares, beyond the registered capital of £101.000.

S. RUSSELL & SONS, LIMITED, brass and iron founders, etc., of Leicester, increased by £50,000, in 5s. ordinary shares, beyond the registered capital of £350.000.

GEORGE GARDNER & SONS, LIMITED, ironfounders, etc., of Openshaw, Manchester, increased by £50,000 in £1 ordinary shares, beyond the registered capital of £50,000.

DORWIN REPETITION, LIMITED, manufacturers of metal and moulded goods, etc., of Kings Norton, Birmingham, increased by £15,000, in £1 ordinary shares, beyond the registered capital of £10.000.

PHOSPHOR BRONZE COMPANY, LIMITED, Birmingham, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £250,000. Birfield Industries, Limited, holds nearly all issued shares.

FISCHER BEARINGS COMPANY, LIMITED, Aston, Birmingham, increased by £125.000, in £1 ordinary shares, beyond the registered capital of £508.000. At June 11, 1952, British Timken, Limited, held 80,200 shares of £1 out of 80,500 issued.

REDLER INDUSTRIES, LIMITED, conveyor manufacturers, etc., of London, W.1, increased by £280.000, in 140.000 5½ per cent. cumulative redeemable preference shares of £1 and 700.000 ordinary shares of 4s. each, beyond the registered capital of £220.000.

ASEA ELECTRIC, LIMITED, Walthamstow, London, E.17, increased by £100.000, in £1 ordinary shares, beyond the registered capital of £650.000. At June 24, 1952, Allmanna Svenska Elektriska Aktiebolaget Vasteras, Sweden, held 599.991 shares out of 600.000 shares issued. The company was allotted a further 50.000 shares on August 12, 1952, and a further 100,000 shares on June 30, 1953.

Export Licensing Control Changes

Changes in export licensing control are made by the Export of Goods (Control) (Consolidation) Order, 1953 (Amendment No. 5) Order 1953 (SI No. 1840), issued by the Board of Trade, and which comes into force tomorrow. The principal changes include the following:—

Licences will not be required, except for exports to China, Hongkong, Macao, and Tibet, for certain forms of iron and steel, raw balata and gutta percha, and vulcanized rubber, and many oils and greases. The export licensing control on metal-working machines and machine tools, which has hitherto embraced all types, has been modified. Those types subject to control are now specified in Group 6(4) and Group 17 of the Export of Goods (Control) (Consolidation) Order, 1953.

Lubricating compositions, mineral jelly, certain oils and greases, mineral waxes, magnesium alloys and certain forms of magnesium, specified small excavators, and unvulcanized rubber may be exported without licence to any of the destinations specified in Part II of the Third Schedule, excluding Hongkong. Also from tomorrow, the Open General Licence of June 25, 1951, relating to machine tools, will be revoked.

B.S. Monthly Information

In the November issue of the British Standards Institution monthly information sheet, under the heading *Amendment Slips Issued*, there appears B.S. No. 460: 1948, Cast-iron rainwater goods, amendment No. 2, ref. No. PD 1727, and B.S. No. 497: 1952, Cast manhole covers and road gully gratings and frames for drainage purposes, amendment No. 1, ref. No. PD 1731. *Draft Standards circulated for Comment* include CR 7356, Glossary for valves and valve parts for fluids (section 2, check valves); and CR 7357 (section 3, gate valves)—both the latter are price 2s. post free to non-members.

U.S. Order for English Electric

The contract for the manufacture and installation of two water-wheel generators has been awarded to the English Electric Export & Trading Company, Limited, by the United States Army Corps of Engineers at a cost of $3,651,476 (approx. £1,300,000), the lowest bid received. The generators, each with a maximum output of 84,740 kva at 13.8 kv, 60 cycles, 85.7 r.p.m., will complete the hydro-electric station at the foot of McNary Dam, built across the Columbia River, which is designed to accommodate 14 generating sets, having a total maximum output of 1,186,400 kva.

The equipment is due for commissioning before December, 1956, and will be built at English Electric's Stafford works. The company is already building three 310,000 kva banks of transformers for the Chief Joseph Dam to step up the generator voltage to 230 kv for transmission purposes.

Well over 1,000 tons of material, mainly special steels and copper, are required for the construction of each unit, which will have an overall size of nearly 52 ft. Each complete stator will weight about 180 tons and will have an outside diameter of approximately 42 ft. The assembled rotor will be nearly 35 ft. dia. and over 5 ft. deep. With the shaft, which will be nearly 35 ft. long and will weigh some 80 tons, and other fitted parts, the rotor weight will approach 500 tons.

Parliamentary

Engineering Workers' Pay

The Minister of Labour was asked by MR. ELLIS SMITH if he would recommend a short-term settlement of the dispute in the engineering and shipbuilding industry based upon a substantial increase in wages to be made retrospective, the restoration of the pre-1931 basis for piecework calculation of earnings, and a special advance for the highly-skilled craftsmen, pending the appointment of a court of inquiry which should issue a report which should form the basis for negotiating a long-term settlement.

MR. WATKINSON, Parliamentary Secretary to the Ministry of Labour, who replied, said: "No, sir. The basis of payment of workers in the engineering industry is a matter for the employers' organizations and trade unions concerned."

Limestone Deposits in Madras

Madras State has good raw material resources for the ceramics, glass, refractories, and paint industries, according to the Geological Survey of India. None of these industries is as yet well established in Madras. Also, there are large deposits of limestone, which could supply cement and chemical plants. Although there is no large building-stone industry, there is stone of excellent quality, which, it is suggested, would provide material for a prosperous new industry.

THE NOTE on apprentices' tax allowance published on page 340 of September 10, 1953, issue of the JOURNAL was not quite correct. The correct position is that an apprentice may earn, as a result of the Government's concession, up to and including £52 per year without affecting the parents' right to claim the normal tax allowance for a child, of £85. The £52 limit on apprentices' income must include the value of any board or lodging provided by the employment.

House Organs

Aluminium News, September. Issued by Aluminium Union, Limited, Adelphi, London, W.C.2.

This issue carries a very interesting illustrated description of the cooking and other equipment used on air liners.

One and All. Issued by Tangyes, Limited, Cornwall Works, Birmingham.

This issue tells an interesting story of Meredith's, who for four generations have served this very old-established concern. To-day Mr. Cyril Meredith is the foundry manager, and has two sons in the concern. The issue also records the 90th birthday celebrations of Mr. J. H. Tangye.

Staveley News, October, 1953. Issued by the Staveley Iron & Chemical Company, Limited, Hollingwood, near Chesterfield.

It is pleasing to note from this issue the great stress the company places upon education. The list of successes among the staff is indeed imposing. The reviewer much appreciated the article on Hutton as the second of a series of "great cricketers."

Royal Doulton Magazine, No. 5 (New Series), December, 1953. Issued by Doulton & Company, Limited, London, S.E.1.

The ordinary reaction to the name "Doulton" is beautifully designed china, but the firm is equally well known for its industrial ceramics, amongst which is to be found a 440-gallon acid-proof stoneware jug. The reviewer, however, found the coloured illustrations of the pottery and china productions most interesting. The colour printing of this magazine is indeed of a high order.

Japanese Trade Marks

The Board of Trade have under consideration a number of questions relating to trade marks which were on the Register on December 8, 1941, in the names of Japanese persons or concerns, living or carrying on business in Japan. Persons or concerns in the United Kingdom claiming to have a continuing interest in such trade marks arising out of their use since December 8, 1941, in connection with goods manufactured in the United Kingdom, are invited to communicate with the Registrar of Trade Marks stating:— (*a*) The numbers (with short descriptions) of the Japanese registered trade marks that they are using; (*b*) the extent of their interests in those marks and the source of those interests; (*c*) whether at December 8, 1941, there existed any contract or agreement between them and the Japanese registered proprietors relating to them; (*d*) whether after December 8, 1941, they exercised registered-user rights in those marks, and, if so, for what period, and (*e*) what goods have been or are being manufactured under those marks, and the periods during which the goods were produced. All communications arising out of this notice should be addressed to:—The Registrar of Trade Marks (Japanese Marks), Patent Office, 25, Southampton Buildings, London, W.C.2.

Reduction in Tungsten Ore Prices

The Ministry of Materials has reduced its selling price for tungsten ores of standard 65 per cent. grade and ordinary quality by 10s. per ton.

The revised prices, which came into effect on December 18, are:—Wolframite, 185s.; scheelite, 170s., per ton, delivered consumers' works.

Monopolies and Restrictive Practices

By F. J. Tebbutt

The Monopolies & Restrictive Practices Commission Act 1953, amplifies and amends the Monopolies & Restrictive Practices (Inquiry & Control) Act 1948 (the principal Act), which measure introduced an organization called the Monopolies & Restrictive Practices Commission, the chief duties of which are to inquire into and if considered necessary to remedy the position as regard monopolies and restrictive practices in trade generally.

Basic Scheme

Under these Acts, the Board of Trade, if it believes that certain conditions exist as to the supply of goods, the application of any process to any goods, or in connection with the export of goods, can send a case to the Commission for investigation and report. These conditions are that at least one-third of all the goods (applies with the necessary qualifications to processed goods and exports likewise) concerned are supplied by or to any one person or by or to any two or more persons. Furthermore, action can be taken if there are agreements or arrangements whereby particular goods are not supplied at all. Inquiry can also be instituted where, although there may be no arrangement or agreement, competition may be restricted or prevented, this really being directed to what is colloquially known as "price leadership," where a firm may be in a position to influence price and other conditions of supply, so that their price becomes the price generally.

Investigations

The Commission may be asked to investigate the facts, meaning to see whether the conditions necessary for an inquiry do prevail, or they may be not only asked to inquire into these facts, but also to see whether the matters under review operate against public interest or are likely to do so. In "public interest" investigations, the Committee must lay its report before Parliament; in other cases they are not obliged to do so, although they can if they so choose. As regards their reports, the Board of Trade can leave out any matters where it considers that publication would be against "public interest," and can omit anything which may relate to a secret process or as to the presence, absence or situation of any mineral or other deposits, and generally can omit anything likely to damage the legitimate business interests of any person. Mostly, the Commission consider specific matters referred to them for investigation, but the Board of Trade has power to ask the Commission to give the Board any information arising out of the investigation as regards the supply, processing, or export of goods.

Sanctions

If on investigation the Commission considers that the conditions prevailing are against "public interest," and come within the matters which the Act is designed to remedy or end, the Board of Trade (or other Government Department) is given power by the making of an Order to declare the matters following to be illegal, and all or any of these can be adopted according to the case. Thus it can be declared unlawful to carry out any agreement mentioned in the Order, and to require that such an agreement be ended. The withholding of supplies can be made illegal (*i.e.* boycotts, "stop" lists, and discrimination); as can the giving of preferences as regards the provision of or the giving of orders for supplies or services (*i.e.*, rebates given for confining trade to a particular seller, special discounts given and the like); and also it can be declared illegal to require as a condition for the supply of certain goods, the buying of other goods (*i.e.* conditional sales and conditional supplies). These Orders, however, must be approved by both Houses of Parliament, before actually becoming law. It should be noted that no criminal proceedings can be taken for the breach of such an Order, but civil proceedings can be instituted either by the Government or any person affected, for an injunction or other relief.

New Act (1953)

The new Act, the Monopolies & Restrictive Practices Commission Act 1953, relates significantly to the composition of the Commission and alters the machinery of operation of the 1948 Act, which should result in more reports being produced in the same amount of time. The maximum number of members of the Commission is now to be 25 (instead of formerly 10), but the new Act allows groups of not less than five persons to officiate and the report of a group can apply as if made by the Commission. Two-thirds of a group (four members when only five in a group) must agree to the report before action under section 10 of the 1948 Act can be taken (section 10 relates to matters explained under headings "Sanctions").

An important alteration is that there is to be a chairman and three deputy chairmen, the positions being paid ones. These positions can be held up to the age of 70 ordinarily, with possible extensions beyond 70 of two years or less at a time. From tomorrow Mr. David Arnold Scott Cairns, Q.C., becomes the Chairman of the Commission, the salary being £5,000 a year; these positions are full-time ones and pensionable. Members of the Commission (including the chairman and deputy-chairmen) are appointed by the Board of Trade.

Sundry Matters

Ordinarily, the Monopolies Commission have investigated and reported on matters concerned with particular industries, but there is a section of the

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1948 Act (section 15) which allows the Board of Trade to require a report to be made on the general effect on the public interest of a specified class, being practices which in the opinion of the Board of Trade are commonly adopted for the purpose of preserving conditions to which these Acts apply. The Commission has been asked to make a report under this section (15); this body has a certain amount of information about the operation of some of the practices to be reviewed, gained in the investigations they have undertaken in regard to individual trades, but the inquiry will cover a wide field, and is likely to take a long time to complete.

Under the heading " Sanctions," reference is made to most of these practices, but the Board of Trade's requirement is as follows:—

Para 1.—Arrangements between a number of traders by virtue of which:—

(*a*) suppliers of goods confine the offer of supplies, or of " trade terms " or " wholesale terms " or other favourable prices or rates of discount or rebate, to particular classes of persons, whether such persons are described in general terms or listed by name;

(*b*) suppliers of goods withhold supplies, or trade terms, or wholesale terms or other favourable prices or discounts or rebate, from particular classes of person, or from persons named in a " black," " stop," or other list;

(*c*) purchasers discriminate in similar ways in favour of, or against, certain suppliers of classes of suppliers when placing their orders (including cases where suppliers and purchasers arrange to discriminate mutually in each other's favour), and,

(*d*) rebates are paid or received by reference to the aggregate of purchases from a number of suppliers.

Para 2.—Arrangements similar to any of the foregoing matters but related to the processing of goods.

Productivity Council Changes

Mr. Tom Williamson, general secretary of the National Union of General and Municipal Workers, has been appointed chairman of the British Productivity Council. He succeeds Lord Bennett of Edgbaston, who has completed a year in that office. Lord Bennett, who will remain a member of the Council, is joint managing director of Joseph Lucas, Limited.

Sir Ewart Smith, technical director of Imperial Chemical Industries, has been appointed deputy chairman. He succeeds Sir Lincoln Evans, who was appointed vice-chairman of the Iron and Steel Board earlier this year. He resigned from the Council on relinquishing the appointment of general secretary of the Iron and Steel Trades Confederation. Sir Andrew Naesmith has also resigned. He was also appointed to the Iron and Steel Board and has retired recently as secretary of the Amalgamated Weavers' Association.

Mr. W. L. Heywood, general secretary of the National Union of Dyers, Bleachers and Textile Workers and Mr. L. T. Wright, general secretary of the Amalgamated Weavers' Association have been nominated by the T.U.C. to fill the consequent vacancies.

Directors Imprisoned

After an 11-day hearing two company directors were sentenced to imprisonment at Birmingham Assizes on Monday for embezzling company funds.

Mr. Commissioner Wrangham told Reginald Noakes (69), of Clungunford (Salop), that the sentence of three months' imprisonment passed on him was " the lightest that could possibly be imposed." The other director, Percy Oakley (64), of Sutton Coldfield, who was " guilty of a far more deliberate and systematic course of fraud," he sent to prison for 15 months. The prosecution had alleged that the two men embezzled funds from three firms—Cindal Aluminium, Limited, Brownhills Smelters, Limited, and Oakley Rubber, Limited—at a time when Noakes was chairman of the companies and Oakley managing director.

After a retirement of nearly three and a half hours, the jury found Noakes guilty of three of the individual charges of misapplication against him and not guilty on all other charges. The charges on which he was found guilty referred to the drawing of two sums, each of £40, as dividends from Brownhills Smelters, Limited, and the misapplication of a tractor bought by Brownhills Smelters and delivered to his farm.

Oakley was found guilty on three of the charges on which he had been jointly charged with Noakes of fraudulently misapplying a total of £4,400, the funds of Cindal Aluminium, Limited, by making payments to Brownhills Smelters; on three individual charges of misapplication involving £100 dividends from Brownhills Smelters, and a car and a tractor from Cindal Aluminium; and on three charges of publishing false balance-sheets. He was found not guilty on all other counts. Both men were found not guilty of conspiracy.

For Noakes, Mr. E. G. H. Beresford said that his client had put £28,100 into the companies since 1948. He had made full restitution and had lost a substantial fortune. Mr. A. W. M. Davies, for Oakley, handed in a medical certificate and asked for leniency in view of the age and previous good character of Oakley. Passing sentence, the Commissioner said that commercial fraud was a thing that could not possibly be overlooked.

Swedish Foundry Abstract

In the November issue of *Gjuteriet*, Mr. Olaf Carlsson has summarized his Paper on the "Life of Bentonite-bonded Moulding Sands" in the following statement:—Casting experiments have been carried out with steel, grey iron and red brass in order to determine the life of moulding sands bonded with different types of bentonite. Sodium bentonite has shown greater durability than calcium bentonite. Natural American sodium bentonite is somewhat superior to so-called synthetic sodium bentonite. Calcium bentonite treated with soda has longer life than untreated calcium bentonite. The moulding sand had about the same durability for both grey iron and steel. This may be due to the fact that approximately the same amount of heat was liberated in both cases in spite of the higher temperature used when casting steel. The best surfaces on the castings were obtained when the moulding sand had been used a few times.

IVE Spring Conference, 1954

The 1954 Spring conference of the Institute of Vitreous Enamellers will be held at the Grand Hotel, Eastbourne, from May 20 to 22. The theme for the papers to be presented at this conference is " Development and Future Trends of Enamels."

Structure of Graphite Spherulites*

By M. N. Parthasarathi and B. R. Nijhawan

The structure of graphite spherulites in nodular cast irons is a subject of much controversy. The controversial points, such as the central white spot, "radial-type" nodule, etc., are discussed here in the light of experimental data, based on a study of a group of four nodules across its different parallel sections. An attempt has been made to explain the structure of graphite and elucidate some of the outstanding debatable points.

Introduction and Method

The morphology of spherulitic graphite in nodular cast irons is a subject of considerable controversy. Various workers[1–4] have put forward different hypotheses based on indirect inferences and derived from a study of random sections. It was therefore felt that a systematic examination of one or more specific spherulites in a number of parallel sections would be more valuable, since it would throw light not only on the actual structure of the spherulites themselves, but also on the tenability of the various hypotheses.

A 10-lb melt of Swedish pig-iron was made in an indirect-arc furnace. Half a pound of copper/magnesium alloy containing 25 per cent. magnesium was added after the metal was received in a crucible. The contents were well stirred and then treated with $\frac{1}{8}$ lb. ferro-silicon and cast into a keel-block mould. The percentage composition of the final material was C-3.3; Si-3.2; Mn-0.5; Cu-1.66; and S and P below 0.01. A suitable specimen was chosen from the iron so cast. The graphite in this specimen was

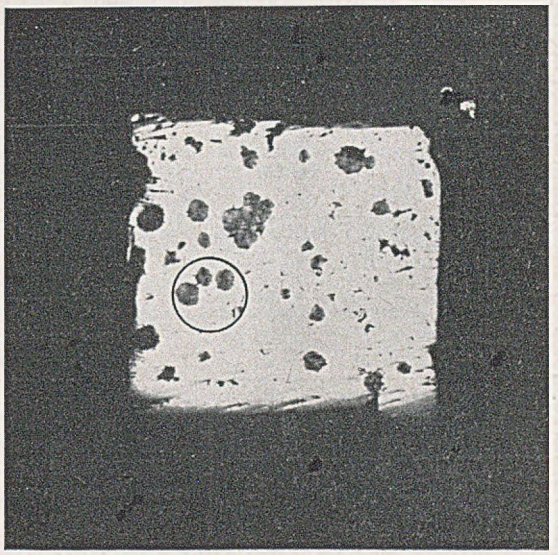

FIG. 1.—*The Circle shows the Location of the Three Original Nodules inside the Square. Unetched* × 90.

* Reprinted by courtesy of the Indian Institute of Metals. The Authors are on the staff of the National Metallurgical Laboratory, Jamshedpur, India.

Mr. H. Morrogh, Research Manager, British Cast Iron Research Association, writes :—

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—This paper by M. N. Parthasarathi and and B. R. Nijhawan entitled " Structure of Graphite Spherulites " is commended for publication in your Journal. It is concerned with the nature of the central bright spot frequently seen in graphite spherulites in nodular cast irons. This subject has produced much speculation and elaborate theory, which must be very misleading to those who are interested and yet do not have the opportunity to make a detailed study.

Morrogh and Williams in the *Journal* of the Iron and Steel Institute for March, 1947, pointed out that a graphite spherulite cut above or below its centre will have a small central portion having a basal plane parallel to the polished surface which cannot be polished in the same way as the rest of the nodule. It was pointed out that this unpolished zone must not be mistaken for a nucleus. This is a simple geometrical explanation, but subsequently the " nucleus enthusiasts " invaded the literature on nodular cast iron and their observations and theories have been given with abandon. In your JOURNAL (March 23, 1950) the present writer made a more careful attempt to explain the nature of this bright spot, but apparently this explanation was too simple to be adopted when more complicated possibilities were available.

Parthasarathi and Nijhawan have, by completely ignoring the complicated explanations and by simple experiment, confirmed the simple geometrical explanation of the nature of the bright spot in graphite spherulites. These investigators are to be congratulated for their practical approach and for the very significant contribution resulting. Their paper has already been presented and published in India, but I feel it has not received due recognition in Europe, in this country or in the United States. I therefore suggest that by reprinting it in your JOURNAL you may give other workers the opportunity to study this very disciplined contribution, which may otherwise be overlooked.

TABLE I.—*Details of the Examinations Made.*

Section No.	Nodule I.	Nodule II.	Nodule III	Nodule IV.
1	Radial structure with no central white spot. (22 sq. cm.)*	Structureless pattern with a central white spot. (12 sq. cm.)	Structureless pattern with a central white spot. (17.06 sq. cm.)	—
2	Radial structure with no central white spot. (22 sq. cm.)	White spot; radial structure faintly visible. (12.40 sq. cm.)	Structureless pattern with a central white spot. (18.06 sq. cm.)	—
3	Very small white spot appears, but the radial structure persists. (22 sq. cm.)	White spot; radial structure faintly visible. (13.00 sq. cm.)	Structureless pattern with a central white spot. (19.06 sq. cm.)	—
4	White spot has increased in dimensions. Radial structure visible near the periphery. Exhibits a duplex structure. (22.5 sq. cm.)	Radial type tends to cover up the entire section. (13.86 sq. cm.)	Structureless pattern with a central white spot. (20.82 sq. cm.)	—
5	White spot; radial structure becomes less prominent. (21.32 sq. cm.)	Radial structure becomes clearer and white spot decreases in area. (13.86 sq. cm.)	White spot has decreased in dimensions. Radial structure faintly visible at the peripheral portion. (21.0 sq. cm.)	—
6	White spot and structureless pattern. (20.50 sq. cm.)	Radial structure becomes clearer and white spot decreases in area. (13.80 sq. cm.)	White spot has increased slightly; radial structure visible at the peripheral portion	—
7	Most of the graphite has been abraded out. This has been confirmed by crossing Nicols. (15.50 sq. cm.)	White spot has shrunk to a point. Radial structure has become clearer. (14.06 sq. cm.)	White spot decreased in size and radial structure at the peripheral area. (23.0 sq. cm.)	—
8	Most of the graphite has been abraded out. This has been confirmed by crossing Nicols. (15.50 sq. cm.)	No white spot and typical radial structure. (15 sq. cm.)	White spot decreased in size and radial structure tending to grow inwards from the periphery. (24.820 sq. cm.)	—
9	Most of the graphite has been abraded out. This has been confirmed by crossing Nicols. (15.50 sq. cm.)	No white spot and typical radial structure. (15 sq. cm.)	White spot decreased in size and radial structure tending to grow inwards from the periphery. (25.660 sq. cm.)	—
10	No graphite; only a pit is to be seen instead	White spot reappears. Radial structure persists. (13.320 sq. cm.)	White spot decreased in size and radial structure tending to grow inwards from the periphery. (26.32 sq. cm.)	—
11	No graphite; only a pit is to be seen instead	White spot has increased in size. Radial structure less prominent. (12.52 sq. cm.)	White spot has decreased in size and radial structure tending to grow inwards from the periphery. (27.20 sq. cm.)	Nodule just born. Shows a central white spot and structureless pattern. (0.332 sq. cm.)
12	No graphite; only a pit is to be seen instead	White spot and the pattern has become structureless. (12.20 sq. cm.)	White spot has decreased in size and radial structure tending to grow inwards from the periphery. (27.00 sq. cm.)	Nodule just born. Shows a central white spot and structureless pattern. (1.2 sq. cm.)
13	No graphite; only a pit is to be seen instead	White spot and the pattern has become structureless. (11.66 sq. cm.)	White spot has shrunk to a point. (27.00 sq. cm.)	Nodule just born. Shows a central white spot and structureless pattern. (1.86 sq. cm.)
14	No graphite; only a pit is to be seen instead	White spot and the pattern has become structureless. (11.46 sq. cm.)	No white spot. Typically radial structure. (27.16 sq. cm.)	White spot and structureless pattern. (2.00 sq. cm.)
15	No graphite; only a pit is to be seen instead	Graphite totally removed. Only the pit is seen confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.66 sq. cm.)	White spot and structureless pattern. (2.6 sq. cm.)
16	No graphite; only a pit is to be seen instead	Graphite totally removed. Only the pit is seen confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.32 sq. cm.)	White spot and structureless pattern. (3.8 sq. cm.)
17	Even the pit has disappeared	Graphite totally removed. Only the pit is seen confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.32 sq. cm.)	White spot and structureless pattern. (3.66 sq. cm.)
18	—	Graphite totally removed. Only the pit is seen confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.32 sq. cm.)	White spot and structureless pattern. (3.66 sq. cm.)
19	—	Graphite totally removed. Only the pit is seen confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.32 sq. cm.)	Structureless pattern; white spot has decreased in dimensions. (4.04 sq. cm.)

(Remarks duplicated in Sections 20 and 21.)

* (1) The figures in parentheses denote the area of the particular section at the original magnification mentioned (× 1,570 mags.). (2) The number of traverses made in the emery paper was in all cases 50 except in the first three wherein 10. 25 and 35 traverses were made, respectively (3) The photographs of the more important sections were taken and the areas of those sections which were not photographed are not quoted.

TABLE I. *Details of the Examinations Made Continued.*

Section No.	Nodule I.	Nodule II.	Nodule III.	Nodule IV.
22	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols. (11.2 sq. cm.)	Radial structure and no white spot. (27.00 sq. cm.)	Structureless pattern; white spot has decreased in dimensions. (4.46 sq. cm.)
		(Remarks duplicated in Sections 23 to 25.)		
26	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols.	Small white spot reappears; but radial structure persists. (26.0 sq. cm.)	White spot has decreased and radial structure faint. (4.60 sq. cm.)
27	——	Graphite totally removed. Only th pit is seen, confirmed by crossed Nicols.	White spot has increased in size. Radial structure persists.	White spot has decreased and radial structure faint. (4.60 sq. cm.)
28	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols.	White spot has increased in size. Radial structure persists.	White spot has decreased and radial structure faint. (4.60 sq. cm.)
29	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols.	Radial structure becomes less clear.	White spot has decreased and radial structure faint. (4.60 sq. cm.)
30	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols.	White spot has increased. Radial structure becomes less clear. (25.32 sq. cm.)	White spot has shrunk to a point. Radial structure becoming clearer. (5.0 sq. cm.)
31	——	Graphite totally removed. Only the pit is seen, confirmed by crossed Nicols. Even the pit has disappeared.	White spot has increased. Radial structure becomes less clear. (25.32 sq. cm.)	White spot has disappeared. Radial structure clearer. (5.26 sq. cm.)
32	——	——	White spot has slightly decreased and the pattern has become structureless. (25.32 sq. cm.)	White spot has disappeared. Radial structure clearer. (5.46 sq. cm.)
33	——	——	White spot has slightly decreased and the pattern has become structureless. (25.32 sq. cm.)	White spot has disappeared. Radial structure clearer. (5.46 sq. cm.)
34	——	——	White spot has increased and the pattern continues to be structureless. (23.66 sq. cm.)	Radial structure very clear and no central white spot. (6.06 sq. cm.)
35	——	——	White spot has increased and the pattern continues to be structureless. (23.66 sq. cm.)	Radial structure very clear and no central white spot. (6.06 sq. cm.)
36	——	——	White spot has increased and the pattern continues to be structureless. (21.80 sq. cm.)	Radial structure very clear and no central white spot. (5.46 sq. cm.)
37	——	—	White spot has increased and the pattern continues to be structureless. (21.16 sq. cm.)	Radial structure very clear and no central white spot. (5.20 sq. cm.)
38	——	——	White spot has slightly decreased. Pattern is structureless. (20.8 sq. cm.)	Radial type has become faint. Very small white spot reappears. (5.2 sq. cm.)
39	——	——	White spot has increased. Pattern is structureless.	White spot has increased in size. Pattern tends to become structureless.
40	——	——	White spot has increased. Pattern is structureless.	White spot has increased in size. Pattern tends to become structureless.
41	——	——	White spot has increased. Pattern is structureless. (17.66 sq. cm.)	White spot has increased in size. Pattern tends to become structureless. (4.2 sq. cm.)
42	——	——	White spot has increased. Pattern is structureless. (17.66 sq. cm.)	White spot and structureless. Graphite is on the point of being removed. (3.8 sq. cm.).
43	——	——	White spot has increased. Pattern is structureless. (6.0 sq. cm.)	White spot and structureless. Graphite is on the point of being removed. Confirmed by crossed Nicols.
		Remarks duplicated in Sections 44 to 48.		
49	——	——	Graphite is on the point of being removed. Confirmed by examination under crossed Nicols. (13.0 sq. cm.)	Graphite totally removed. Only the pit is seen instead. (2.40 sq. cm.)

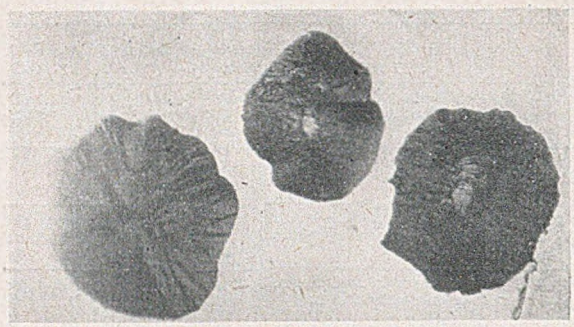

FIG. 2.—*Section* (1).* *The Three Nodules selected; Nodule I has no Central White Spot and shows a Typical Radial Structure. Nodules II and III show Central White Spots and have Structureless Patterns.*

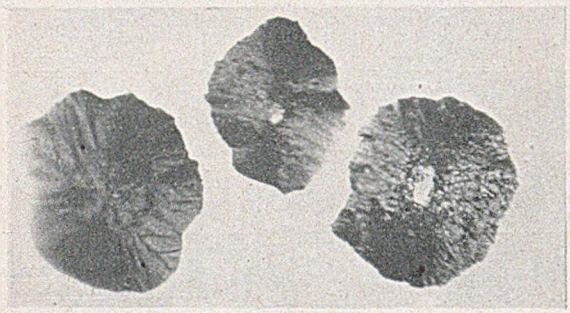

FIG. 3.—*Section* (3). *Small White Spot appears at the Centre of Nodule I.*

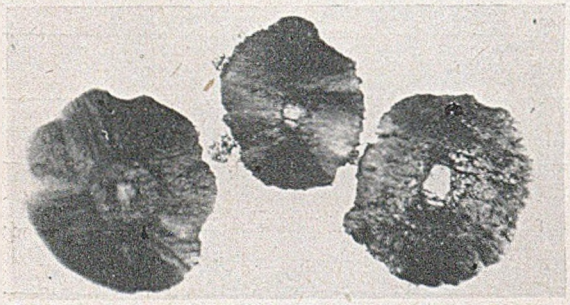

FIG. 4.—*Section* (4). *White Spot has increased in Area in Nodule I and it tends to have a Structureless Pattern.*

FIG. 5.—*Section* (7). *Nodule I is being Totally removed. The White Spot in Nodule II has shrunk to a Point and Radial Pattern begins to appear. Nodule III shows Radial Structure near the Periphery.*

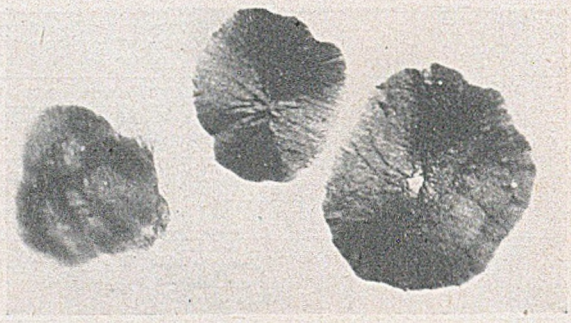

FIG. 6.—*Section* (8). *No White Spot is seen in Nodule II and Typical Radial Structure is exhibited.*

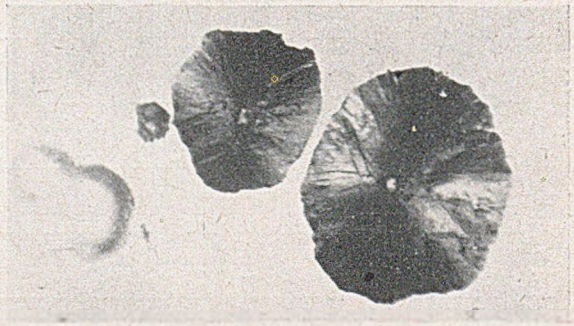

FIG. 7.—*Section* (11). *A White Spot reappears in Nodule II but Radial Pattern persists. The White Spot in Nodule III has become smaller. Nodule IV (Small One) makes its Appearance. It has a Structureless Pattern and a Small Central White Spot.*

wholly in the spherulitic form. One side of the specimen was polished and an outline of about 0.5 by 0.5 mm. square was engraved on the polished surface. The sample was then repolished and examined under the microscope. About a dozen spherulites were found within the square. Three spherulites occurring more or less in a line were selected for detailed study as shown in Fig. 1.

The following method was adopted to obtain a series of parallel sections of the three spherulites chosen for study. This specimen was initially polished and examined in the unetched condition under low and high magnifications. It was then abraded on an emery paper so as to remove a thin layer from the polished surface. The surface was re-polished on a buffing wheel and examined under the microscope. This process was repeated until all the spherulites were abraded out. To ensure the removal of approximately equal thickness of surface material in each operation the same number

* This and the subsequent photomicrographs were taken in plane polarized light. Nodules are numbered from left to right as I, II and III. All the originals were at ×1,570 magnification but are reduced by about half this linearly in reproduction; all are unetched.

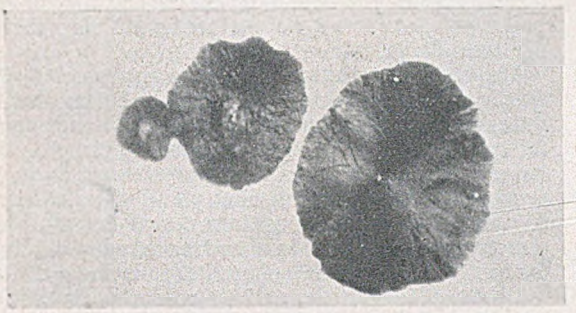

FIG. 8.—*Section* (13). *White Spot in Nodule II has become bigger and the Pattern has become Structureless. White Spot in Nodule III has shrunk much.*

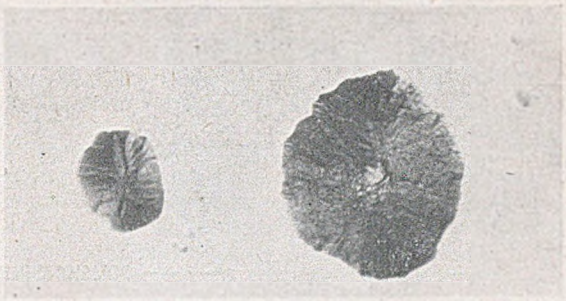

FIG. 11.—*Section* (36). *No White Spot is seen in Nodule IV. The Structure is completely Radial. The Spot observed in Nodule III has increased in Size.*

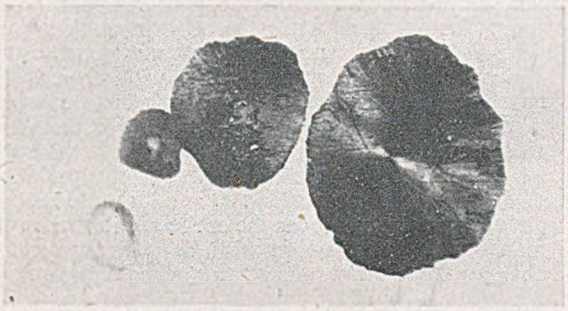

FIG. 9.—*Section* (14). *No White Spot is observed in Nodule III and Typical Radial Structure is exhibited.*

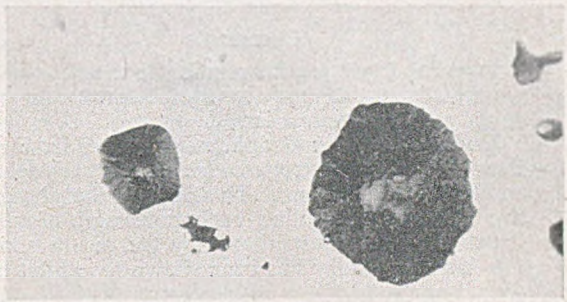

FIG. 12.—*Section* (41). *A White Spot reappears in Nodule IV and it exhibits a structureless pattern. Nodule III has a Bigger White Spot.*

FIG. 10.—*Section* (30). *The White Spot reappears in Nodule III and the Radial Structure has not altogether disappeared. The White Spot in Nodule IV has shrunk to a point, the Structure tending to become Radial.*

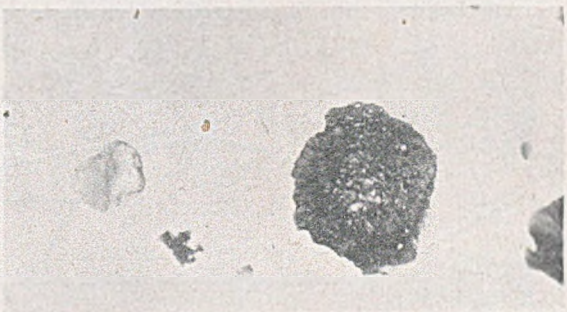

FIG. 13.—*Section* (49). *Nodule IV is almost removed and Nodule III is on the Point of being removed.*

of identical traverses were made each time on an emery paper. The layer thus removed in each operation was of the order of 0.5 microns. In this way, several parallel sections were obtained and these were micro-examined under identical conditions. During the course of the experiment, a small spherulite appeared adjacent to No. II spherulite (Fig. 7). This was abraded before the three spherulites initially chosen for study had been completely removed. To ascertain the position of a micro-section in relation to the centre of a spherulite, cross sectional areas of the spherulites across the various sections were measured by a planimeter. The section which possessed the maximum area was taken to be the section through the centre of the spherulite.

Results

In Table I are summarized the observations made in this study. Only important photomicrographs are presented (Figs. 2 to 13). These data clearly show that:—

1. Spherulites exhibit typical "radial structure" only in sections at or near their centre and not in other sections.
2. The "white central spot" is observed only in sections away from the centre. Sections in the vicinity of the centre do not reveal this characteristic spot.

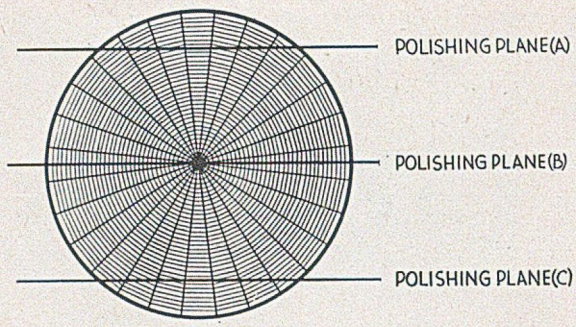

FIG. 14.—*Schematic Diagram of a Graphite Spherulite showing the arrangement of the Constituent Crystallites and the Manner in which they meet the Plane of Polish.*

Comments

Two important aspects relating to the structure of graphite spherulites are discussed below on the basis of the results given earlier.

Radial Structure: Graphite spherulites have been classified[5] into two groups, *viz.*, the " structureless " and the " radial " types. This opinion that there are two types of spherulites each possessing a typical structure is not substantiated by the results shown. The same spherulite has been shown to exhibit both types of structures depending on the location of the polishing plane *vis-à-vis* the centre of the spherulite (see Table I).

The changes in microstructure with respect to the position of the polishing plane may be followed with the aid of Fig. 14. If the spherulite is sectioned away from its centre (for instance at polishing plane A) the basal planes of the constituent crystallites lie more or less parallel to the polishing plane. The sections of spherulite in these positions reveal the so-called structureless pattern. In a section passing through the central region of the spherulite (polishing plane B), the basal planes of the various crystallites meet the polishing plane at an angle of about 90 deg. Sections of spherulite in this region exhibit the typical radial structure. When plane A moves towards plane B, the basal planes of the crystallites at the centre of the micro-section remain more or less parallel to the polishing plane, while the other crystallites meet the polishing plane at angles of increasing magnitude. When the plane A tends to merge with plane B, the basal planes of all the crystallites meet the polishing plane approximately at right angles. For the above reason, as plane A moves towards plane B, the radial structure should be observed first in the periphery of the spherulite section (Fig. 5) and it should become clearer and tend to cover the entire section when the plane A tends to merge with B. Similar gradual changes from the " radial " to " structureless " pat-

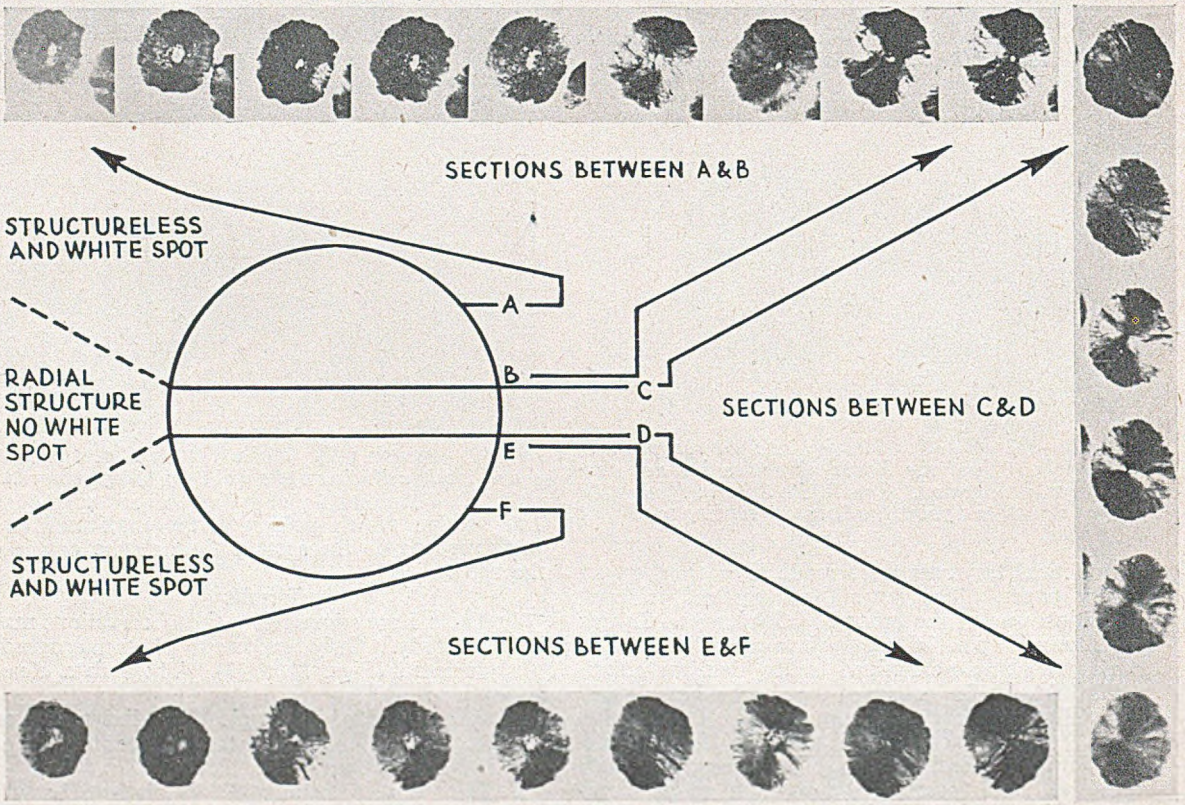

FIG. 15.—*Diagrammatic Sketch depicting the Morphological Changes observed at Sections Near the Centre and away from it. The Photographs presented here are of Nodule III.*

terns should be observed as plane of polish moves from B to C. This is borne out by the data presented in Table I and Figs. 2 to 13, which clearly indicate that changes in the microstructure are governed by the position of polishing plane across the spherulite with respect to its centre. It therefore appears that in any microstructure of nodular cast-iron, both types of structures will be found, since the plane of polish passes through the spherulites at different positions.

Central white spot: The appearance of central white spots in the micro-section of graphite spherulites in nodular cast irons has led some workers to believe that the spot occurs at the centre of the spherulite and represents its nucleus. The experimental evidence obtained in this investigation does not support this conclusion.

The white spot is not found at the geometrical centre of the graphite spherulite. Table I shows that sections taken through the centre of the spherulite or its vicinity do not exhibit the white spot, whilst sections away from the centre showed these spots. Since the white spot is not observed at the geometrical centre of the spherulite the view that it represents the latter's nucleus is untenable. The appearance of the white spot due to the presence of a foreign nucleating agent does not appear to be justified. The explanation[6] that the white spot is merely an optical phenomenon appears to be more appropriate.

The diagrammatic representation in Fig. 15 may now be referred to in detail. Since the white spot is observed in sections located away from the centre, it is logical to associate it with the structureless pattern. This is confirmed by the results presented above. It is, however, also possible to see a spherulite micro-section showing both the central white spot and the radial structure. Such structures may be located on fortuitous sections where the structureless pattern tends to merge with the radial pattern (Fig. 15).

The results recorded above may now be compared with the findings reported in a recent paper by Weld and others.[7] It has been stated that "measurements of a large number of nodules having central white spots showed the average core diameter to be only about 10 per cent. of the diameter of the nodules." The present study of various sections showed that no such relationship exists. The white spot appears enlarged in sections taken near the periphery and tends to diminish to a point as the sectioning plane moves towards the centre. This tendency of the white spot to shrink or enlarge depending upon the position of the plane of polish was found to hold good in general, although minor deviations were observed in a few sections. This may be attributed to the change in shape and size of the central crystallites, since these factors determine the form and area of the white spot.

Referring to the overall relationship between the diameter of the white spot and that of the spherulite, it appears that sections of the same spherulite with smaller cross-sectional areas (lying close to the periphery) show bigger white spots. On the other hand, central sections with larger cross-sectional areas exhibit either no white spot or a very small point.

Furthermore, it has been stated[7] that sections in which more than half the spherulite is embedded in the metal (plane A in Fig. 14) reveal structures somewhat different from those in which less than half of the spherulite is embedded (plane C, Fig. 14). It is reported that the area adjoining the white spot in the latter cases is smoother in relation to the former. It is felt, on the basis of the present work, that there is no marked difference in the appearance of the two sections.

Conclusions

1.—The " radial structure " is confined to sections passing through the spherulite centre or its vicinity.

2.—The " structureless pattern " is observed in sections taken away from the centre.

3.—The " white spot " is not located at the centre of the spherulite. It cannot be attributed to the presence of a foreign nucleating agent.

4.—The white central spot is observed in sections taken away from the centre and is generally associated with the " structureless " pattern.

5.—The area of the central white spot is not directly proportional to the cross sectional area of the spherulite.

Acknowledgment

The Authors wish to thank Dr. G. P. Contractor, acting director, National Metallurgical Laboratory, Jamshedpur, for his constant interest and encouragement in this work.

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[7] H. M. Weld, R. L. Cunningham and F. W. C. Boswell. *Journals of Metals*, 1952, July, p. 738.

Mr. C. T. Cripps, chairman and managing director of Pianoforte Supplies, Limited, Northants, has made a gift of £100,000 to Nottingham University for the endowment of two professional Chairs—one of metallurgy and one of production engineering.

A return to normality rather than a state of depression was indicated by the recession in the demand for ship repairs, said Col. T. G. Creenwell, managing director of T. W. Greenwell & Company, Limited, Sunderland, speaking at the company's staff dinner. Inroads were being made into the industry in this country by competition from the Continent, where through their ability to carry out continuous shift work dockyards were able to give speedy delivery of ships, he declared.

Valuable assistance is being rendered by ambassadors, consuls, trade commissioners and other officials of H.M. Missions abroad, to the Scottish Industries Exhibition, 1954, as a result of personal letters sent to them by Lord Bilsland before leaving on his American tour. Leading industrialists, manufacturers and stores in the areas served by British Embassies, Legations and Consulates overseas, have been supplied with details, and are being encouraged to visit Glasgow next year or send their buyers to the Exhibition.

Testing Castings Under Pressure

The C.F.A. have extracted from the *Industrial Accident Prevention Bulletin* of the Royal Society for the Prevention of Accidents as follows:—A number of castings were being tested under pressure in a foundry. They were 8 ft. in height and 3 ft. 4 in. dia., and were subjected to both water- and air-pressure tests. Order sheets stating the pressures to be applied to various types of castings were kept near at hand for reference by the testing staff, but in this instance these were not consulted and water-pressure tests of 154 lb. per sq. in. and air-pressure tests of 25 lb. per sq. in. were carried out. Fifteen castings had been successfully tested in this way when the sixteenth exploded under air pressure, killing one of the operators and seriously injuring another.

The order sheets, to which reference should, of course, have been made, called for a water- pressure of 38.98 lb. per sq. in. and an air-pressure of 20 lb. per sq. in. for castings of this type. It is, however, fundamentally unsafe practice to carry out air-pressure tests at pressures above those to which the vessels will be subjected in actual use. Tests above normal working pressure should be carried out with liquids only, as the explosive force of compressed air constitutes a serious hazard in cases of failure.

New Equipment

Flowmeter

George Kent, Limited, Luton, Bedfordshire, who have been making flowmeters for nearly 60 years, have just designed and placed on the market an entirely new model. This is to be known as the "Commander" class. To inaugurate the new class, type "KU" has been launched. This meter can be used for the recording, indication, integration and automatic control of the flow of oil, water, gas, air, steam and most industrial liquids. It works in conjunction with a venturi or orifice in the pipe-line. One feature—the float in the down stream chamber—is the subject of a Patent application. It is interesting to note that spare parts will be available for ten years for those instruments which the "KU" type will eventually replace. This policy regarding spares is the standard practice of the firm and one worth emulating by other instrument makers. Technical details of the equipment are available to readers on writing to Luton.

Shotblasting of Rolls

A new machine for producing a matt surface on rolls primarily for rolling sheet steel is shown in Fig. 1. It is of the shotblast type, and is produced by Ets. A. Sisson-Lehmann, of Charleville, France. During treatment, the roll is mounted on bearings in an enclosure, where it is revolved by connection to gearing, while shot is projected against it *via* a cast-iron nozzle which travels backwards and forwards along the length of the roll. After impact, the shot gravitates to a hopper from which it is raised by bucket elevator for treatment before being returned for further use. The five models constructed by the company can take rolls weighing from 10 cwt. to 15 tons.

Control of Steel Composition

New Sampling Technique

Although the single-slag basic melting practice adopted for steel castings by an American firm displayed speed that indicated additional savings in heat time, one noticeable feature causing delay was the 20 to 25 min. required for the preliminary carbon and manganese analysis. Consequently it became imperative not only to speed up sampling, but to provide the melter with immediate information on the condition of the melt. The steps taken are described by Mr. V. E. Beluski in an article published in *Journal of Metals* for November, 1953. The Brinell hardness test block method of rapid carbon determination is described, which consists of removing a sample of metal in a well-slagged spoon, and killing it with aluminium wire and approximately 0.5 per cent. manganese as low-carbon manganese, then pouring the metal into a metal chill mould. The resulting block is removed, quenched with vigorous agitation in water, then ground lightly on one side and Brinell impressions made under the standard 3,000 kg. load.

Attention was also directed to the elimination of the preliminary manganese analysis. But as chemical data indicated that an average of 92 per cent. Mn which was oxidized into the slag during the oxygen blow was recovered in the reduction phase of the process and as charges were standardized on 40 per cent. foundry returns of known composition, manganese determination was found to be unnecessary. Although higher carbon heats still required combustion carbon analysis, the delay was overcome by adopting the induction-furnace method and developing a suitable sampling method described by the author. For slag analysis, a viscosimeter of the Herty design is stated to have proved most valuable.

Through these improved methods, an average saving of some 20 min. per heat has been realized on the hardenable grades of steel produced. The daily production of the PT Lectromelt furnace in use averages 14 heats per day, of which approximately eight heats are low-alloy heat-treatable steels. Hence, there is a daily saving of some 2½ hrs. in furnace time, allowing approximately two additional heats per day.

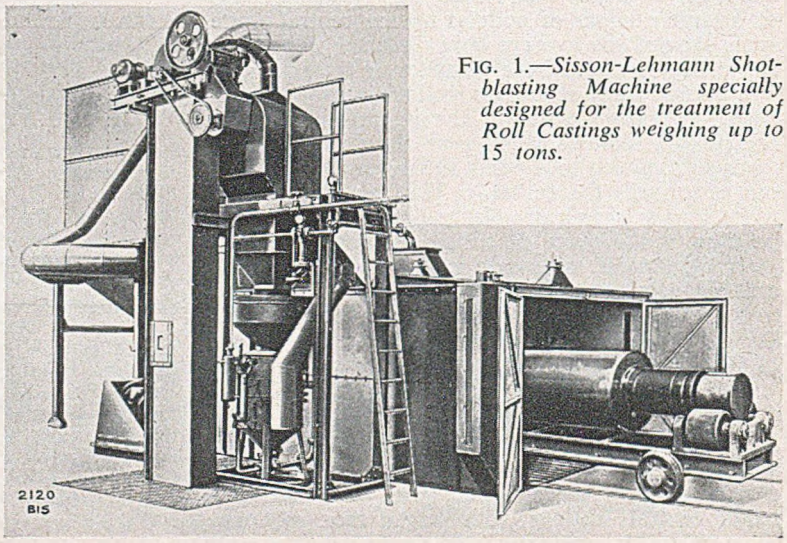


FIG. 1.—*Sisson-Lehmann Shotblasting Machine specially designed for the treatment of Roll Castings weighing up to 15 tons.*

Code of Good Practice for the Provision of Patterns*

Abstract from Belgian Recommendations

This specification has for its object the setting out of a "Code of Good Practice" for the provision of patterns and coreboxes. The first part describes and illustrates the types of patterns used by the foundry industry. Part II, in dealing with underlying principles, enunciates the notion that it is for the patternmaker to choose the materials, the method of assembly, and the quality of the type of accessories to the pattern, taking into consideration the light or heavy nature of subsequent usage. Thus, the buyer must, without ambiguity, notify the master patternmaker of the conditions of service.

Then the materials used are classified and a note is printed that the master patternmaker can always suggest alternative materials capable of giving improved service.

The actual classification has been fully translated below, but following it there is the standardized colour-scheme for Belgian patterns, which is much the same as the new British specification with the exception that the body of the pattern is coloured to show the metal to be used for the casting. Finally, standard letters of inquiry and the corresponding quotation form are set out and it is noteworthy that the name of the foundryman with whom to make contact is both set out and acknowledged—a very sensible notion.

Characteristic Types of Construction

Grade A (*patterns for light duty*)

Generally speaking no extensive method should be used to ensure long life for this type of pattern.

Normal Timber—fir, lime: Application—massive wooden patterns or simplified assemblies; fitments glued, nailed or screwed; fragile parts not to be specially protected and leather fillets as marked on the pattern.

Grade B (*patterns of ordinary quality for short or average runs*)

The sizes and shapes of the pattern play an essential part in the choice of type to be supplied.

Body of the pattern to be in red pine according to size; accessories in hard wood; panels to be tongued and carefully glued. According to local needs, and the size of the pattern, assemblies may be carried out in half-wood (*mi-bois*) by tenons and mortises or by multiple-slot mortises: Fillets to be loose; loose pieces to be dove-tailed; dowel pins in wood or metal. For large patterns, rapping plates and lifting plates should be incorporated.

Grade C (*high-quality patterns—mass production patterns*)

Here the type best suited for assuring the long life of the pattern must be provided, even though it increases the cost of the pattern. These types will vary according to the size and shape of the job. As far as possible, all large masses will be made quite rigid and will be joined together by struts of an equally rigid character. Facings are to be of hard wood, as far as possible with the grain running in the same direction as the stripping. Fragile fitments, loose or not, should be protected either by the use of very hard wood or metal. All assemblies should be of tenons and mortises or slot mortises and the loose parts must be grooved and fixed. Fillets will be permanently attached to the body of the pattern and to the fixed parts of it. Rapping and lifting plates should preferably be attached by means of bolts and placed in such a way as to take care of all strains which they impose on the structure of the pattern.

Grade D (*metal patterns, loose or plated, for unlimited production*)

(*a*) *Master pattern.* The master pattern for such jobs is made to carry double construction and can be light construction. In the case, however, where the metal pattern is not required to be machined all over, the surface of the master pattern must be extremely well finished (the wood well polished, and the fillets carefully inserted).

In the alternative case of a fully-machined job, the allowance must be such as to suit the projected method of finishing and the metal chosen for the working pattern.

(*b*) *Metal pattern and stripping plate.* Here, the working pattern will be cast from the master pattern according to the usual technique of the foundry. The pattern and also the stripping plate will be finished according to the requirements or drawings of the buyer.

Coreboxes

The construction of coreboxes should adhere to the same quality criteria and grades as the actual patterns.

For *Grade C*, they will adhere to the following practice: For small coreboxes cut from solid timber, measuring about 70 mm. (2¾ in.) of wood on each side of the core along the parting line and 30 mm. (1¼ in.) in all other directions. For larger coreboxes the surround (*encadrements*) should be on a 6:4 ratio for boxes not exceeding one metre long and 8:4 for boxes longer than a metre. The splices should be 7 mm. for the 6:4 and 10 mm. for the 8:4 ratio.

The reinforcing struts should be screwed on the extension walls of the boxes at intervals not less than 460 mm. (18 in.) maximum. Each time, where possible the patternmaker should make the core-prints in such a way, that when coring up, the core cannot be set in any way other than the correct one.

* Extracted from S.B.M. 1801—a specification prepared by the *Association Technique de Fonderie de Belgique*, and the *Société Belge des Mecanaciens*—obtainable from either of the above at 21 rue des Drapiers, Brussels. Price 50 (Belgian) francs.

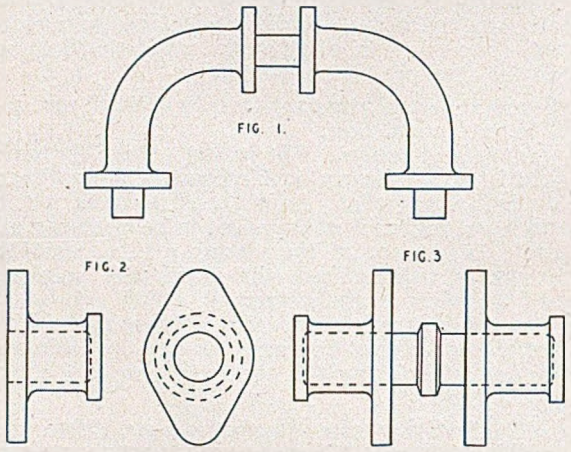
Double Patterns

By "Checker"

Double patterns are often used to give a more substantial and satisfactory seating to the core. Possibly the most common examples of their use are those for pipe bends or similar patterns. Fig 1 illustrates this clearly, showing how the connecting print between both patterns gives a definite core seating, in addition to those at either end. Thus, when the core is positioned in the mould, it is both balanced and located correctly.

It can be visualised easily that if patterns of this type were made separately, the core would not be balanced properly in the coreprints at the ends. Therefore the use of chaplets would have to be resorted to. Another advantage with these double or twin patterns is that castings are produced quicker and cheaper than when single patterns are used.

Usually, double or twin patterns of this kind are made in halves and mounted on plates or wooden boards, while the corebox is also constructed to cater for the two patterns. A full corebox can be used, or in some instances when the core shape is symmetrical,



FIGS. 1 TO 3.—*Use of Balanced Core-prints; Fig.* 1 *to ensure Symmetry of Moulding of Two Castings, Figs.* 2 *and* 3—*a "Blind" Core for One Casting is balanced about Two Castings.*

a half corebox may only be made. From this the half-cores are produced, dried, and then gummed together.

In many instances, where a balancing print at one end has to be used for seating the core, a double pattern will give a more satisfactory job. Fig. 2 shows a casting for which the only outlet for the internal shape is in the large flange. Therefore, with a single pattern of this type, a balancing print of considerable length would be necessary to give the required core seating. If, however, a double pattern is produced, having one coreprint connecting the two patterns, any difficulty in setting the core is overcome. Fig. 3 gives an illustration of the double pattern required, including a local print extension between the patterns, which ensures the core position is always correct longitudinally. The coreprint length between the patterns should always be sufficient to guarantee that the core sits firmly when placed in the mould.

SO MANY APPLICATIONS for space for the 1954 Scottish Industries Exhibition have been received that many have had to be rejected.

Book Reviews

Vocabulaire du Fonderie—Anglais/Français. Published by *Editions Techniques des Industries de la Fonderie,* 12 Avenue Raphael, Paris 16, price 400 French francs.

This is an excellent English/French foundry dictionary, and thus very unfortunately not of too great a help when translating from French to English, except, perhaps, when one has a bright idea which can be confirmed or ruled out. When struggling with such words as *elaboration, reperage,* this dictionary will not help. There are just a few printers' errors which need amending in the next edition, such as "blast piper," which should, of course, be "blast pipe," and "moulder bench" should be "moulders' bench." One cannot criticize a poor choice of an English expression, as it can be presumed that they have been culled from the Press. The little book includes several pages of conversion tables. The French are indeed fortunate to possess such a useful specialized dictionary, and the compilers are to be congratulated.

Industrial Inorganic Analysis, by Roland S. Young, Ph.D., F.R.I.C. Published by Chapman & Hall, Limited, 37, Essex Street, London, W.C.2. Price 36s.

The arrangement of this book is simple. It is divided into sections or chapters, each devoted to one element. For each element there is a short introductory note on its occurrence and significance in industry. This is followed by "general procedure" for the separation and determination of the element, finishing up in most cases with "special procedures." In this manner some 45 of the most important elements normally encountered in an inorganic laboratory are dealt with. This, the major part of the book, comprises 318 pages, and is arranged alphabetically. The remaining 35 pages are given over to six short sections on miscellaneous subjects, the principal being gas and water analyses and standard solutions.

The analytical procedures in this book are essentially "wet" methods. Techniques involving instrumentation, *i.e.,* absorptiometric, spectrographic and polaroof the matter is of most direct interest to the metalgraphic, are not included. Almost inevitably, the bulk lurgical and allied industries. Other applications, however, such as the fertilizer industry, have not been forgotten. As would be expected from the author's mining experience, ore analysis is well catered for.

The book is very readable and, in the reviewer's opinion, the methods given are excellent in themselves and very well described. The author mentions many of the specific difficulties likely to be encountered, and the special precautions necessary. These are features which could only arise from wide experience. The newer advances in analyses have been woven into older techniques and, as a result, the methods presented are really up to date. The references at the end of each section have been sparingly but wisely selected and almost wholly from post-war publications. In some cases readers are directed to companies or organizations who will assist chemists having special problems. The book is well printed and, on a first read through, appears to be pleasantly free from typographical errors.

J. A.

A BUILDING LICENCE for work involving £41,000 has been granted to Dorman, Long & Company, Limited, for proposed alterations to the Cleveland Works at South Bank-on-Tees.

Advisory Service for Copper-base Founders

As has already been reported in these columns, under the Mutual Security Acts of 1951 and 1952, money has been placed at the disposal of the British Government for use in British Industry to improve productivity, including the implementation of the lessons learned by the productivity teams which recently went to the United States of America, under the auspices of the Anglo-American Council of Productivity. A limited sum of this money has been made available for the provision of an advisory service in the bronze and brass foundry industry. The Association of Bronze & Brass Founders has been entrusted by the Board of Trade with this money for the administration of the new service, which is to be available to *all* founders whether members or non-members of the Association.

Under the scheme, an organization is being prepared whereby any founder wishing to receive advice on costing, welfare regulations, materials handling, foundry lay-out or other technical matters, can apply for the services of a specialist to assist him in his problems. The nature of the service and its cost are such that it would not be provided free, but a nominal charge, which would be agreed in advance with the applicant, would be made.

It is felt that in one field or another most copper-base foundrymen will wish to avail themselves of this opportunity to make progress. For their convenience and for efficiency of detail operations, advisory committees are being formed in five areas of Great Britain. It is hoped that interested foundrymen will be able to attend inaugural meetings at their local centre, at which the scheme will be fully explained and the area committee elected. Other meetings will follow at suitable intervals, for the successful running of the scheme and for discussion of subjects bearing on productivity. As so far announced, the first area meeting will be held on Thursday, January 14, 1954, at the Great Western Royal Hotel, Paddington Station, London, W.2, commencing at 2.15 p.m., and those intending to be present are asked to inform the A.B.B.F. secretaries as soon as possible. (Heathcote & Coleman, 69, Harborne Road, Edgbaston, Birmingham, 15.) The dates and times of subsequent area meetings will be given in the JOURNAL.

Another Scrap Price Offence

Samuel Thompson (Millfields), Limited, of Bilston, pleaded guilty recently to five summonses for buying at a price exceeding the permitted maximum a total of 192 tons 4¼ cwt. of cast-iron scrap between November, 1952, and April 30, 1953. They were fined £8 on each summons, and ordered to pay 10 guineas costs. The amount paid for the metal was £1,478 0s. 10d. and the excess £65 18s. 9d. For the defence, Mr. D. F. Cave said the firm was founded in 1875 and manufactured cast-iron sanitary fittings for the building and allied trades, 25 per cent. of its products being exported. At the time of the purchases, there was a supply shortage and if the scrap had not been obtained, the foundry would have had to close down. It was the only occasion they had had metal from outside their normal source of supply. They could get the scrap only by paying transport charges from Cheshire. The Stipendiary, Mr. Kenneth Wood said that the order had to be enforced, but having regard to the circumstances, the previous good reputation of the company and the difficult position in which they were placed, he felt considerable sympathy with them.

U.K. Exports Highest for 20 Months

A letter signed by Mr. D. Heathcoat Amory, Minister of State, Board of Trade—the first step in a campaign started by the Board of Trade to make better known the services Government departments offer to exporters—has been sent to 50,000 British manufacturers and trade associations. It coincides with the announcement that, according to the Board of Trade's provisional estimates, United Kingdom exports in November were the highest for 20 months.

Although November had only 25 working days, against 27 in October, exports rose by £12,300,000 to £239,900,000 (f.o.b.), which was the highest since March, 1952. Re-exports amounted to £8,900,000, compared with £9,300,000 in October. With imports (c.i.f.) £7,400,000 lower at £272,400,000, the oversea trade deficit—the excess of imports (c.i.f.) over exports plus re-exports (f.o.b.)—came out at £23,500,000, the lowest since November, 1950. In October the deficit was £42,900,000, and in the third quarter of this year it averaged £54,800,000.

Exports in the five months July to November averaged £220,500,000 a month, against £202,600,000 a month from July to November, 1952, but this increase does not fully offset the reduction in the first half year compared with the first half of 1952. United Kingdom exports in the first 11 months averaged £214,400,000 a month, compared with £215,800,000 in January to November, 1952.

United Kingdom exports to North America in November, at a provisional total of £25,100,000, brought the average for October/November to £26,000,000 a month.

Exports to the United States in November, at £11,300,000, were 19 per cent. below the high average of the second and third quarters. Exports to Canada, at £13,800,000, were 8 per cent. up.

Imports of Sulphur and Iron Pyrites

Following the recent announcement by the Ministry of Materials that private trading in sulphur and iron pyrites is to be resumed on January 1, the Board of Trade is now prepared to consider applications for licences to import sulphur from any source after that date. Applications for licences should be made on Form ILB/A (Revised) and should be addressed to the Import Licensing Branch, Board of Trade, 43, Marsham Street, London, S.W.1. The form should be fully completed, and, in particular, the country of origin, the price, the source, and, if possible, the firm or firms who are to use the imported sulphur, and whether it is to be used for making sulphuric acid or not, should be stated.

Imports of iron pyrites from any source will be admissible under open general licence, and separate import licences will no longer be required.

Institute of Metals Awards

The Council of the Institute of Metals has made the following awards of medals for 1954,

Institute of Metals (Platinum) Medal to Dr. Leslie Aitchison, M.SC., in recognition of his services to metallurgy in industry, in education and in public service.

Rosenhain Medal to Professor Alan Howard Cottrell, B.SC., PH.D. (professor of Physical Metallurgy, University of Birmingham), in recognition of his outstanding contributions to knowledge in the field of physical metallurgy, with special reference to the deformation of metals.

Pig-iron and Steel Production

Statistical Summary of October Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table I summarizes activity during the previous six months. Table II gives production of steel ingots and castings in October and Table III, deliveries of finished steel in September, 1953. Table IV gives the production of pig-iron and ferro-alloys in October, 1953, and furnaces in blast. (All figures weekly averages in thousands of tons.)

TABLE I.—*General Summary of Pig-iron and Steel Production.*

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (all qualities). Imports.[1]	Output of ingots and castings.	Deliveries of finished steel.	Stocks.[2]
1951	284	170	206	186	175	8	301	244	585
1952[3]	306	190	228	202	171	29	310	252	739
1953—May	319	198	243	215	190	19	351	263	902
June[4]	301	202	238	211	188	14	338	263	914
July	281	197	229	202	153	19	277	223	958
August	273	203	226	204	159	19	291	211	1,046
September[4]	292	215	232	214	196	14	347	271	1,016
October	288	226	237	222	202	12	355	—	982

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in October, 1953*[1]

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derby, Leics., Notts., Northants and Essex	—	3.9	5.9 (basic)	1.9	0.2	10.9	1.0	11.9
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	1.7	25.9	—	1.6	0.7	28.6	1.3	29.9
Yorkshire (excl. N.E. Coast and Sheffield)								
Lincolnshire	—	38.8	—	—	0.1	38.7	0.2	38.9
North-East Coast	2.4	66.9	—	1.3	0.6	69.2	2.0	71.2
Scotland	3.9	39.9	—	1.7	0.8	44.2	2.1	46.3
Staffs., Shrops., Worcs. and Warwick	—	18.1	—	1.2	0.7	18.2	1.8	20.0
South Wales and Monmouthshire	4.8	67.2	6.0 (basic)	1.2	0.1	78.6	0.7	79.3
Sheffield (incl. small quantity in Manchester)	9.6	29.1	—	9.6	0.6	46.7	2.2	48.9
North-West Coast	0.1	2.4	5.5 (acid)	0.5	0.1	8.5	0.1	8.6
Total	22.5	292.2	17.4	19.0	3.9	343.6	11.4	355.0
September, 1953[4]	22.9	283.0	17.8	18.9	3.9	335.2	11.3	346.5
October, 1952[4]	24.5	257.6	22.2	19.7	3.8	316.1	11.7	327.8

TABLE III.—*Weekly Average Deliveries of New Non-alloy and Alloy Finished Steel.*

Product.	1951.	1952.[3]	1952. Sept.	1953. Aug.	1953. Sept.[4]
Non-alloy steel:					
Ingots, blooms, billets and slabs[5]	4.0	4.5	5.0	4.0	4.6
Heavy rails, sleepers, etc.	10.1	9.8	10.7	8.1	10.4
Plates ¼ in. thick and over	41.0	41.4	46.9	34.0	47.7
Other heavy prod.	39.9	39.0	44.3	37.8	47.3
Light rolled prod.	46.7	46.0	53.4	42.6	48.9
Wire rods	15.9	15.9	18.6	13.2	15.1
Bright steel bars	6.5	6.5	7.2	5.0	6.8
Hot-rolled strip	19.5	18.8	21.1	14.2	18.6
Cold-rolled strip	6.0	6.1	6.4	4.3	5.3
Sheets, coated and uncoated	30.4	31.6	33.8	27.1	35.9
Tin, terne and blackplate	13.8	16.0	16.6	11.3	16.9
Steel tubes and pipes	20.3	20.1	23.0	16.5	21.2
Tube and pipe fittings	0.5	0.4	0.4	0.3	0.3
Mild wire	11.6	12.2	14.5	8.5	11.0
Hard wire	3.5	3.6	4.4	3.2	3.5
Tyres, wheels and axles	3.7	3.5	4.1	3.5	5.0
Forgings (excluding drop forgings)	2.3	2.8	3.0	2.6	3.0
Steel castings	3.8	4.2	3.9	3.0	3.8
Tool and magnet steel	[8]	0.3	0.4	0.2	0.3
Total	279.5	282.7	317.7	239.4	305.6
Alloy steel	11.4	13.7	14.9	11.3	13.5
Total deliveries from U.K. prod.[6]	290.9	296.4	332.6	250.7	319.1
Add: Imported finished steel	5.8	13.8	13.6	5.0	7.4
	296.7	310.2	346.2	255.7	326.5
Deduct: Intra-industry conversion[7]	55.0	60.2	66.2	46.1	57.2
Total net deliveries	241.7	250.0	280.0	209.6	269.3

TABLE I.—*Weekly Average Production of Pig-iron and Ferro-alloys during October, 1953.*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants and Essex	27	—	17.3	24.3	0.8	—	42.4
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	8	—	15.7	—	—	1.6	17.3
Yorkshire (incl. Sheffield, excl. N.E. Coast)							
Lincolnshire	12	—	29.0	—	—	—	29.0
North-East Coast	24	4.5	47.8	—	—	1.2	53.5
Scotland	9	0.7	13.7	2.5	—	—	16.9
Staffs., Shrops., Worcs., and Warwick	9	—	8.4	1.6	—	—	10.0
S. Wales and Monmouthshire	9	5.0	20.2	—	—	—	34.2
North-West Coast	8	16.8	—	0.2	—	1.2	18.2
Total	106	27.0	161.1	28.6	0.8	4.0	221.5
September, 1953[4]	104	26.6	155.4	26.2	1.1	4.6	213.9
October, 1952[4]	103	28.0	142.8	28.2	1.5	3.7	204.2

[1] Weekly average of calendar month.
[2] Stocks at the end of the years and months.
[3] Average 53 weeks ended January 3, 1953, all tables.
[4] Five weeks, all tables.
[5] Other than for conversion into any form of finished steel listed above
[6] Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table.
[8] Included with alloy steel.

Personal

DR. ALWYN WILLIAMS, lecturer in geology at the University of Glasgow, has been appointed to the Chair of Geology at Belfast University.

MR. R. RANIE is retiring from the position of manager of the London repair works of Harland & Wolff, Limited, with which he has been associated for 32 years. He is succeeded by the deputy manager, MR. C. A. M. GRAY.

COL. A. C. R. WAITE is relinquishing the deputy chairmanship of the Austin Motor Export Corporation, and has reassumed the position of London director of the Austin Motor Company, Limited, 479, Oxford Street, London, W.1.

MR. ALEXANDER BLACK, who has been works engineer of William Jessop & Sons, Limited, the Sheffield steelmakers, for the past six years, has been appointed works engineer of the Cleveland Steel & Iron Company, Middlesbrough.

MR. AMBROSE FIRTH, chairman of Brightside Foundry & Engineering Company, Limited, Sheffield, has been presented with a long-service certificate marking his 40 years with the firm. He is believed to be the first chairman of the company to receive the certificate, which is the 70th to be presented.

MR. LEONARD YATES, secretary of Pickford, Holland & Company, Limited, brick and refractory manufacturers, of Sheffield, has been appointed commercial manager of the company. Both he and MR. J. F. MARCER, assistant general works manager, have been appointed local directors. MR. C. JAMES succeeds Mr. Yates as secretary.

SIR H. B. ROBIN ROWELL, chairman of R. & W. Hawthorn, Leslie & Company, Limited, Hebburn, announced at the annual presentation of prizes and awards to apprentices recently, that MR. J. BULMAN, a director of the firm and managing director of the engineering department, had been appointed managing director of the shipyard.

MR. C. E. KING has tendered his resignation as a director of Vauxhall Motors, Limited, and as director of engineering, effective from to-day, because of his uncertain health, which necessitates rest and remedial treatment. At the request of the company, Mr. King has agreed to act as an engineering consultant and, in that capacity, will be available to the Vauxhall organization.

DR. P. DUNSHEATH and MR. G. C. R. ELEY have been reappointed as part-time members of the London Electricity Board by the Minister of Fuel and Power. Mr. W. J. H. Wood is retiring on completion of his term of office. Mr. E. A. Mills who, as already announced, relinquishes the deputy chairmanship of the Board to-day, will remain on the Board as a part-time member.

MR. V. DELPORT, from to-morrow, will relinquish his duties as managing director of the Penton Publishing Company, Limited, a post which he has occupied for 30 years. He will retain his connection with the company as director and treasurer, and will continue his activities as representative of *Foundry* and other Penton journals. Mr. Delport will be succeeded as managing director by Mr. J. C. G. Crump, previously a director.

Obituary

MR. R. H. BURROW, a director of Spencer Abbott & Company, Limited, fuel distributors, of Birmingham, died on December 17.

MR. SAMUEL JONES, for many years a director of the Midland Steel Company, Limited, died at his West Bromwich home on December 16 at the age of 82.

PROF. GUSTAV BAUER, the well-known German marine-engine designer, has died at the age of 82. He gave his name to the Bauer-Wach exhaust steam turbine.

MAJOR-GENERAL SIR NEILL MALCOLM, who died recently, was chairman of B.K.L. Alloys, Limited, Birmingham, and was also on the boards of several other companies. Sir Neill, who was born in 1869, had a distinguished military career.

THE DEATH OCCURRED on December 16 of MR. HARTLEY WATERHOUSE, of Keighley, at the age of 83. Up to three years ago Mr. Waterhouse was chairman of Waterhouse (Manchester), Limited, textile-machinery manufacturers, of Haworth and Cross Hills, near Keighley, and up to the time of his death was chairman of Frederick Greenwood & Sons, of Rochdale.

MR. WILLIAM AUBREY WILLIAMS, who died at his residence in Cardiff, on December 16, was a director of John Williams & Sons (Cardiff), Limited, and a member of the executive committee of the National Association of Iron and Steel Stockholders. He was a well-known personality in the Institute of British Foundrymen, and amongst shiprepairers, steelmakers, metal-window makers, architects and contractors. His spare time was devoted to masonic and public-health activities.

THE DEATH is announced, at the age of 85, of MR. S. H. HEYWOOD, chairman of S. H. Heywood & Company, Limited. He was the founder of this company and for many years its chairman. It was largely as a result of his pioneering of electric hoist blocks that the organization grew from a small business to attain its present position as one of the leading manufacturers of electric cranes in the United Kingdom. He was also a director for many years of B. R. Rowland & Company, Limited.

MR. J. HOGAN, who was export sales adviser of British Insulated Callender's Cables, Limited, until his retirement a few months ago, died recently. He joined the former Callender's Cable & Construction Company, Limited, in 1902, and, after serving his apprenticeship, entered the sales and estimating department in London, where he later specialized in oversea contracts. In 1923 he took charge of the oversea power cables department, and, later, on its formation, of the oversea sales and estimating department. He served in this capacity until his appointment as export sales adviser a few years ago.

THE DEATH has occurred of MR. WILLIAM WHITTINGHAM, who for many years had been prominently associated with industry in the Midlands. Mr. Whittingham, who was 62, journeyed to London on December 9 to attend a meeting of the Central Council of the British Iron and Steel Federation, and was taken ill soon after his arrival. He was admitted to hospital later in the day, but his condition gradually deteriorated, and he died the following day. He was secretary of the employers' section of the Midland Iron and Steel Wages Board and the South Staffordshire Iron Masters' Association, and was a director and secretary of John Bradley & Company (Stourbridge), Limited, ironfounders, and the Harts Hill Iron Company, Limited, having been with the former company since 1920.

News in Brief

LORD HIVES, chairman and joint managing director of Rolls-Royce, Limited, officially opened Littleover Village Hall, near Derby.

IT IS ANNOUNCED that the Sheffield steel firm Darwins, Limited, has bought the denationalized Sheffield Forge and Rolling Mills Company, Limited, for £420,000.

IT IS REPORTED from Venezuela that a new electric furnace of 45,000 tons annual capacity is to be installed by Siderurgica Venezolana S.A., Caracas, for the reduction of scrap.

CHARLES W. IRELAND & SON, scrap merchants, Chapel Street, Burnbank, have purchased the Greenfield Works of Campbell, Binnie, Reid & Company, engineers, for additional accommodation.

MR. A. D. GATENBY and MR. J. A. DANIELLI have been appointed directors of H. Kaufmann, Limited, as from to-morrow. Mr. H. Watson has retired from the Board after 25 years' service.

THE ANNUAL STAFF DINNER and social of Brown's Foundry Company, Limited, Derby, was held in the Albert Rooms, Derby. Presentations were made by the directors and staff to four men whose service to the firm totalled 174 years.

HINXTON HALL, a mansion near Cambridge, and the surrounding land, has been purchased by Tube Investments, Limited. It is understood that a large outlay will be made in adapting and equipping the property for fundamental research.

IMPORTS OF IRON ORE to the River Tyne this year are expected to be over 750,000 tons, which would exceed the highest total for 40 years—726,548 tons in 1913. At the end of November the intake of ore had reached 708,642 tons.

SHOTTS IRON COMPANY, LIMITED (in voluntary liquidation)—A third distribution of 9s. per 10s. share will be made on February 15. A circular giving instructions will be issued in due course. The first was 24s.—and the second 6s.—per share.

A PLAN proposed by Nottingham University to develop the engineering and scientific departments over the next 10 years will cost about £1,200,000. Under the scheme the number of students in the departments will be increased from 285 to 830.

THE SECRETARIES of the Association of Bronze and Brass Founders report that Mr. Mundell represented the Association at an enquiry held to investigate the application of Hinckleys, Limited, to develop moulding-sand deposits at Congleton, Cheshire, which had been opposed by the Cheshire County Council.

TWELVE THOUSAND oil heaters left Birmingham Airport for Brussels on December 16, part of a large order secured by John Harper & Company, Limited, of Willenhall, against strong German and other competition. Previous consignments have been sent here by sea, but air transport is no new thing for this company.

STAVELEY COAL & IRON COMPANY, LIMITED—At the annual meeting held recently, Mr. T. A. McKenna, the chairman, emphasized that the capital dividend of £1 a share, free of tax, absorbed almost all the capital surpluses which at the end of the financial year were capable of distribution to stockholders without attracting tax in their hands.

MR. A. DYSON, chairman of the company, presided at the staff dinner and dance of W. G. Allen & Sons (Tipton), Limited, colliery engineers, steelmakers, etc., held at Dudley Zoo recently. The toast of the company was proposed by Mr. R. A. McMullen, agent-general for the Government of Alberta, Canada, who was guest of honour.

ENGLISH ELECTRIC COMPANY, LIMITED—The directors have announced that £130,300 (nominal) 4½ per cent. debenture stock 1972-77 was drawn on December 8 for redemption. The redemption will be effected at par on February 1, 1954. Accordingly, after taking the above redemption into account, the outstanding 4½ per cent. debenture stock 1972-77 will, after February 1, amount to £5,302,382.

THE ANNUAL MEETING of the Standard Motor Company, Limited, on December 15, brought together the only two surviving members of the company's first Board of directors, Mr. R. W. Dana, and Mr. C. J. Band. Standard Motors, which reached their 50th anniversary this year, became a public company in 1912 and since that year both Mr. Band and Mr. Dana have maintained their association with it.

THE DUDLEY-AREA COMMITTEE of the National Union of Manufacturers is pressing for the withdrawal of the Notification of Vacancies Order and has resolved that it "feels that now the claims of the rearmament programme on the labour force have been satisfied, the necessity for the Order no longer exists and it should be abolished with a consequent reduction of work on staffs of industry and employment exchanges."

FOR THE FIRST TIME an electro-magnet was used recently at Leith Docks to discharge a ship's cargo of scrap metal into wagons. The magnet, which weighed 2½ tons, was hired by Leith Dock Commission to assist in the discharge of 9,500 tons of scrap metal from the Italian shop Albaro at the Imperial Dock. Altogether 370 tons were unloaded with the help of five cranes, one of which held the magnet.

CHARLES W. IRELAND & SON, scrap merchants, of Hamilton (Lanark), have purchased the Greenfield Works of Campbell, Binnie, Reid & Company, colliery engineers. The new premises will be used principally for the firm's scrap-metal business, but it is intended to carry on the engineering activities, which at present provide employment for about 20 men, who are engaged mainly in the production of washing plant.

A LOCAL COMMITTEE of the British Productivity Council has been formed in Paisley. The Council are supported by the Government, nationalized industries, employers, and the trade unions. Chairman of the committee is Mr. R. H. Millar, director of J. & P. Coats Limited, and the vice-chairmen are Mr. D. S. M. Eadie, of Eadie Bros., Limited, and Mr. J. McCorkhill, of the National Union of Tailors & Garment Workers.

THE FIRM OF CHARLES CLARK & SONS, LIMITED, which the Rubery Owen organization has just acquired, was founded in Wolverhampton in 1843 and taken over in 1913 by Mr. J. H. Barnett, who extended it to include a similar business at Shrewsbury, in 1947. Mr. Barnett, who was the sole owner of the business until the present change, has a long association with the Austin Motor Company, having been a pupil of Lord (then Mr. Herbert) Austin at the Wolseley works at Adderley Park, Birmingham.

MR. WILLIAM G. GIBB, director and general manager of Beckett & Anderson, Limited, engineers, Rutherglen, a subsidiary of the Coltness Iron Company, Limited, has been appointed managing director of the parent company. He succeeds Mr. John Williamson, who retires at the beginning of next year, but who will remain a member of the Board and act in a consultative capacity. Mr. Adam Bryson, secretary of the Coltness Com-

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News in Brief

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pany, is retiring today and will be succeeded by Mr. George Wilson.

INDIAN IRON & STEEL CORPORATION—The general meeting was held in Calcutta yesterday, at which it was proposed the meeting be adjourned *sine die*, as owing to conditions that have prevailed at works at Burnpur it has not yet been possible to complete the audit of the accounts for the year ended March 31, 1953. If this is approved, the directors' report and accounts for the period, with remaining business on the agenda, will be considered at the adjourned meeting which will be held as early as possible.

SIR EDMUND HILLARY, of Everest fame, with Lady Hillary, visited recently the works of Platers and Stampers Company, Limited, City Road, Derby, and were welcomed by the managing director, Mr. S. Field. Afterwards a tour of the various departments was made, and the operations of making pressure cookers inspected. Later, Sir Edmund told the workpeople that part of the equipment taken on their Everest expedition was a pressure cooker manufactured by the firm, and that in the Himalayas it had been used at a height of 21,000 ft.

ALL PRODUCTIVE WORKERS at the Darlaston (Staffs) engineering works of Rubery, Owen & Company, Limited, who ignored the token strike call on December 2—a total approaching 4,000—have received a special bonus. Excluding staff personnel, who were not due to take action in any case, they represented about 90 per cent. on the factory payroll. The bonus, about £1 for men and slightly less for women and boys, was additional to the traditional gift of £2 which the company is paying as Christmas presents to all workers, strikers or not.

REFERENCE to the effect of the steel shortage on the shipbuilding industry was made by Sir Frederick Rebbeck, chairman and managing director of Harland & Wolff, Limited, Belfast, when he spoke at the launch of the British Corporal, a 14,000-ton dw. motor-driven oil tanker. Sir Frederick said that the building of 15 ships had been visualized for the company's Belfast and Govan shipyards this year, but because the appropriate steel supply was not available at the proper moment the full programme could not be carried out, and only 13 ships would be launched.

AT A LUNCHEON aboard the Israel ship Tamar in Glasgow on Friday, Mr. M. Keren, British agent for the Zim Navigation Company, Limited, announced that his company intended placing orders for new shipping at U.K. yards. He indicated that at least one of these ships would be built on the Clyde, and suggested that one Scottish order would be for a passenger ship. Mr. Keren also disclosed that the Israel Government had given approval to the company to place orders for four ships with German yards under the Israel-German "reparations agreement." Three of the ships had been ordered last week and would be ready in 1955.

CERTAIN METALS, metal alloys, raw materials, and chemicals are included in a list issued by the Board of Trade of additions to the goods that can now be imported without licence from (*a*) any country and (*b*) any country other than the dollar area. Import licences for most of these goods have already been granted fairly liberally and the control is being relaxed to give importers and users a freer choice of sources of supply and to avoid the need to obtain a separate import licence for each consignment. Details are given in Notice to Importers No. 608, which was issued by the Import Licensing Branch of the Board of Trade on December 16.

THE MINISTER OF FOOD, Major the Rt. Hon. Gwilym Lloyd-George, M.P., announces that control over processing, sale and use of some of the less important oilseeds and edible oils will end tomorrow, and private imports will again be permitted. The oilseeds and oils to be de-controlled are soya beans, shea nuts, kapokseed, soya-bean oil, shea butter or oil, kapokseed oil, maize oil, herring oil, pilchard oil, and seal oil. The Oils and Fats (No. 2) (Amendment No. 2) Order, 1953, has been made to give effect to this decision. The arrangements under which private imports will be allowed after January 1, 1954, are being announced in a notice to importers issued by the Board of Trade.

AN ANNUAL PRIZE for the most distinguished student in the higher Natural Philosophy class for engineering students at Glasgow University is to be awarded as a result of a gift of £250 by Miss Jessie M. Younger, in memory of her brother, who had been associated with the Department of Natural Philosophy for 31 years. Gifts received by the university include equipment from Bruce Peebles, Limited, to enable the magnetic properties of electrical sheet steel to be demonstrated. Two fellowships of £600 each for a period of one year have been granted by Imperial Chemical Industries, Limited, to enable research work to be carried out at the university on the subject of industrial relations.

SHEEPBRIDGE ENGINEERING, LIMITED, Chesterfield, by agreement with the United States Pipe and Foundry Company, Special Products Division, Burlington, N.J., are to employ under licence the "Burlington" process in the spinning of cast piping in high-alloy steels and nickel-base alloys. Heat-resisting and corrosion-resisting steel alloys will also be spun in long castings by this process for ultimate use as rollers in heat-treatment furnaces, run-out rolls for steel mills, etc. A feature of the process is the use of a special refractory spray on the walls of the mould that helps the metal to flow evenly throughout its length, thereby eliminating a principal difficulty in normal British practice. Experimental, 10-foot long cylinders 8-in. dia. have already been cast successfully. The method will be employed by Sheepbridge Steel Castings, Limited, Sutton-in-Ashfield, and Sheepbridge Stokes, Limited, Chesterfield.

MANUFACTURERS "who seemed to expect Government Departments to tell them how to run their own businesses" were criticized by Mr. Barry Kay, Midland Regional Controller of the Board of Trade, in Birmingham on December 15. He pointed out that the manufacturer's job is to go and get orders, while the Board's job is to create the necessary "climate." "We have neither the staff nor the equipment, nor has it ever been the intention of Government Departments to tell industry how to get orders and carry out its export trade." Mr. Kay was speaking at a Press conference following the Regional Board for Industry meeting. At the monthly meeting of the Board, it was stated that the number of unemployed in the Midlands in mid-November (14,352) was fewer than at any time since April, 1952. Unemployed in the Midland Region now represent 0.7 per cent. of the working population, compared with 1.5 per cent. for the country as a whole.

Latest Foundry Statistics

According to the British Bureau of Non-Ferrous Metal Statistics the output during October of copper-base castings was 4,923 tons, or 40,488 tons for the 10 months of the year. In 1952 the corresponding figure was 56,086 tons.

Raw Material Markets

Iron and Steel

It is becoming manifest that the further expansion of pig-iron production is an urgent necessity. Foundrymen are getting reasonable supplies, but the maintenance of the current high rate of steel production calls for bigger tonnages of basic iron, and at best withdrawals from stock can only afford a temporary measure of relief. It is a clear indication of a shortage when Continental pig-iron is being shipped to the Tees, which is the centre of the biggest pig-iron producing area in the country. Larger tonnages of scrap are also being used in the furnace mixtures and pressure for additional supplies from both home and oversea sources is relentless.

A much easier trend is developing in regard to supplies of steel semis. Requirements of the re-rollers are on a reduced scale and on the other hand much more abundant supplies of billets, blooms, sheet bars, and slabs are available from home sources. Naturally, the first reaction has been a sharp decline in the imports of this material from Western Europe, and as ample supplies of prime billets are available from home sources, makers are finding it less easy to dispose of defectives. It is hoped that the reduction of £2 per ton announced earlier in the month will attract buyers after the holidays.

Most of the rolling mills were idle for three or four days at Christmas, affording opportunities for the repair gangs and also to accumulate a good supply of ingots. The mills have substantial programmes to keep them busy during January and February. Beyond that period the outlook is uncertain. Steel production in the Schuman countries this year is about 5 per cent. below that of 1952, and the export cartel has just announced a further cut in prices. Clearly, the steel market is softening, but with modernized plant and low production costs, British steelmakers are not unduly perturbed.

Non-ferrous Metals

Markets closed last week on the eve of Christmas after one session at midday and reopened on Monday to cover the four last days of 1953: trading will be suspended on New Year's Day. Considering the approach of the holiday season, business was quite active up to Christmas and, generally speaking, the close was firm, especially in copper, in which the turnover amounted to some 500 tons. Zinc was steady, but closed 5s. lower for December and 15s. down for March, the backwardation standing at £1, which reflects the continuing scarcity of early metal. In lead, however, the spread between December and March narrowed somewhat to 35s., while the two positions were down 7s. 6d. and 2s. 6d. respectively. Tin lost some ground, being £3 down for cash and £4 10s. lower for three months. In the United States, business in Chilean copper was reported down on the basis of 30 cents, but the Custom smelters cut their purchase prices for copper scrap by ½ cent per lb., so that in due course we may suppose that some reduction will take place in their selling price for refined copper.

Details of copper consumption, etc., during November, published by the Copper Institute in New York, show that production of crude copper in the U.S.A. was 87,000 short tons, against 92,300 tons in October, while in refined quality the corresponding figures were 119,230 tons and 126,100 tons. Deliveries of refined copper to consumers in November amounted to 100,900 tons, against 110,500 tons in October. Stocks of refined copper in producers' hands at November 30 were 93,274 tons, compared with 84,303 tons at October 31. Outside the United States stocks were 261,096 tons—practically unchanged from a month earlier. Output of crude copper was 101,153 tons in November, against 116,488 tons in October and of refined 79,009 tons, compared with 92,632 tons. Deliveries to fabricators, at 80,009 tons, were nearly 10,000 tons higher than in October, a gain which offset the setback in the United States, where, however, it looks as though business in copper is hardly what it was and may be curtailed even further during the coming weeks.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* December 22, £230 to £230 10s.; December 23, £230 10s. to £231; December 24, £231 to £232; December 28, £231 10s. to £232; December 29, £233 10s. to £234; December 30, £234 to £235.

Three Months: December 22, £218 10s. to £218 15s.; December 23, £218 5s. to £218 10s.; December 24, £218 to £218 10s.; December 28, £218 5s. to £218 10s.; December 29, £221 5s. to £221 15s.; December 30, £221 to £221 10s.

TIN, Standard—*Cash:* December 22, £642 10s. to £645; December 23, £642 10s. to £645; December 24, £648 to £649; December 28, £645 to £647 10s.; December 29, £650 to £655; December 30, £660 to £662 10s.

Three Months: December 22, £625 to £626; December 23, £626 to £627 10s.; December 24, £627 10s. to £628; December 28, £626 to £627; December 29, £632 10s. to £634; December 30, £635 to £637 10s.

ZINC—*December:* December 22, £74 15s. to £74 17s. 6d.; December 23, £74 7s. 6d. to £74 12s. 6d.; December 24, £74 10s. to £74 15s.; December 28, £74 10s. to £75; December 29, £74 12s. 6d. to £75; December 30, £74 15s. to £75.

March: December 22, £73 15s. to £74 5s.; December 23, £73 7s. 6d.; to £73 12s. 6d.; December 24, £73 10s. to £73 15s.; December 28, £73 10s. to £73 15s.; December 29, £73 10s. to £73 15s.; December 30, £73 15s. to £74.

LEAD—*December:* December 22, £89 5s. to £89 10s.; December 23, £89 10s. to £90; December 24, £87 17s. 6d. to £90; December 28, £89 12s. 6d. to £89 15s.; December 29, £89 15s. to £89 17s. 6d.; December 30, £89 10s. to £89 12s. 6d.

March: December 22, £87 10s. to £87 15s.; December 23, £88 to £88 5s.; December 24, £88 to £88 5s.; December 28, £88 to £88 5s.; December 29, £88 5s. to £88 10s.; December 30, £88 10s. to £88 15s.

India's New Steel Plant

It was reported from Delhi on December 21 that articles of association for a private Indo-German limited company to be known as Hindustan Steel, Limited, were signed on that day. Mr. A. K. Chanda, secretary of the Ministry of Production, signed on behalf of the Government, and Herr H. Seyboth and Dr. W. Thun for the German combine of Krupps and Demag. At the same time an agreement was signed providing for technical consultation for the planning, erection, and initial operation of the new steel plant, which will have an annual capacity of 500,000 tons, capable of expansion to 1,000,000 tons. It is expected that it will be ready four years after a site has been approved, and Krupps and Demag will continue as consultants for a further three years.

The new company has an authorized capital of Rs.1,000 million. The capital cost of the plant will be about Rs.712,500,000, and it is to be incorporated with an initial capital issue of Rs.500,000, of which Rs.100,000 will be contributed by the German firms.

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

(*Delivered unless otherwise stated*)

December 30, 1953

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £13 18s. 0d.; Birmingham, £13 11s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £16 14s. 6d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £17 0s. 3d.

Scotch Iron.—No. 3 foundry, £16 11s. 0d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £18 3s. 0d.; South Zone, £18 5s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £19 3s. 0d.; South Zone, £19 5s. 6d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £16 12s. 0d.; Scotland (Scotch iron), £16 18s. 6d.; Sheffield, £17 13s. 0d.; Birmingham, £17 19s. 6d.; Wales (Welsh iron), £16 18s. 6d.

Basic Pig-iron.—£14 6s. 6d. all districts.

FERRO-ALLOYS

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

Ferro-silicon (6-ton lots).—40/55 per cent., £53 10s. 0d., basis 45 per cent. Si, scale 21s. 6d. per unit; 70/84 per cent., £82 10s. 0d., basis 75 per cent. Si, scale 23s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £165 0s. 0d. to £181 0s. 0d. per ton; 38/40 per cent., £229 0s. 0d. to £235 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 13s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 16s. 0d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s. 0d., basis 60 per cent. Cr, scale 28s. 3d. per unit; 6/8 per cent. C, £80 17s. 0d., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. 0½d. per lb. Cr; max. 1 per cent. C, 2s. 1d. per lb. Cr; max. 0.15 per cent. C, 2s. 2d. per lb. Cr; max. 0.10 per cent. C, 2s. 2¼d. per lb. Cr; max. 0.06 per cent. C, 2s. 2½d. per lb. Cr.

Cobalt.—98/99 per cent., 20s. 0d. per lb.

Metallic Chromium.—98/99 per cent., 6s. 3d. to 6s. 9d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 12s. 6d.; tested, 0.08 to 0.25 per cent. C (100-ton lots), £26 2s. 6d.; hard (0.42 to 0.60 per cent. C), £28 0s. 0d.; silico-manganese, £33 16s. 0d.; free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s. 0d.; case-hardening, £33 0s. 0d.; silico-manganese, £34 17s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic soft up to 0.25 per cent. C, £29 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 0s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £30 6s. 6d.; boiler plates (N.-E. Coast), £31 14s. 0d.; floor plates (N.-E. Coast), £31 15s. 6d.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £28 9s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £32 4s. 6d.; flats, 5 in. wide and under, £32 4s. 6d.; hoop and strip, £32 19s. 6d.; black sheets, 17/20 g., £41 6s. 0d.; galvanized corrugated sheets, 24 g., £49 19s. 6d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £51 14s. 3d.; nickel-chrome, £73 3s. 6d.; nickel-chrome-molybdenum, £80 18s. 3d.

NON-FERROUS METALS

Copper.—Cash, £234 0s. 0d. to £235 0s. 0d.; three months, £221 0s. 0d. to £221 10s. 0d.; settlement, £235 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 27¼d. per lb.; wire, 261s. 6d per cwt. basis; 20 s.w.g., 290s. 6d. per cwt.

Tin.—Cash, £660 0s. 0d. to £662 10s. 0d.; three months, £635 0s. 0d. to £637 10s. 0d.; settlement, £660 0s. 0d.

Zinc.—December, £74 15s. 0d. to £75 0s. 0d.; March, £73 15s. 0d. to £74 0s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £103 10s. 0d.; rolled zinc (boiler plates), all English destinations, £101 5s. 0d.; zinc oxide (Red Seal), d/d buyers premises, £90 0s. 0d.

Lead (Refined Pig).—December, £89 10s. 0d. to £89 12s. 6d.; March, £88 10s. 0d. to £88 15s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 22¼d. per lb.; rods, drawn, 32¾d.; sheets to 10 w.g., 249s. 3d. per cwt.; wire, 29¾d.; rolled metal, 236s. 0d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £165 to £170; B6 (85/15), £205 to £210; BS249, £186 to £190.

Brass (High Tensile).—BS 1400, HTB1 (30 tons), £196 to £205; HTB2 (38 tons), £205 to £210; HTB3 (48 tons), £214 to £220.

Gunmetal.—RCH, 3/4 per cent tin, £190 to £195; BS 1400, LG2 (85/5/5/5), £196 to £200; LG3 (86/7/5/2), £204 to £208; G1 (88/10/2/½), £260 to £263; (88/10/2/1), £251 to £255.

Phosphor Bronze.—BS 1400, PB1 (AID released), £277 to £285 per ton.

Phosphor Bronze Strip etc.—Strip, 347s. per cwt.; sheets to 10 w.g., 368s. 9d. per cwt.; wire, 43¾d. per lb.; rods, 38½d.; tubes, 36¾d.; chill cast bars: solids 41d., cored 42d. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × .056, 3s. 0½d. per lb.; round wire, 10g., in. coils (10 per cent.), 3s. 5½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 4½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 10½d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex warehouse, £61 15s. 0d. Nickel, £483 0s. 0d. Aluminium, ingots, £150 0s. 0d.; aluminium bronze (BS 1400), AB1, £253 to £260, AB2, £266 to £270. Solder, brazing, BS 1845, 2s. lb.; granulated, 2s. 3d. lb.

Forthcoming Events

JANUARY 1

Purchasing Officers' Association

Mid Kent group:—Film evening, 7 p.m., at the offices of Winget, Limited.

JANUARY 2

Institution of Production Engineers

Birmingham graduate section:—Works visit to British Electricity Authority Generating Station, 9.30 a.m., at Nechells, Birmingham.

JANUARY 4

Beeston Boiler Foremen's Association

Film evening, 7.30 p.m., at the Canteen of the Beeston Boiler Company, Limited, Mona Street, Beeston, Notts.

Institute of British Foundrymen

Sheffield and District branch:—"Examples of Loam Moulding as applied to production of Pump Castings and Impellers," by E. Clipson, 7.30 p.m., at the Sheffield College of Commerce and Technology, Pond Street.

Institution of Mechanical Engineers

North-eastern branch:—"Properties and Applications of S.g. Iron," by Dr. A. B. Everest, 6 p.m., in the Neville Hall, Westgate Road, Newcastle-upon-Tyne.

JANUARY 5

Association of Bronze and Brass Founders

Midlands area:—Informal meeting to discuss Advisory Service to be established under Conditional Aid, 12.30 p.m., at the Victoria Hotel, Wolverhampton.

Incorporated Plant Engineers

London branch:—"Transmission Equipment and Bearings," by F. J. Walters, 7 p.m. (preceded by tea at 6.30 p.m.), at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2.

JANUARY 6

Institute of British Foundrymen

Burnley section:—"Shell Moulding," by D. N. Buttrey, 7.30 p.m., at the Municipal College, Ormerod Road.

Institution of Mechanical Engineers

Education group discussion:—"Future Development of the National Certificate and Diploma Courses," 6.45 p.m., at the Institution, Storey's Gate, St. James's Park, London, S.W.1.

Institution of Production Engineers

Wolverhampton section:—Application of Hydraulic Power as an Aid to Productivity," by F. B. Levetus, 7.15 p.m., at the Wolverhampton and Staffs. Technical College.

Manchester Metallurgical Society

"Recent Developments in Magnetic Materials," by A. E. De Barr, 6.30 p.m., in the Lecture Room of the Manchester Central Library.

Purchasing Officers' Association

London students' section:—"Where do the Purchasing Officer's Duties Begin and End?" 7 p.m., at Caxton Hall, Westminster, S.W.1.

JANUARY 7

Institute of British Foundrymen

Lincolnshire branch:—"Aluminium Pattern Equipment by the Pressure-cast Plaster Process," by D. H. Potts, 7.15 p.m., at the Lincoln Technical College.

Institution of Production Engineers

South Wales and Monmouthshire section:—"Increased Productivity by the Use of Compressed Air," by C. M. P. Willcox, 6.45 p.m., at the South Wales Institute of Engineers, Park Place, Cardiff.

Leeds Metallurgical Association

"Applications of Spheroidal-graphite Cast Iron," by Dr. A. B. Everest, 7.15 p.m., at the Chemistry Department, Leeds University.

JANUARY 8

Institution of Works Managers

Notts and Derby branch:—"Problems of My Job," an open evening, 8 p.m., at the Welbeck Hotel, Nottingham.

Manchester Association of Engineers

"Training of Designer-draughtsmen," a discussion, 6.45 p.m., at the Engineers' Club, Albert Square.

Purchasing Officers' Association

East Midlands branch:—"What We Make," 7 p.m., at "The Bell" Hotel, Leicester.

JANUARY 9

Institute of British Foundrymen

Newcastle branch:—"Residual Stresses in Castings," by Dr. R. N. Parkins, 6 p.m., at the Neville Hall, Westgate Road, Newcastle-upon-Tyne.

Scottish branch:—"Core Assembly as a Production Aid to the Jobbing Foundry," by E. H. Beech and J. Hoynes, 3 p.m., in the Royal Technical College, Glasgow.

West Riding of Yorkshire branch:—"Aluminium Casting Alloys," by R. Mercer, 6.30 p.m., at the Technical College, Bradford.

CLASSIFIED ADVERTISEMENTS

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

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

SITUATIONS WANTED

ENGINEERS' PATTERNMAKER (35), sound technical, practical, and foundry experience, organising ability, wishes to contact Proprietor or Manager requiring conscientious Assistant.—Box EP130, FOUNDRY TRADE JOURNAL.

ENERGETIC young Man, 7 years' experience in Foundry progress and production control, seeks position, with opportunity for advancement.—Box EY102, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE—Qualified Metallurgist and Foundryman (34), desires position with progressive company requiring hardworking and active representative, resident Sheffield.—Box T.R. 131, FOUNDRY TRADE JOURNAL.

FOUNDRY WORKS MANAGER (M.I.B.F.), age 45, sound practical experience modern methods of high production in Blackheart, Malleable, Grey Iron, Chilled, Roll and Non-Ferrous Castings.—Box F.W. 132, FOUNDRY TRADE JOURNAL.

METALLURGIST, A.I.M. Full Tech. C. and G., metallurgy, foundry practice. Age 27. Experience: steel, arc and open hearth; iron; cupola, P.F., arc, grey, high duty, S.G. rolls; chilled, grey. Sand control. Initiative, responsibility, development and research.—Box MA125, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order,* 1952.

FOUNDRY FOREMAN required for small Foundry. General engineering and repetition grey-iron castings—2 to 3 tons per day, castings up to 10 cwts. Knowledge of modern production methods, control of green labour, set out pattern plates and tackle. Full particulars of experience, age, and salary required. Leeds (Yorks) area.—Box FF151, FOUNDRY TRADE JOURNAL.

FACTORY SUPERINTENDENT required, West of Scotland. Pipefounders and Engineers require Practical Qualified Engineering Superintendent of New Factory, comprising Foundry and Machine Shop, employing 150 men. Applicant must be engineer of good character and education; strong and fair, with floor management experience. Aged 30/36. Salary: £900, plus pension contributions, and house.—Applications, which will be treated in confidence, write to 02X2, WM. PORTEOUS & Co., Glasgow.

SITUATIONS VACANT—*contd.*

AN experienced FOUNDRY MANAGER required for Light Medium and Heavy Ferrous and Non-ferrous Foundry in the Leeds district. Capacity up to 400 tons finished castings per month. Experience of mechanisation essential. Pension scheme in force. Assistance to procure a house if necessary.—Apply, stating age, experience, and salary required, to Box AE141, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT required for Pipefoundry. Applicant must have experience in Flanged Pressure Pipework and be capable of taking charge of all departments. Applications should state age, experience, and present salary. House can be made available.—Box FS152, FOUNDRY TRADE JOURNAL.

INVESTMENT FOUNDRY.

THE DE HAVILLAND ENGINE CO., LTD., requires a senior man to take charge of and organise the production side of its Investment Foundry. This Foundry is already organised and working, but the production side is to be greatly expanded. Applicants must have the requisite technical qualifications. Previous experience would be an advantage. Salary according to qualifications and experience. Written applications only, giving age and particulars of educational and industrial background, to HEADQUARTERS, Personnel Department, The de Havilland Engine Co., Ltd., Stonegrove, Edgware, Middlesex.

A MODERN plant, operating three foundries and having an established Metallurgical Department, require the services of a qualified METALLURGIST, to undertake investigation and development work. Applicant should have had experience of production methods, and be capable of carrying out close liaison work with allied department. The post offers a wide scope to the successful applicant. Contributory pension scheme and non-contributory life assurance applicable. Excellent canteen and social amenities available.—Write, giving details of experience, qualification, education and age, to BOX AM153, FOUNDRY TRADE JOURNAL.

ASSISTANT METALLURGIST required for Experimental Foundry in the research laboratory of a large Light Alloy Firm in Southern England. The successful candidate will be required to work on the development of aluminium and magnesium base alloys, and should have a good knowledge of sand and die casting techniques with qualifications of the L.I.M. or H.N.C. standard. The salary will be generous and commensurate with qualifications and experience.—Apply to Box AM154, FOUNDRY TRADE JOURNAL.

GRAVITY DIECASTING.—Man required to take charge of production and administration of gravity diecasting foundry as FOUNDRY SUPERINTENDENT. This is a new appointment, and offers good salary to a really capable man having thorough practical knowledge of diecasting and experience in shop management. Preferred age about 35.—Applications in confidence to GENERAL MANAGER, Wm. Mills, Ltd., Friar Park Road, Wednesbury, Staffs.

SITUATIONS VACANT—*contd.*

REQUIRED immediately, FOUNDRY FOREMAN, for Machine Tool Loose Pattern Foundry. Castings up to 7 tons. Essential good organiser, disciplinarian, sound practical man production, and progressively minded. North Midlands.—Box RI134, FOUNDRY TRADE JOURNAL.

FOUNDRY METALLURGIST wanted for Iron Foundry in Glasgow district, to take charge of Cupola and Sand Control.—Box FM142, FOUNDRY TRADE JOURNAL.

METALLURGIST for new Shell-Moulding Steel Foundry required. Melting process of operating High Frequency and Induction-Arc Furnaces necessary. Knowledge of analysis and physical tests essential. Foundry situated in Midlands—Write, stating salary, experience, and earliest commencement date, to Box MF143, FOUNDRY TRADE JOURNAL.

WORKS MANAGER required for large Midland Foundry. Sound knowledge of Malleable and Grey Iron essential. Apply, stating experience, age. Exceptional opportunities.—Box WM155, FOUNDRY TRADE JOURNAL.

A TECHNICAL REPRESENTATIVE is required by Bagshawe & Co., Ltd., Dunstable Works, Dunstable, to handle sales of Malleable Iron Castings. Some practical foundry experience is considered essential. The foundry concerned is of a light repetition character, and previous experience of sales of this type would be an advantage. Applications, which will be treated in confidence, must state full details of experience and salary required.

FOUNDRY FOREMEN. — Vacancies exist at the English Electric Co., Ltd., Rugby, for men, aged 30-40 years, with experience in dry and green sand moulding for castings up to 30 tons in weight. Modern foundry, good conditions. Previous supervisory experience desirable.—Apply in writing to PERSONNEL DEPARTMENT.

BAMFORDS LTD., Agricultural Engineers, Uttoxeter, require Metallurgical Chemist for Foundry producing repetition high duty and light grey iron castings. Applicants should have a sound knowledge of metallurgical analysis and experience in cupola control, sand testing, etc. State age, experience, and present salary.

HIGHLY qualified ENGINEER required, to take charge of organisation responsible for design and sales of foundry plant and associated equipment. Post advertised constitutes key position in internationally known group of engineering companies. Applicants are asked to supply details of experience, qualifications, age, etc.—Box 3908, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

STEEL FOUNDRY FOREMAN required, Sheffield. Accustomed to high quality product. Age about 35 years. Progressive future for suitable applicant.—Write, giving age and qualifications, to Box SF128, FOUNDRY TRADE JOURNAL.

LABORATORY ASSISTANT required by Metallurgical Department attached to large non-ferrous alloy foundries in the London area. A man with foundry experience will be preferred.—Write, giving full particulars, to Box LA108, FOUNDRY TRADE JOURNAL.

FOUNDRY RATEFIXERS.—Vacancies exist at the English Electric Co., Ltd., Rugby, for men with ratefixing experience in iron foundries producing castings up to 30 tons in weight. Good conditions in a modern foundry.—Apply in writing to the PERSONNEL DEPARTMENT.

REPRESENTATIVE required by old-established Midland Ironfounders to sell high grade Grey Iron and Special Duty Alloy Castings.—Write in confidence, Box MA124, FOUNDRY TRADE JOURNAL.

VITREOUS ENAMELLER.—Required for South Africa, capable chargehand for continuous plant. Excellent prospects. —Write, stating age and experience, Box V120, FOUNDRY TRADE JOURNAL.

WANTED.—CHARGEHAND for Grey Iron Foundry handling General Engineering Work.—Write, giving experience and age, and state if married or single.—CARTER WILKINSON, LTD., Kingsfield, Hooley Lane, Redhill, Surrey.

MELTING SHOP SUPERINTENDENT for Factory, West of London. Salary: £700-£800 per annum, depending on qualifications and experience.—Write, giving full details of career, Box MS122, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT, with all-round production experience, used to operating mechanised moulding unit. Fully conversant with both grey iron and alloy iron automotive castings of all descriptions. Must have a thorough knowledge of core-making as well as light and heavy moulding, also cupola practice. Present daily melt 60 tons. First-class conditions, offering permanent position, superannuated. Foundry situate North Midlands.—Box 3916, FOUNDRY TRADE JOURNAL.

WORKS MANAGER.—West of Scotland Pipefounders and Engineers require Works Manager to supervise two Factories employing 350 total personnel. Applicant must be a Qualified Engineer, 35 years of age or over, with Management experience and thorough knowledge of Greensand Flanged Pipework manufacture. Salary: £1,500 per annum, with foreman and staff benefit. Help with housing if necessary. Applications, which will be treated in confidence, should state age, education, training and experience.—Box WM127, FOUNDRY TRADE JOURNAL.

METAL STORES CONTROL.—Man required by Merseyside Non-ferrous Founders to develop and take charge of comprehensive control system. Costing background preferred, with some foundry and metallurgical experience. Salary: £550-£650, according to qualifications. Good pension scheme.—Apply, giving full details, to Box 3891, FOUNDRY TRADE JOURNAL.

PROPERTY

ADVERTISER wishes purchase Established Foundry Supplies or Equipment Business. Willing consider continuance present management. Medium or large business required.—Write Box AW137, FOUNDRY TRADE JOURNAL.

PATENT

THE Proprietor of British Patent No. 629248, entitled "Improvements in and connected with the casting of metal," Offers same for licence or otherwise to ensure practical working in Great Britain. —Inquiries to SINGER, STERN & CARLBERG, 14 E. Jackson Boulevard, Chicago 4, Illinois, U.S.A.

TENDERS

THE Director General, India Store Department, 32/44, Edgware Road, London, W.2, invites tenders for the supply of:—

	Qty. Tons.
76/80% FERRO-MANGANESE (0.3% max. Phosphorous)	380
76/80% FERRO-MANGANESE (0.1% max. Phosphorous)	35

Forms of tender, which are returnable by Friday, 22nd January, 1954, may be purchased at the above address on or after Thursday, 31st December, 1953, at a cost of 10s.

In your application for tender forms please quote reference HN.4847/50.

MACHINERY WANTED

ONE 3-5 cwt. drum type Ladle. Preferably ungeared.
One 10 cwt. Roper type Rack Hoist.
Box WO135, FOUNDRY TRADE JOURNAL.

WANTED.—BMM. RD.5 Jolt Squeeze Turnover. Cap. 1,100 or 1,300 lbs., pattern draw 12 in., table 48 in. by 30 in.—MACMILLAN FOUNDRIES, LTD., 130, St. Albans Road, Watford. Tel.: Watford 6241.

FOUNDRY wishes to purchase small experimental Sand Mill; also hot strength Dilatometer for testing sands at elevated temperatures. Give complete details, together with price required.—Box FW156. FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

ONE Air Pumps TS20 Compressor. 120 c.f.m. at 80 p.s.i. Complete with bed, vee belt drive, 30 h.p. Lancashire Dynamo Motor, 440 volts, 3-phase, a.c. Ellison starter.
Box FS136, FOUNDRY TRADE JOURNAL.

COMPLETE Cupola-Converter Steelmaking Plant, now producing approximately 300 tons liquid steel weekly, will be for disposal in four months time. The unit consists of two 84 in. outside dia. Cupolas, two Cupolettes, six Converter Bodies, complete with Fans, Blowers, Ladles and subsidiary equipment. The plant can now be inspected whilst operating.—Box CC110, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE—*contd.*

600
AIR COMPRESSORS.

THREE 260-c.f.m., Broom & Wade. 4-cylinder watercooled; 100 lb. w.p. Arranged "V" belt driven from 50/55-h.p. Mawdsley S/R Motor, 400/3/50, with Ellison control gear.
Two 80-c.f.m., Reavell. Vert., twin cyl., watercooled, 100 lb. w.p.; "V" belt driven from 25-h.p. S/R Motor, 400/3/50, with stator/rotor Starter.

GEORGE COHEN
SONS & CO., LTD.
WOOD LANE, LONDON, W.12
Tel: Shepherds Bush 2070
and STANNINGLEY nr. LEEDS
Tel: Pudsey 2241

SAND Preparing Plant, comprising 6 ft. dia. sand mill with bucket loading gear, and fitted with discharge aerator, in practically new condition, with a.c. 3-phase motors. Cheap for quick sale.
New Centre Axis Tilting Furnace. 600 lb., oil-fired, with Morgan Oil Burner and new Keith Blackman a.c. Blower. £375.
New motorised Ingersoll-Rand, three cylinder, air-cooled, two-stage Compressor, with inter-cooler. £200.
Portable Electric Sieve, a.c. motorised. £33.
August Sand Dryer. £30.
Over 40 Bale-out Furnaces in stock, cheap.
Large stock of Air Receivers, at reasonable prices.
New Broomwade Compressors.
New Keith Blackman Fans.
Morgan Tilting Furnaces.
4 ft. dia. Sand Mill, motorised.
Two new and unused Cupolas, 31 in. dia. and 36 in. dia., with new blowing fans and linings.
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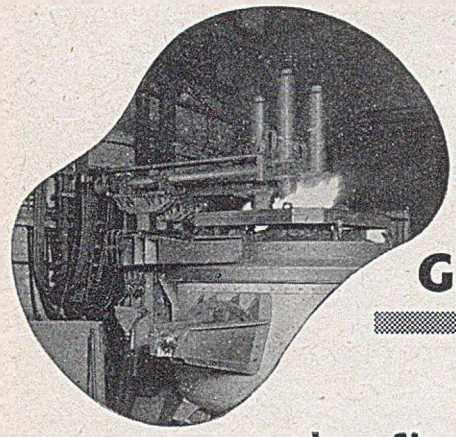

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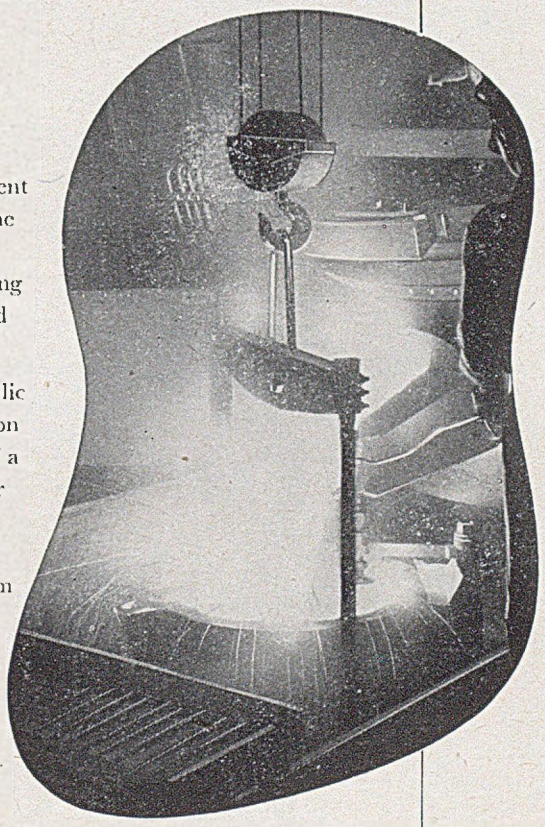

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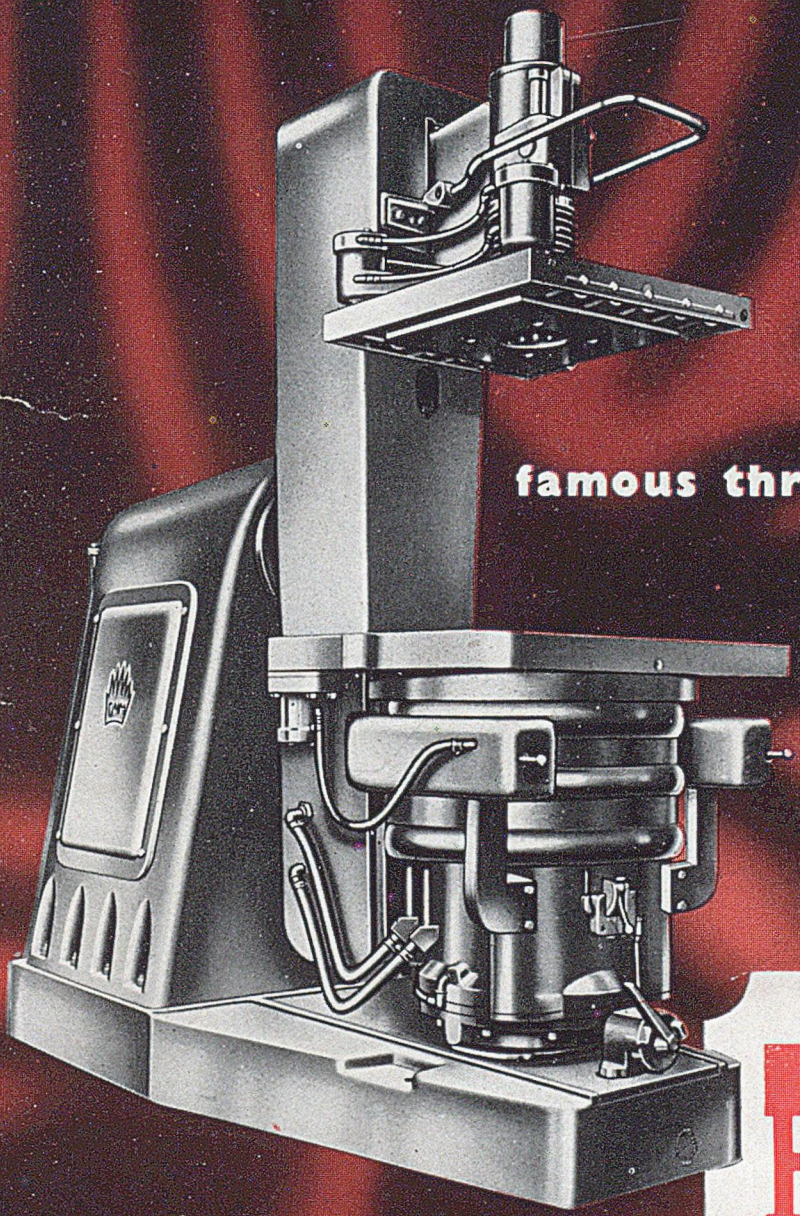

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