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Technological Education

According to a Report of the National Advisory Council on Education for Industry and Commerce, entitled "The Future Development of Higher Technological Education,"* there is a pressing need in industry for more and better-trained technologists. The Report, which is published with the object of evaluating public opinion on the subject, suggests the establishment of a body of assessors to be known as the Royal College of Technologists, which will approve of the courses and endorse the results of examinations organised by the various technical colleges of the country. The standard for these examinations is to be the same as a University first degree or those organised by the great professional institutions. In plain English, this means the according of a sort of degree to those who have never passed the Matriculation examination or its equivalent. Actually, the recommended awards are for the first stage an Associateship; for the second, Membership, and for those further distinguishing themselves in the field of technological research—Fellowship. No indication is given as to the unanimity of the Report, though there has been verbal assurance that this was virtually the case. The Report tabulates in an Appendix the various bodies which were consulted and we are sure that not in every case was approbation accorded.

It appears to us that instead of worrying about the provision of technologists, the Council would have been better occupied in so improving primary and secondary education, that a reasonably high percentage of youths could acquire essential background knowledge. This might enable them to satisfy the examiners in those subjects fundamental to all professions as up to the present expressed by "matriculating." Whilst primary schools are badly housed and understaffed, the solution of the problem of the provision of high-grade technologists will be retarded and, as basic education is so much more urgent, the Ministry of Education could well leave technology to develop on its traditional—and, we suggest, not unsuccessful lines.

The need of better general education is even shown in the Report itself, where such jargon as "first-degree level" or "post-graduate level" and the use of expressions such as "vitally necessary" or "urgently necessary" and so forth indicate a departure from the best standards of English. It is of some importance that if the scheme outlined is to be a success the award envisaged must merit public approbation. We doubt if the proposals will be consummated, unless technical colleges are in a position to accord to the teaching staff, the freedom and general standing of University professors, which seems unlikely. Easily obtained "degrees" are likely to have adverse repercussions on technology *vis à vis* the other professions, and we counsel that the suggestions outlined in the Report be left to lie on the table and attention be given instead to implementing more energetically the provisions of the Butler Report.

* H.M. Stationery Office, price 1s. 0d.

Contents

I.B.F. National Works Visits

Successful Inaugural Function at Birmingham

ON OCTOBER 6, the Birmingham branch of the Institute of British Foundrymen acted as hosts for the first day's programme of works visits open to members of the Institute from all over the country. More than 200 participated, including the principal officers of the Institute, drawn from places as far apart as Newcastle-upon-Tyne, and South Wales. In all, fourteen foundries in the Midlands area were visited; eight parties being arranged and grouped as shown in the Table below.

On arrival at the morning rendezvous (Imperial Hotel, Birmingham) the visitors formed themselves into the various parties, each under the wing of a steward (from the branch council), and moved off in coaches to the works chosen. At the close of the morning visit, luncheon was provided in some cases at the firm visited and in others at a local hotel. Transport was then by coach to the works for the afternoon part of the programme. At the conclusion tea was served, the coaches returning to the Imperial Hotel in the early evening. Brief descriptions of the establishments visited are printed elsewhere in this issue.

Evening Programme

The majority of the members who had participated in the day's visits re-assembled at the Imperial Hotel, Birmingham, for dinner and a smoking concert, with Dr. H. T. Angus, Birmingham branch president, in the chair. The gathering was informal, but the occasion was used by the home branch to make the presentation of a silver tankard, suitably inscribed, to Mr. J. J. Sheehan, B.SC., A.R.C.SC.I., once its president and now the national president of the Institute. In expressing thanks, Mr. Sheehan referred briefly to the problems of productivity which were to-day before the industry and used the opportunity to join his appreciation with that already expressed by other speakers to the council and members of the Birmingham branch who had organised such a successful function. Mr. R. B. Templeton, past-president of the Institute, also received congratulations for having fostered during his term of office the idea of holding National Works Visits, the first of which had been held that day. The programme was concluded by entertainment. The whole event was acclaimed an unqualified success, and its inclusion annually in the general programme of the Institute was enthusiastically supported. The London branch will be next year's hosts.

Party.	Steward.	Number participating.	Morning visit.	Luncheon.	Afternoon visit.
A	Mr. E. Hunter	28	H. W. Lindop & Sons, Limited, Walsall	George Hotel, Walsall	F. H. Lloyd & Company, Limited, Darlaston
B	Mr. G. R. Shotton	28	Beans Industries, Limited, Tipton	Station Hotel, Dudley	F. H. Lloyd & Company, Limited, Darlaston
C	Mr. T. H. Weaver	22	William Mills, Limited	New Inns Hotel, Handsworth	Simplex Electric Company, Limited, Oldbury
D	Mr. D. M. Mo r	30	Midland Electric Manufacturing Company, Limited, Tyseley	Airport Hotel, Elmdon	Ford Motor Company, Limited, Leamington Spa
E	Mr. J. W. Dews	25	Belliss & Morcom, Limited	Airport Hotel, Elmdon	Sterling Metals, Limited, Nuneaton
F	Mr. T. R. Twigger	26	Austin Motor Company, Limited, Longbridge	Austin Motor Company, Limited	Parkinson Stove Company, Limited, Stechford
G	Mr. H. G. Hall	30	Austin Motor Company, Limited, Longbridge	Austin Motor Company, Limited	Dartmouth Auto Castings, Limited
H	Dr. H. T. Angus	22	Birmingham Aluminium Castings Company, Limited	New Inns Hotel, Handsworth	Rudge-Littley, Limited, and the National Foundry Craft Training Centre at Swan Village

A Visit to B.I.S.R.A. Physics Laboratory

The British Iron and Steel Research Department were very fortunate when they, three years ago, acquired what were factory premises at the back of No. 140, Battersea Park Road. With a planned laboratory, researches tend to occupy the whole of a standardised size of room, but where a building is adapted, there is a wide choice of size, resulting in beneficial isolation. During a rapid tour through the laboratories, our representative found much to bewilder him in the elaborate apparatus that has been evolved. Yet there were quite a few matters of real interest for the foundry technician. In the mathematics department, for instance, a study has been made of transport—an important factor in very large undertakings—one of the objects being the reduction of "shut downs," due to incidence of prolonged bad weather. In another laboratory, there was shown the commercial model of an optical pyrometer of a reliable type which has resulted from work done in the laboratory. Work is being done on the erosion of the walls of open-hearth plant by means of a model which simulates the oil and air passage through the furnace. Fine aluminium powder is introduced and a sticky surface communicated to the roof. The adherence of the powder positions the place of major erosion. The reviewer was reminded of the lessons to be learnt from Mr. Blakeborough's "Sand Storm Secrets" film from which similar conclusions can be drawn. The "star" exhibit was the making of steel rods by a continuous process. An electric furnace provides clean metal from which the slag is automatically separated. It then drops on to a bar plugging up the base of a water-cooled brass die. As the mould fills, the plugs and later the bar are withdrawn downwards into a pit by means of the rotation of a pair of grooved rollers. Some excellent rods 5 ft. long have been made. It appeared to be quite a practical method for the production of solid cast-iron bars. Should any of our readers wish to visit this really interesting series of laboratories they should write to Mr. Max Davies, B.I.S.R.A., 11, Park Lane, London, W.1, for permission.

Jobbing Founding on Scientific Lines

" Awkward jobs our speciality " might well be the motto of J. Hobkirk, Sons & Company. This Bedford foundry has established a reputation for never refusing to tackle a difficult casting, and satisfied customers return to place orders for their more usual, as well as out-of-the run work. Although the business has been built up largely on jobbing founding, mechanisation is applied wherever possible. Care has been taken to develop a team spirit among the employees, and this has been found a great asset in maintaining the quality of products for which the firm is noted.

AMONG THE SUCCESSFUL foundry businesses started after the 1914-18 war is that of J. Hobkirk, Sons & Company, Limited, Bedford. In those now far-off days, launching a new business was a mere matter of acquiring a five-shilling registration form from the Post Office and getting on with the job. On his return in 1919 to civilian life the present managing director, Mr. W. T. Hobkirk, joined forces with his father, Mr. J. T. Hobkirk, who had previously been foundry foreman at W. H. Allen, Sons & Company, Limited, of Bedford, and the company was formed with a very small capital.

Mr. J. T. Hobkirk, then 52, had already had 38 years' practical experience of the foundry trade. He actually worked in a Coatbridge steelworks at the age of 8½, but lost his first job when the Schools Act came into force and he had to return to school. At 14 he was able to re-enter industry and served a seven years' apprenticeship in the foundry trade. At the age of 83 he is still chairman of the firm, in which he continues to take an active and daily interest.

Built on a 2-acre site at Ampthill Road, the establishment now comprises an ironfoundry, non-ferrous foundry, patternshop, various stores, fettling shop, office block and various ancillary buildings, such as canteen and toilet block.

The business has been built up essentially on jobbing founding, a very wide range of castings being produced in grey iron, high-duty iron, high-conductivity copper and practically all non-ferrous alloys, with the exception of magnesium. Castings up to 2½ tons are regularly produced in iron, whilst the non-ferrous foundry has handled copper castings weighing a ton, as well as gunmetal castings up to this weight. At present, the monthly outputs of finished castings of the iron and non-ferrous foundries are about 140 tons and 12 to 15 tons respectively.

Policies of Business

The foundry has weathered three very critical periods, the worst year being 1923, when the net profits were negligible. Somehow these crises were surmounted and the business has been built up gradually but surely in accordance with a planned policy. Making full use of Mr. J. T. Hobkirk's vast practical experience, the partners made a special point of asking for jobs which other foundries were unwilling or unable to handle. They found that by mastering these difficult jobs they opened the door to further business, for once their capabilities were known to the customer, the easy jobs also came along.

A cardinal feature of the company's policy is never to have too many customers in the same line of business on their books, so that output is not affected by the fluctuations of seasonal trades. Thus the regular customers include some of the best-known firms in the electrical-engineering, machine-tool, instrument, gear-making, crane, Diesel-engine and many other industries. In accordance with this policy, the company has made a feature of maintaining close personal contact with every customer and endeavouring to know and understand his special requirements. Whilst, of course, the company prefers repetition jobs, it is understood by all concerned that the same service shall be given to the customer for a single casting as to those with large accounts. A special point has been made of informing customers of the exact position regarding deliveries, with the result that when a customer calls or telephones, he realises that any promise made will be honoured to the best of the firm's ability.

Personnel

On the labour side, careful attention has been given to the selection of employees, the aim being to develop a team spirit and a genuine feeling of pride and interest, especially among the younger men, in the products created in the shops. As the business has grown the directors have taken special care not to lose personal contact with all employees, which is such an invaluable asset to any firm. Several employees have been with the firm since it was founded in 1920 and one man of over 80 still works in the fettling shop, being actively engaged in trimming and finishing non-ferrous castings.

Finally, the company's policy has been based on insistence on quality, even at financial cost. Detailed inquests are held on any jobs which are returned from customers or which do not come up to the high standard insisted upon by the firm. Good castings are frequently sectioned to make sure that soundness is equal to the quality of the finish. In particular, the firm consistently refuses to accept requests to bring down prices by using scrap metals; in fact, no scrap material is used in the non-ferrous foundry under any circumstances, excepting, of course, for runners and shop returns.

Unusual Orders

From its inception the firm has specialised in production of high-conductivity cast copper. During the recent war, certain castings were required

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for the production of switchgear for degaussing equipment. The Admiralty specification called for 80 per cent. conductivity, but as a result of its extensive experience in this particular field, the company was able to step up the conductivity to well over this figure. Also, during the war, the company supplied about a million castings to the American Air Force, not one of which was returned.

The company supplied aluminium castings for the first totalisator erected in Britain and produced all the castings for a model of the "Queen Mary" constructed for test purposes. A very interesting job was undertaken for a firm of instrument manufacturers, who required a sheath to surround a large glass thermometer for an aluminium works. This job had to be produced in cast iron because steel would have corroded too rapidly. To put a core in a casting 4 ft. long, having outside and inside diameters of respectively 1¼ in. and ⅝ in. with one end closed, presented a difficult problem, since no support could be provided and the core had to remain absolutely straight and true. This job proved so successful that regular repeat orders were secured.

Acoustic Properties

About 1923 a very unusual order was received which involved the production of a gramophone horn capable of reproducing a very high note played by Kubelik. A gramophone of the all-wooden type with the horn inside was brought to the company, who lined it with sheet metal. This proved so noisy that some of the other notes could not be heard. The foundry then made an aluminium horn, which was even poorer than the wooden original. Finally, they tried cast iron and the note came through as clear as a bell. Many years later, Mr. Hobkirk was consulted by a firm experimenting with electrical equipment for surgeries, which functioned satisfactorily but made too much noise for an operating theatre. Recalling his experiences with the gramophone, Mr. Hobkirk suggested that the job should be made in aluminium. This shrouded the noise so effectively that a red signal light had to be provided to show the doctor that the instrument was working.

Simplification of Work

The foundry is prepared to tackle any job which it is equipped to handle. Castings capable of standing up to 1,000 lb. per sq. in. pressure are frequently produced in iron, and up to 1,600 lb. per sq. in. pressure in aluminium bronze.

Particular attention is given to the simplification of foundry work in order to relieve the pressure on the skilled moulders by using less highly-skilled labour wherever possible. Any job which it is at all possible to mechanise goes on a moulding machine, and it is surprising how often this can be achieved by co-operation between the foundry and patternshop. For example, a winding drum weighing 15 cwt. for a steam crane used to be made as a long barrel in one piece, but owing to the shortage of skilled moulders the job is now split halfway down its length and mounted on a machine plate for making on a large plain jolter. Reduction-gear housings in cast iron, also weighing 15 cwt., are produced on the same machine. When this pattern was received from the customer it was found that it was too large to fit into an existing steel moulding box, but here the patternshop was able to assist the foundry by reducing the size of the prints to fit the pattern into the box. Certain castings are produced which are finned for cooling purposes, and these were found to present difficulties if moulded in the usual way, as it would have been necessary to dry the mould and then black it. The blacking in such narrow fins invariably spoiled the appearance. The existing pattern parts were, therefore, mounted in suitable frames to form coreboxes, which were then fitted together and formed the mould, being weighted and cast without any moulding-box. These cores were made in suitable oil-sand mixture and required no blacking.

Patterns

The company is badly in need of extra pattern-storage accommodation and one of the next extensions will probably be the provision of a double-storey storage block to conserve floor space. One of the greatest storage problems is presented by moulding-machine boards and wherever possible, to save two plates, one is used with the top and bottom halves of the pattern dowelled and removable from the plate. From the foregoing remarks it will be obvious that one of the main functions of the patternshop is simplification and maintenance of patterns for the foundry. Although the firm is essentially a jobbing foundry, many of the jobs run on for years and, in this case, metal pattern equipment is preferred, but as a compromise the edges of patterns and coreboxes are reinforced with metal sheet.

The equipment of the patternshop has recently been re-organised and modernised, all belting and shafting having been removed and replaced by motorised drives. The present patternshop staff comprises some nine patternmakers and three apprentices. All patternmaker apprentices spend a term in the foundry and conversely moulder apprentices put in a spell in the patternshop. This policy broadens the outlook of the boys and is giving excellent results. All foundry apprentices are encouraged to attend the National Foundry Craft Training Centre, but the biggest problem is to get apprentices at all.

Iron Foundry

The iron foundry is equipped with two cupolas which run on alternate days, each cupola having a nominal capacity of 2 tons per hour. Metal is transported to the various bays on bogies on rails. Electric cranes pick up from the bogies and transport the metal to the various parts of the shop, an exception being one of the moulding machine bays, which is provided with a Roper geared ladle for casting the smaller moulds. The heavy bay is covered by three cranes, one being an electric overhead traveller of 6-ton capacity, and the others 3-ton and 2-ton hand cranes, the medium bay being served by a 2-ton electric and a 2-ton hand crane. Any overflow of metal is poured into a series of pigs which are rammed up every morning from aluminium patterns. The machine-moulding bay is equipped with five plain jolt-type pin-lift machines with pneumatic rammers. Among other castings produced by these machines are 30 sets per day of verge-cutter parts, which the company has been making for many years. East set includes two wheels weighing approximately 40 lb. each, a body and a lid, and various other smaller castings.

Work which is too small to be put on the larger machines is handled on a Pridmore hand machine, which produces about 80 boxes per day. All hand moulders on the larger work are provided with pneumatic hand rammers served from an air-supply point for blowing out moulds as well as spraying them with blacking.

Core Shop

The core shop is located at one end of the iron foundry and each coremaker has an individual bench. The oil-sand is mixed in two Fordath mixers, which are situated next to the openings from the sand bins. These sand bins are filled direct from lorries, as they are located on the outside walls of the foundry. Wherever, possible, and when quantities justify the expense of suitable, well-vented coreboxes, use is made of a Titan core-blowing machine. The largest cores at present being made in this manner are those for the verge-cutter bodies, each core weighing approximately 80 lb., 30 sets being completed in 3½ hrs. All cores up to about 1 cwt. are dried in a coke-fired vertical continuous core-stove, which has a cycle time of 45 minutes. The dried cores are then removed and stored in racks and fed to the moulders as required. Larger cores are dried in bogie-type stoves.

Typical Moulding Features

Features of the ironfoundry practice include the complete elimination of rod feeding and the extensive use of green-sand moulds even for large jobs. The accompanying illustrations show various stages in the production of a 2-ton baseplate cast in green-sand. The sand used was a suitable Erith No. 2, with additions of coaldust, Fulbond and bonding clays. This job took three men two days to produce. A good example of the methods adopted is the manufacture of a toothed roller 6 ft. 6 in. dia., 6½ in. square section and weighing 18 cwt. This job is bedded in green-sand and the mould is finished and cast within the normal working day. The use of green-sand on this particular job has

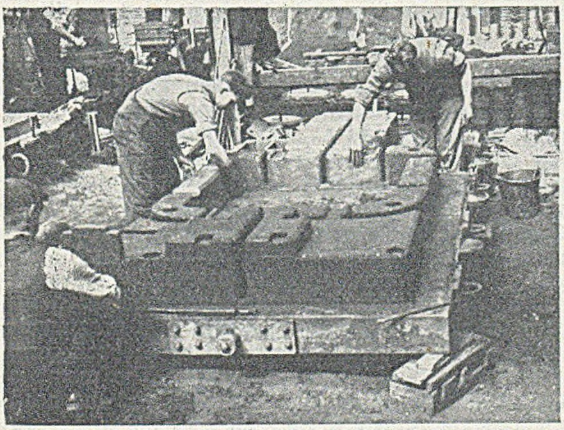

FIG. 1.—*Preparing the Mould for a 2-ton Baseplate Cast in Green-sand.*

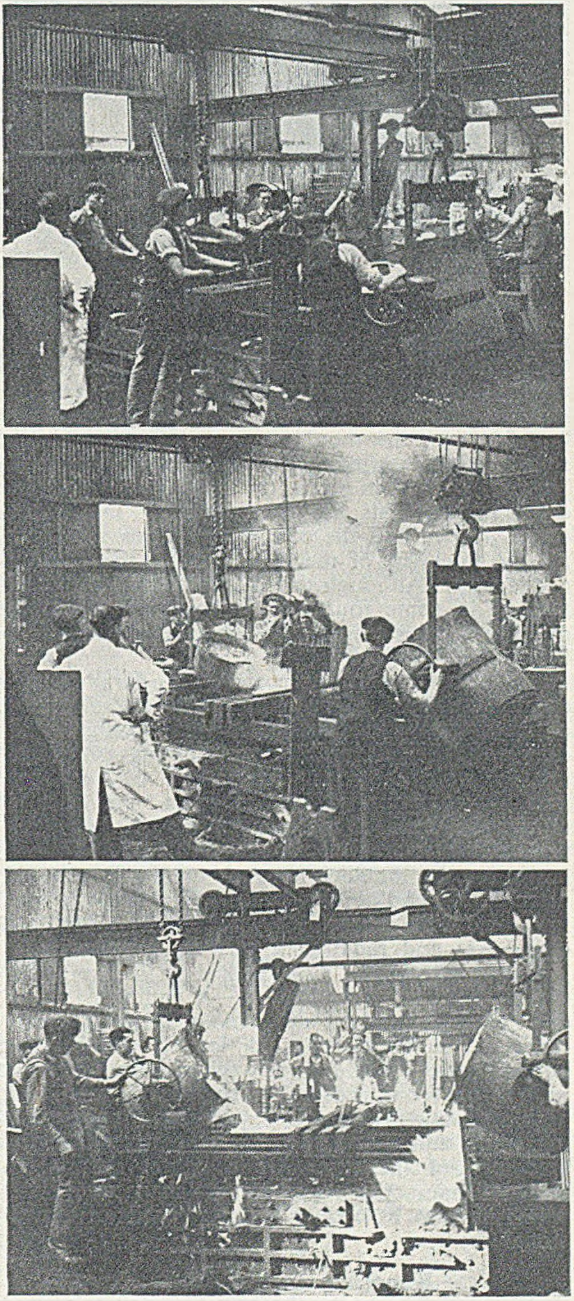

FIG. 2.—*Stages in Pouring the Baseplate Casting.*

Jobbing Founding on Scientific Lines

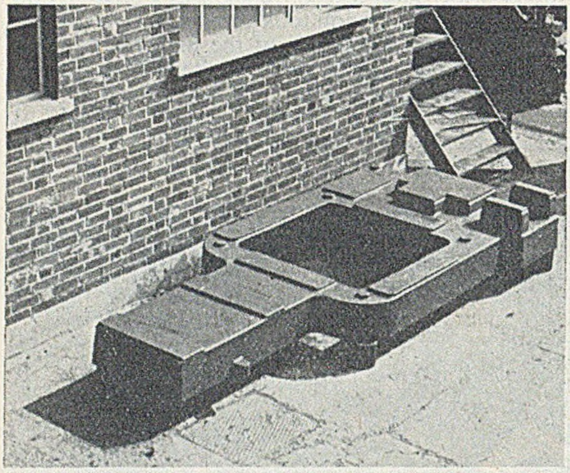

FIG. 3.—*The Finished Casting.*

reduced fettling time, particularly around the teeth, to a minimum. An unusual job which is sometimes produced in the iron foundry is a large cooking pot weighing 7 cwt. To avoid making a core-box for this, the mould is rammed and wooden slats are then inserted to give the thickness of metal. The moulder then rams the core from this and draws it, the slats are then removed, the mould dried, painted and the core replaced, leaving space for the thickness of metal formed by the removal of the slats. Although this is a comparatively usual method in some foundries, in this case no loam or loam brick is employed—normal moulding sands being used.

An order was recently received for a large cabinet casting weighing 35 cwt., in which the thickness of metal was ½ in. In such a thin casting for its design the biggest problem was to prevent cracking, for which reason a collapsible oil-sand was specially compounded for the cores. In order to reduce the depth of individual parts of the mould, the pattern was suitably split. This also made it easier for the moulder to work on the hot mould after drying and he could thus avoid bending over into very deep parts. This particular job had 26 core-boxes and required a very rigid pattern.

Among many other jobs handled by the iron foundry at regular intervals are:—a complete set of castings for a steam crane (some of them extremely intricate); clutch housings for lorries; water-cooled Diesel-engine cylinder heads (which are produced in a special mixture and have to withstand very high hydraulic pressure tests); castings for the printing trade and many and varied castings for the machine-tool industry. Of a lighter nature are electrical contact boxes in various shapes and sizes, which have to be cast to very fine limits of dimensional accuracy.

Knocking-out and Fettling

All knocking-out in the iron foundry is carried out at night by a special shift and the castings are then transported to the fettling shop where the cores are knocked out, together with any lumps of adhering sand. The castings are then shot-blasted, runners and risers are removed, and any necessary grinding of the larger castings is carried out with pneumatically driven hand grinders. Smaller castings are ground on the heavy pedestal-type grinders. All grinders and cutting off machines have individual dust-extraction equipment, as has the 90-in. table shot-blast machine by Constructional Engineering Company.

Castings are transported about the fettling shop and to the despatch department by Collis lift trucks on suitable stillages, and Lister trucks are employed for all larger handling jobs around the foundry, assisted by a Hyster mobile crane capable of lifting 3½ tons.

Since the iron-castings trade is at present more active than the non-ferrous, an overflow iron bay has been provided in the non-ferrous foundry. This bay is covered by a 3-ton Morris electric crane and also a 7-ton hand crane. A 25-cwt. Jackman plain jolter moulding machine has been installed in this bay and under the company's policy of utilising all mechanical aids, is used for all possible jobs, even if some modification of pattern is required. A moulder and an assistant operate this large jolter, the former carrying out the finishing, coring and closing, and the latter the actual jolting. At the present time, these men are producing about 30 cwt. of castings per day. Molten metal is brought from the main iron foundry in a bogie on a suitably-adapted Lister truck.

Non-ferrous Castings

In the non-ferrous foundry, melting is mostly by a battery of six oil-fired tilting furnaces supplemented by four coke-fired crucible furnaces. These latter are used mainly for smaller quantities of metal requiring very accurate control. As previously mentioned, no scrap is employed, first-quality ingots being used or, where necessary, virgin materials.

Two moulding machines are in use, one a Pridmore hand-operated machine capable of producing 100 12-in. sq. moulds per day, the other a Jackman plain jolt-type pin-lift machine, which is handling some 40 to 50 larger boxes per day. Sand is fed to these two machines, which are situated on either side of the storage bin, by the simple method of putting it through a Screenarator. This store of sand also serves the four moulders whose benches have a built-in bin, the bins being filled by hand from the main supply. Three floor moulders are also employed and casting is more or less continuous. In this foundry, axial-flow pump castings are made in gunmetal in various weights up to 15 cwt. and one regular job is the production of round copper castings roughly 10 in. dia. by 5 in. deep. These were originally cast in a dry-sand mould with suitable denseners and required 5 in. diameter riser. They are now cast in a permanent mould and the riser is interrupted by a check core, having a neck of 1¼ in. diameter. The metal is poured directly in through the riser and the head can now be knocked off, whereas the old riser used to take 20 minutes or more for cutting off

(*Continued on page* 398.)

I.B.F. National Works Visits

Establishments Inspected in the Midlands

H. W. Lindop & Sons, Limited, Walsall (Malleable founders)

About 30 members of the Institute of British Foundrymen visited this foundry which has been semi-mechanised in recent years and produces castings over a wide range for the commercial-motor industry, as well as for agricultural, electrical and machine-tool trades.

The melting plant consists of three Sesci rotary furnaces and six heats of metal are tapped each day. An interesting feature of these furnaces is the silica-brick lining backed with about 4 in. of ordinary refractory. Between 200 and 250 heats are regularly obtained in each campaign. The firm has a well-equipped laboratory where routine analysis checks are taken daily of both iron and sand. Annealing ovens are of the "batch" and "bogie" type, fired by pulverised fuel from a ring main. Although the coal for both the melting and annealing plants is carried from a central pulverising station, through pipes up to a distance of some 200 yds., little trouble is experienced with obstruction by clogging. Much interest was shown by the visitors in all phases of manufacture and a considerable amount of useful discussion took place.

F. H. Lloyd & Company, Limited, Wednesbury (Steel founders)

A joint visit of two parties was paid to the steel foundry of F. H. Lloyd & Company, Limited, at Wednesbury, in the afternoon. This is a large foundry, turning out a wide variety of steel castings at the rate of about 350 tons per week.

The party saw all types of castings being made, and among items which aroused interest the following are, perhaps, worthy of special mention: (*a*) The machine-moulding unit and the output being obtained from it; (*b*) the use of green-sand moulding for castings up to 2 tons in weight; (*c*) the acid-electric steelmaking process and the use of oxygen injection; (*d*) the method of determining carbon in steel with the Carbometer; (*e*) the Hydroblast plant, and the quality of sand reclaimed from it, and (*f*) radiography, which is now being applied to an increasing extent, chiefly on prototype castings.

Among castings which have recently been made, or are in current production, may be mentioned the 8-ton tank turret, which is water quenched, a large excavator revolving frame weighing 18 tons, a 7-ton steam-turbine casing, a 2½-ton locomotive frame cradle casting, made in green-sand and a three-bladed stainless-steel propeller, weighing over 4 tons.

Beans Industries, Limited, Tipton (Iron foundry)

Mr. G. R. Shotton, past-president of the Birmingham branch, accompanied the visit of 28 members to the Tipton works of Beans Industries, Limited. This foundry comprises three sections, each making a separate weight-range of iron castings. There is a fully mechanised plant for purely repetition castings such as small automobile flywheels, brake-drums, manifolds and gearboxes; a semi-mechanised section making heavily-cored, medium-weight lines (cylinder-blocks up to 1,000 per week) and finally a heavy jobbing section producing single castings (cylinders for marine engines, Diesel-engine beds and columns and the like) up to about 5 tons in weight and 14 ft. long. Total output is of the order of 300 tons on single-shift and about 450 tons on double-shift working. The integration of operations in the repetition sections, the core manufacture and coring-up operation on cylinder-block production and the skilled operations (including loam coremaking) as well as the use of Sandslingers, large jolters and other production aids in the jobbing section provided the main centres of interest. The metal for the completely mechanised section is supplied from a battery of four cupolas (two in use each day), while that for the medium and heavy work is jointly furnished from a separate battery of larger capacity. These sections also share the same dressing and dispatch departments.

William Mills, Limited, Wednesbury (Aluminium-alloy founders)

The light-alloy foundry practice at William Mills, Limited, which was visited by some twenty members, has been previously described in these columns.* Much of the production has been built up round the development of special aluminium alloys, particularly the Y group and separate sections of the foundry deal with sand moulding gravity-die and pressure die-casting respectively. Much use is made in the sand foundry of jib cranes, mainly for transferring moulds to the roller feed tracks. Additionally the shop is spanned by a 5-ton overhead travelling crane. The die-casting foundries provided a revelation of what extreme planning and organisation could be put into die design and operation when quantities justified. Considerable interest was taken in metal melting and ancillary services, laboratory, radiographic heat-treatment, etc.

Simplex Electric Company, Limited, Oldbury (Repetition grey-iron and malleable)

A party of 22 members of the Institute including representatives from some of the leading foundries in the country, visited the Simplex Electric Company, Limited, whose foundry is considered to be one of the most highly-mechanised in the area, with a pay roll of approximately 400. The production includes a wide variety of small castings in whiteheart malleable and grey iron, such as switch-gear, lighting fittings and cooker castings, all of which require a high standard of quality.

* "Examples of Aluminium-alloy Foundry Practice," FOUNDRY TRADE JOURNAL, June 23 and 30, 1949, and "Some Notable Aluminium-alloy Castings," September 23 and October 6, 1949, both by J. Caven and H. W. Keeble.

I.B.F. National Works Visits

The party was given a cordial welcome by Mr. P. H. Lowe, the chief personnel manager, and Mr. E. A. Holman, foundry manager, with Mr. Bernstein, chief metallurgical chemist, acted as guides. A comprehensive tour was undertaken with access to all departments of the organisation, and the visitors were encouraged to exercise complete freedom in making enquiries, many incidental discussions taking place. The core-shop particularly captured their interest, where approximately 40,000 cores are made per day, by core-blowing machines as well as by hand, many being blown four at a time. Much interest was also taken in the new Birlec electrical malleablising plant; a second unit is shortly to be installed.

At the conclusion of the tour, the party gathered in the boardroom where, over a cup of tea, questions and discussions were invited by Mr. E. A. Holman, who took the chair. Speakers all expressed keen appreciation and some surprise at the general efficiency, productivity, and advanced methods employed, including pattern building and plating, which was considered unique in the industry. Speaking on behalf of the directors, Mr. Holman extended an open invitation to similar organised parties as a means of encouraging co-operation, improving foundry practice, and as an important contribution to the national economy.

Midland Electric Manufacturing Company, Limited, Birmingham (Mechanised iron foundry)

This fully-mechanised foundry incorporating two Morris sand-conditioning plants and producing 60 tons per week of light iron castings for use in the manufacture of switch, fuse and motor control gear, was visited by a party of 30. Two balanced-blast cupolas operating on alternate days for a continuous run of 18 hrs. each and using the syphon-brick method of tapping, were of special interest. Also particularly remarked in this foundry was the provision of amenities (lighting, heating and washing facilities) which go a considerable way in implementing the recommendations of the Garrett Report.

Imperial Foundry Company, Leamington Spa (Iron and steel foundries and assembly shops)

The Imperial Foundry, Leamington (proprietors, Ford Motor Company, Limited), received 30 visitors. It consists of foundries, machine shops and assembly sections and manufactures steel castings and iron castings for tractors and agricultural implements; further iron castings for cars and trucks, and its finished machinery products include agricultural implements for the Fordson " Major " tractor. The castings (in weight from about 1 to 120 lb.) are produced on three fully-mechanised systems with pallet-type conveyors and complete sand-preparation and distribution plant; on squeeze, jolt-squeeze, and roll-over moulding machines; continuous pouring methods being employed. The melting plant for steel is a triplexing process consisting of 12 ton-per-hour cupolas, 2-ton capacity converters, and a 10-ton electric furnace. The electric furnace functions as a receiver and carries a sufficient bath of metal to give a continuous supply of molten steel to the moulding lines. The cupolas are fitted with Whiting-type spark arrestors and dust catchers. A specially-designed smoke-abatement plant is installed to take care of the gases from the converters and catches approximately 5 to 6 tons of solids per week. The iron-melting equipment consists of three cupolas with an oil-fired receiver to ensure a continuous supply of metal.

In the ancillary sections, the fettling shop is well-equipped with a continuous airless shot-blast plant, tumbling barrels, Wheelabrators, snagging machines, etc., with conveyors for the heavier types of castings. The core-shop is equipped with six core-blowing machines, together with several circular benches for hand core-making. The sand is supplied on over-head belts with automatic distribution. Vertical drying stoves are used for baking. A heat-treatment department includes four continuous-type furnaces. The laboratory handles steel samples every 15 min. for carbon and manganese and iron samples every 30 min. for carbon, silicon, and manganese. The remaining elements in both cases are estimated several times daily. Control is also exercised from the laboratory on the specification of pig-iron, steel scrap, and many other materials used.

A self-contained pattern-shop is big enough to handle the manufacture and maintenance of the necessary patterns in wood and metal. In addition, there are excellent machine and assembly shops for the production of hydraulically-operated ploughs, cultivators, beet harvesters, and other agricultural implements.

The only regret felt by the members who visited this plant was that time prevented their examining it in greater detail.

Belliss & Morcom, Limited, Icknield Square Works (Engineering grey-iron foundry)

The party of 25 for the visit to Belliss & Morcom, Limited, Birmingham, was met by Mr. J. R. Richardson and Mr. F. G. Wilson, who acted as guides. The firm have four main products, namely vertical steam engines up to 500 h.p., reciprocating air compressors up to 6,500 cub. ft. per min., oil engines up to 1,000 h.p., and steam turbines up to 10,000 h.p., the latter complete with condensers when required. Examples of all these products were seen on the test beds and in the shops in various stages of erection, and it was particularly noticeable in the heavy machine shop, which was passed through on the way to the foundry, that probably three-quarters of the material required for the manufacture of these plants was grey-iron castings.

The iron foundry itself comprises three main shops adjoining each other. The first of these is a three-storey building about 120 ft. long and 70 ft. wide, of which the ground floor and the first floor are devoted to the storage of patterns whilst the top floor is the patternshop itself. Two dozen or so pattern-makers, with a good sprinkling of apprentices, supply the patterns necessary for the wide variety of castings made in the foundry. It is in this department that the policy of the firm to make engines to customers' individual requirements first makes itself apparent, and there are few patterns that really could be called standard. The pattern-shop stands at right-angles to a building about 150 ft. long by 60 ft. wide, where the smaller castings are made. Crane capacity up to 8 tons is provided and the shop is self-contained, with its own cupolas, drying stoves and core-shop. It is in this small foundry that a Pneulec roll-over bumper-type moulding machine to 4,000 lb. capacity, complete with sand elevator and overhead bunkers, has just been installed and will be started up as soon as the electric wiring is complete.

Adjoining the end of this foundry is the large foundry, a shop about 200 ft. long by 70 ft. wide, provided with cranes up to 20 tons capacity and again having its own cupolas, drying stoves and core-shop. One of the striking features one notices on entering is the height of the roof, giving good natural lighting and a clear atmosphere. Adjoining the larger foundry is a dressing yard, radiant-panel heated, and incorporating a single-gun Hydroblast plant, where the bulk of the castings are washed with high pressure water before being dressed, which practice eliminates the liberation of airborne dust.

During the visit, a wide variety of work was in progress and castings, moulds and cores illustrating the various types dealt with were examined, such as oil-engine liners, cylinder heads, bedplates, steam-engine guides, engine and air-compressor cylinders, etc., many showing the superlative skill of the experienced craftsmen of whom Belliss & Morcom are so proud. It was interesting to note that all the men in the pattern-shop and foundry participate in a bonus scheme which depends on the weight of the castings delivered each week, at present between 25 and 30 tons. This bonus is paid in proportion to the hours each man works. Those under 21 get half the full bonus. A constant check on the quality of castings is kept by regular laboratory analyses of incoming materials and finished products, as well as regular trial of test-bars which are cast on all important components.

Sterling Metals, Limited, Nuneaton (Magnesium and aluminium foundry)

An afternoon visit by a party of 20 I.B.F. members was paid to the light-alloy sand foundries of Sterling Metals, Limited, at Nuneaton, where approximately 900 people are employed on the production of magnesium and aluminium-alloy castings, principally for aircraft and aero-engines, heavy-vehicle engines and transmission units, agricultural tractors and cultivators, generating-station equipment, the electrical industry, portable tools and textile warp-beams and beam-drums.

The party divided into five groups and, conducted by guides, made a comprehensive tour of the works. This included visits to:—(*a*) The No. 1 magnesium-alloy sand foundry, a Sandslinger and floor-moulding foundry; (*b*) the No. 2 magnesium foundry, a bench-moulding unit which produces the small quantities off and serves as a trainee foundry; (*c*) the No. 3 magnesium foundry, a fully-mechanised foundry in two sections, one of which is laid out solely for the production of transmission casings for the Ferguson tractor, the present rate of production being 1,300 per week; and (*d*) the aluminium-alloy sand foundry, a Sandslinger, floor and machine-moulding unit. Auxiliary departments visited were the fettling, pattern- and core-shops, heat-treatment section, final inspection (which includes jigging and marking-off) and machine shops where the textile castings are machined and assembled. In addition, each group in turn made a tour of the laboratory block which houses the chemical, physical and radiological laboratories, the latter employing four X-ray units on aircraft castings in addition to research work.

Points which caused special comment were the high standard of inspection exercised both on aircraft and commercial work and the very high rate of production obtained, particularly in the mechanised foundry. At the conclusion of the tour, high tea was served in the staff canteen and Mr. J. Sully, director and works manager of the Nuneaton works, made a short speech reiterating the welcome and remarking that such visits proved of benefit to the trade as a whole. The leader of the party, Mr. J. W. Dews, replied, a vote of thanks being passed to the directors for allowing such an interesting visit and for the courtesies extended to the visitors.

Austin Motor Company, Limited, Longbridge (Automobile foundry)

Two parties joined for the visit to the foundry of the Austin Motor Company, Limited, at Longbridge, Birmingham, making 55 delegates in all, headed by Dr. C. J. Dadswell, of the English Steel Corporation, junior vice-president of the Institute.

The parties arrived at Longbridge at about 10.30 a.m., and after the preliminary introduction to the guides, were at once taken to the foundry (by way of one of the machine shops), where they were received by Mr. W. H. Bamford, and Mr. Phillips, in the absence of Mr. Oddy, foundry superintendent. About an hour and a half was spent in the core-making and pouring sections of this highly-mechanised plant. The Austin Foundry was one of the first mechanised foundries in Britain, and at the moment some 350 tons of finished castings are produced weekly. Members found much of mutual interest, and the technicians who were present representing the company were kept busy answering questions. Production of brake-drum moulds on Nicholls machines and the core-assembly for cylinder heads were subjects for admiration. The water-cooling system for the cupolas also excited much comment.

Following their tour of the foundry, the visitors were taken down one of the final production lines, where the Austin cars are assembled, and this added further proof of the high degree of mechanisation which the company has perfected. Returning to the showroom, they were entertained to lunch by the company, and Dr. Dadswell concluded an enjoyable morning with a vote of thanks to the directors and management, in which he paid tribute to the amazing standard of mechanical aids which had been reached in the foundry. Mr. W. H. Bamford responded for the company.

I.B.F. National Works Visits

Parkinson Stove Company, Limited, Stechford (Iron castings for cookers)

The 26 visitors to the iron foundry of Parkinson Stove Company, Limited, examined in detail the various stages in the manufacture of light castings of particular compositions to suit design requirements and for subsequent vitreous enamelling. The foundry proper consists of two 42-in. cupolas with their usual accessories and serving two casting platforms from which moulds at the rate of five a minute are filled. The sand-reclamation unit is a standard equipment consisting of a tramp-iron magnetic removal gear and the usual train of mills and hoppers for reconstituting the sand.

The core-shop produces the intricate shapes (many gas-burner cores) required for this specialised industry, and includes both hand-filling and core-blowing machines, with the cores baked in a vertical continuous oven. Adjacent to this section is a core-sand preparation and distributing unit. From the "knock-out" the castings are treated after dressing in shot-blast equipment and tumbling barrels, and then pass into the machine shop for machining prior to painting or enamelling. The rest of the visit was occupied with the inspection of ancillary operations such as press work, and the cast-iron and sheet-steel vitreous-enamelling processes associated with domestic gas-cooker and -fire production.

Dartmouth Auto Castings, Limited, Smethwick (Automobile ironfounders)

Dartmouth Auto Castings, Limited, consists of two separate foundries known as the Dartmouth Road Foundry (No. 1) and the West Bromwich Foundry (No. 2), each of approximately equal capacity but occupied on different weight ranges of castings. Owing to the short time available, the visit of some 30 foundrymen on the I.B.F. national visits day was confined to the No. 1 Foundry engaged on the lighter castings.

This No. 1 Foundry was started under the name of Dartmouth Auto Castings, Limited, in 1934, primarily for the production of ancillary castings for the motor trade, and at that time the output was of the order of a few tons per week. There has been a gradual and progressive increase in output through the intervening years until the present output of castings of similar design to those originally envisaged is of the order of 220 tons per week, consisting of about 70,000 individual castings of various types. The manufacture of these castings necessitates the production of about 10,000 moulds per week and involves some 100 pattern changes in the period, so that planning for production must receive considerable attention.

The bulk of this production is made on two independent moulding units, designated as No. 27 and No. 28 sections. No. 27 Section utilises a battery of moulding machines, mostly of the Nicholls type, with hopper-fed sand and a spillage belt below, moulds being cored and placed directly on a pendulum conveyor, upon which they are cast from monorail-suspended ladles with metal supplied by two cupolas. The larger cupola is of 7 tons per hr. capacity and is continuously tapped into an oil-fired receiver. The smaller cupola producing at the rate of 3 tons per hr. is intermittently tapped. The furnaces supply metal of different grades, dependent upon the requirements of the day's programme. All cupolas are charged by a telpher system, and are duplicated for use on alternate days. A feature much admired by the visitors was the placing of charge buckets on roller conveyors for moving to the weighing point. Sand is supplied by a continuous mill. Castings from the knock-out are handled into a bucket conveyor for cooling and delivered to the fettling shop.

No. 28 Section comprises a battery of Nicholls-type moulding machines served by a continuous sand-preparation plant and hopper feed. The moulds are cored-up and placed directly on a plate conveyor for pouring and transmission to the knock-out. Metal in this case is supplied by a cupola of 3 tons per hr. capacity, the grade being varied as for the other section in accordance with the scheduled production requirements. Castings from the knock-out of this section are conveyed to the fettling shop by the same conveyor as the No. 27. The first fettling operation is sorting and removal of runners and feeders on a ramp from which the castings progress through the various operations of Wheelabrator, grinding, chipping and inspection prior to delivery to the despatch stores. Coremaking is done in quite a small shop, working on double shift, and good use is made of Osborne and Colman core-blowers.

In addition to the two mechanised units briefly described, a small foundry is operated to deal with prototype quantities, samples, and items required in small numbers which do not permit of inclusion in the mechanised sections. The foundries are served by a well-equipped engineering department and laboratory, and a pattern-shop adjacent to No. 1 Foundry provides facilities for the entire works.

It is the policy of the firm constantly to develop these plants and perfection in any sphere is not claimed, but there is, however, quite a high productivity of the range of high-grade castings. Comments from the visitors on some aspects of the organisation which were thought capable of improvement were welcomed. Most were found to be already receiving very active attention.

Birmingham Aluminium Casting (1903) Company, Limited (Aluminium founders)

Twenty-two members of the Institute visited the works of the Birmingham Aluminium Casting (1903) Company, Limited, accompanied by the Birmingham branch president, Dr. H. T. Angus. Under the guidance of members of the company's technical staff, they saw castings being produced by the sand, gravity-die and pressure-die processes in a variety of aluminium, magnesium and zinc-base alloys. The tool-room was open to inspection and much interest was shown in the production of dies. The visitors were able to see dies in use for the manufacture of gravity-die-cast cylinder heads, sumps and other components for the motor industry. Other castings in this department included parts for gas cookers and the range of "Birmid" rainwater goods

(*Continued on page* 398.)

Testing the Metal or Testing the Casting*

Some Notes on the New Swedish Grey-iron Specification

By Erik O. Lissell, M.Sc.

(*Continued from page* 364.)

ON THE BASIS of the viewpoints as to the testing of castings brought out in the foregoing sections, the Author will now discuss the relative merits and drawbacks of the present British, American, German and Swedish specifications for cast iron. Before discussing the significance of these specifications, a few historical notes will be presented followed by a brief outline of the scope of the specifications.

(*a*) *Historical*

Years ago it was customary for Government departments, public-works authorities, registers of shipping, and similar institutions which have to take certain responsibilities, to guard themselves from buying or approving castings of inferior quality by issuing specifications of their own. In those days, the producers of castings showed only limited interest in national specifications. The first national standard specifications seem to have been issued in the United States. In 1928, the British specification for grey cast iron, B.S. 321, was issued. German specifications appeared in 1928 and tentative Swedish standard specifications in 1935. The standard specifications drafted by the American Society for Testing Materials were tentative in their present form from 1933 to 1936, when they were adopted. They were revised in 1941, 1946 and 1948.[35] To the British specifications were added three new grades in 1938 and another grade in 1941. The present specifications were revised in 1948.[36] The German specifications were revised in 1929, 1933, 1942 and 1949.[37, 38] The Swedish tentative specification of 1935 (finally), which was very similar to the ones just mentioned, was nullified by severe criticism. New specifications[39] modelled according to a different pattern have been published for consideration this year.

* Paper presented at the Buxton Conference of the Institute of British Foundrymen. The Author is attached to the Foundry Division, Federation of Swedish Mechanical Engineering Industries.

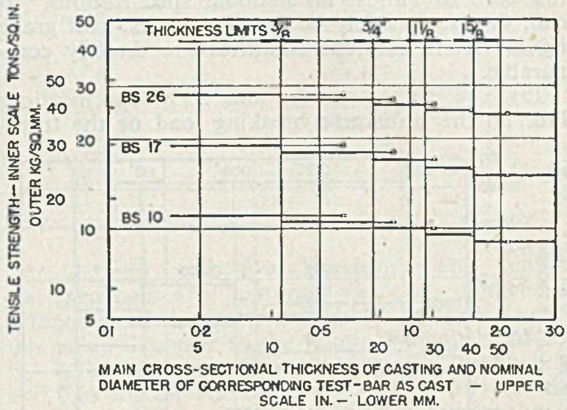

FIG. 11.—*Correlation of Tensile Strength, Test-bar Diameter and Main Cross-sectional Thickness of Casting for Three Cast-iron Grades, British Specification.*

(*b*) *Comparison between the latest British, American, German and Swedish Specifications for Cast Iron*

The British (B.S.), American (A.S.T.M.), German (D.I.N.) and Swedish (S.I.S.) specifications have certain features in common, but also differ widely in other respects. The main similarities and differences

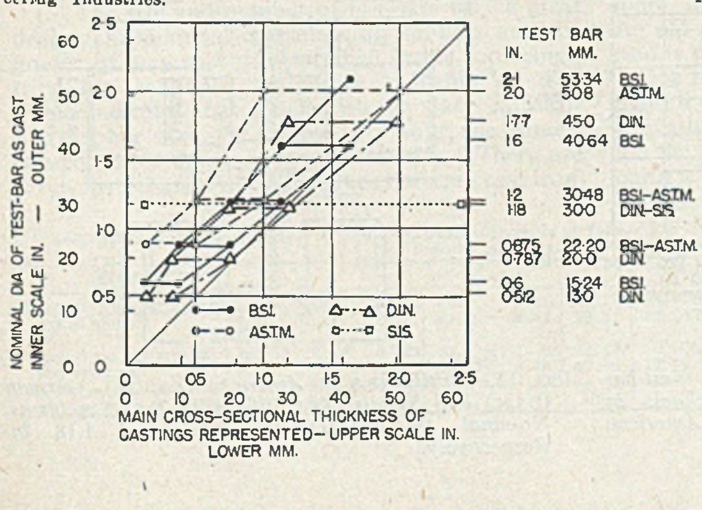

FIG. 10.—*Correlation of Nominal Diameter of Test Bar as Cast and Main Cross-sectional Thickness of Casting according to British, American and German Specifications.*

Testing the Metal or the Casting

can be listed as follow:—

(1) The classification or grading of the irons is based on tensile strength.

(2) The class or grade designations refer to the 1.2-in. dia. or 30-mm. (1.18-in.) dia. test-bar, except according to the American specifications, where the class number may be related to any one of three test-bar sizes standardised. However, since the 1.2-in. dia. test-bar is the most widely used in the United States, tensile-test values are generally understood to be related to this bar. The S.A.E. standards for motor-vehicle grey-iron castings as appearing in the S.A.E. handbook clearly illustrate this trend. The 1.2-in. dia. or the 30-mm. (1.18-in.) dia. test-bar is the base in almost all national specifications. It can, therefore, safely be stated that cast-iron grade figures from different countries are directly comparable.

(3) The B.S.I., A.S.T.M. and D.I.N. specifications link up the transverse breaking load or the transverse rupture strength with the tensile strength in such a way that the transverse values may supersede the tensile values completely. Generally speaking, the tensile-test specimens are machined from the (broken parts of the) transverse bar. The transverse test is omitted in the Swedish specifications.

(4) Correlation of test-bar size and main cross-sectional thickness is given in the British, American and German standard, but not in the Swedish. In the

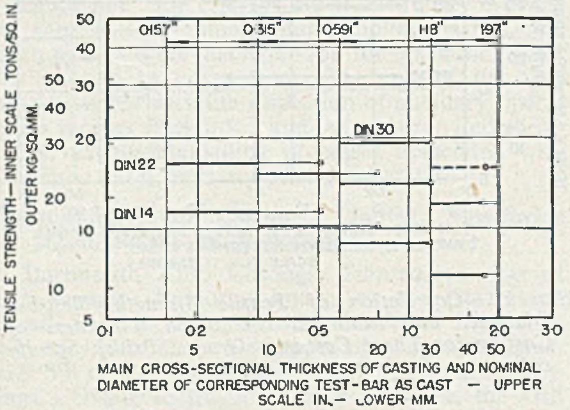

FIG. 12.—*Correlation of Tensile Strength, Test-bar Diameter and Main Cross-sectional Thickness of Casting for Three Cast-iron Grades, German Specification.*

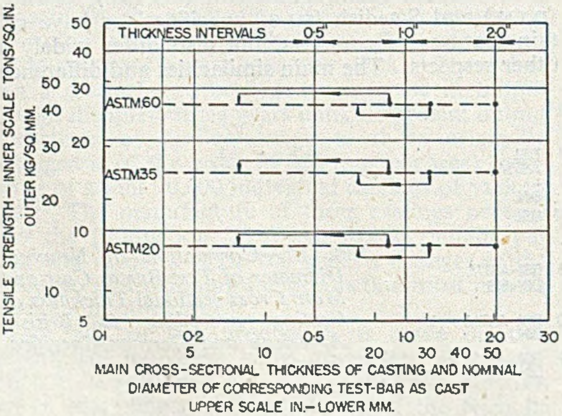

FIG. 13.—*Correlation of Tensile Strength, Test-bar Diameter and Main Cross-sectional Thickness of Casting for Three Cast-iron Grades, American Specification.*

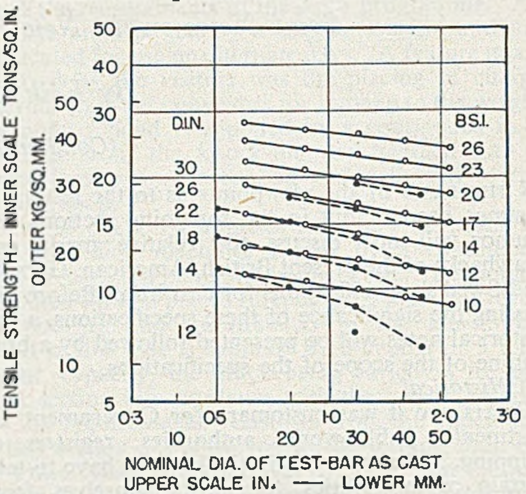

FIG. 14.—*Relationship between Tensile Strength and Nominal Diameter of Test Bar according to British and German Specifications Indicating Section Sensitivities.*

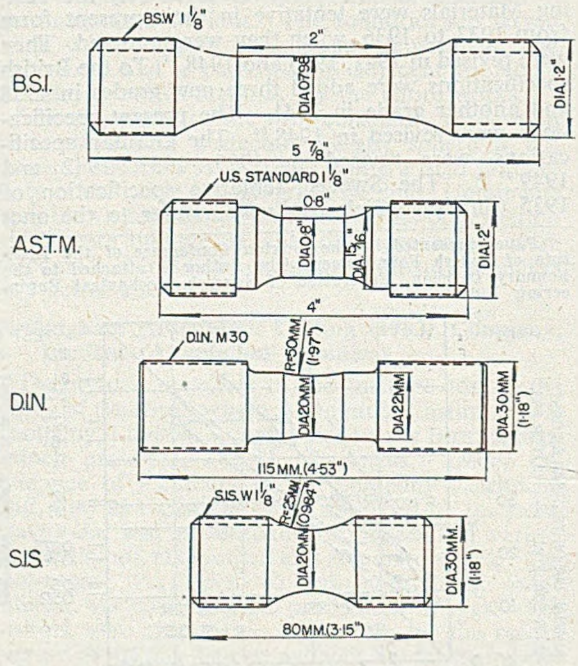

FIG. 15.—*British* (B.S.I.), *American* (A.S.T.M.), *German* (D.I.N.) *and Swedish* (S.I.S.) *Tensile Test Specimens, Nominal Test-bar Diameter* 1.2 *and* 1.18 *in. Respectively.*

TABLE V.—*Nominal Diameters of Test-bars and Grades of Grey Cast Iron Specified in Different Countries.*

Specification.		D.I.N.	B.S.I.	D.I.N.	B.S.I. A.S.T.M.	D.I.N. S.I.S.	B.S.I. A.S.T.M.	B.S.I.	D.I.N.	A.S.T.M.	B.S.I.
Nominal diameter of test-bar as cast ..	In.	0.512	0.6	0.787	0.875	1.18	1.2	1.6	1.77	2.0	2.1
	Mm.	13	15.24	20	22.20	30	30.48	40.64	45	50.8	53.34
B.S. 1542 : 1948	Grade										
Great Britain	10	—	11.0	—	10.5	—	10.0	9.5	—	—	9.0
	12	—	13.0	—	12.5	—	12.0	11.5	—	—	11.0
Unit of which	14	—	16.0	—	15.0	—	14.0	13.5	—	—	13.0
the grades	17	—	19.0	—	18.0	—	17.0	16.0	—	—	15.0
are based—	20	—	22.0	—	21.0	—	20.0	19.0	—	—	18.0
tons per sq. in.	23	—	25.0	—	24.0	—	23.0	22.0	—	—	21.0
	26	—	28.0	—	27.0	—	26.0	25.0	—	—	24.0
A.S.T.M. A 48-48	Class										
United States	20	—	—	—	8.92	—	8.92	—	—	8.92	—
	25	—	—	—	11.16	—	11.16	—	—	11.16	—
Unit on which	30	—	—	—	13.39	—	13.39	—	—	13.39	—
the classes	35	—	—	—	15.62	—	15.62	—	—	15.62	—
are based—	40	—	—	—	17.86	—	17.86	—	—	17.86	—
lb. per sq. in.	50	—	—	—	22.32	—	22.32	—	—	22.32	—
	60	—	—	—	26.79	—	26.79	—	—	26.79	—
D.I.N. 1691 (1949)	*Güte klasse*										
Germany	12	—	—	—	—	7.62	—	—	—	—	—
	14	11.43	—	10.16	—	8.89	—	—	6.99	—	—
Unit on which	18	13.97	—	12.70	—	11.43	—	—	9.53	—	—
the classes	22	16.51	—	15.24	—	13.97	—	—	12.07	—	—
are based—	26	—	—	17.78	—	16.51	—	—	14.61	—	—
kg. per sq. mm.	30	—	—	—	—	19.05	—	—	(15.88)	—	—
S.I.S. (1950)	*Klass*										
Sweden	15	—	—	—	—	9.53	—	—	—	—	—
Unit on which	20	—	—	—	—	12.70	—	—	—	—	—
the classes	25	—	—	—	—	15.88	—	—	—	—	—
are based—	30	—	—	—	—	19.05	—	—	—	—	—
kg. per sq. mm.	35	—	—	—	—	22.23	—	—	—	—	—

A.S.T.M. specifications, it is stated that the correlation is only approximate and may need modification for complicated castings. The S.A.E. standards do not mention anything with respect to the correlation of test-bar and casting.

(5) A standardised method for casting the bar for the tensile specimen separately is specified in the Swedish specifications only. The American standard specification is provided with explanatory notes which include examples of different methods for casting the test-bars. The German specification outlines different modes of making the test-bar mould and pouring it. According to the American standard, the bar shall be cast separately. The British Standards Institution leaves it to the engineer or purchaser to decide if the bars should be cast-on or separately cast. The same is true for the German specification, which, however, also provides for test-bars cut from the casting.

(6) The size and number of test-bars vary a great deal. The nominal diameters of test-bars and the grades of grey cast iron specified in the four countries just mentioned are shown in Table V. The Table indicates that the British standard calls for five test-bar sizes, the German for four, the American for three and the Swedish for one. There are seven British and American grades of grey cast iron, six German and five Swedish. The tensile-test specimens are "natural," *i.e.*, their diameter is a function of the bar size (Table VI). The ratio of the gauge diameter to the nominal diameter of the bar varies between 0.67 and 0.76 for the British, 0.58 and 0.63 for the American and 0.62 to 0.71 for the German test-bars. The lower ratios correspond to the smaller-diameter specimens and the higher ratios to the large ones.

Merits and Drawbacks of Present Specifications

(a) Tests to be Specified

It has been argued from time to time that the tensile test should be abandoned. There are good reasons both for keeping this test and for discarding it. From a testing point of view, the tensile test is undoubtedly rather poor. It is almost impossible to carry out the test without getting some bending stresses set up within the test specimen. Furthermore, the specimen is rather expensive to prepare. An old argument against the tensile test is that cast iron is seldom subjected to purely tensional stresses.

One reason for retaining the tensile test is the fact that all other metals are tested with respect to tensile strength. As long as the tensile test is used solely for the grading of irons with respect to quality, no harm is actually done. For this purpose, tensile test

TABLE VI.—*Nominal Diameters of Test-bars, Gauge Diameters of Tensile Test Specimens and Ratios of Gauge Diameter to Bar Diameter for British, American, German and Swedish Test-bars.*

Specification.		B.S.I.					A.S.T.M.			D.I.N.				S.I.S
Nominal diam. of test-bar as cast	In.	0.6	0.875	1.2	1.6	2.1	0.875	1.2	2.0	0.512	0.787	1.18	1.77	1.18
	Mm.	15.24	22.20	30.48	40.64	53.34	22.20	30.48	50.8	13	20	30	45	30
Gauge diam. of tensile test specimen.. ..	In.	0.399	0.564	0.798	1.128	1.493	0.505	0.750	1.25	0.215	0.492	0.787	1.26	0.787
	Mm.	10.13	14.33	20.27	28.65	37.92	12.83	19.05	31.75	8	12.5	20	32	20
Ratio gauge diam. to bar diam.		0.67	0.65	0.67	0.71	0.76	0.575	0.625	0.625	0.62	0.63	0.67	0 71	1.67

Testing the Metal or the Casting

specimens prepared from the 1.2-in. or 30-mm. dia. test-bar and with gauge diameters between 0.750 and 0.798 in. are used almost universally. If, however, the use of the tensile test is extended further, other questions enter into the picture and the wisdom of using the tensile test may become subject to discussion. In such cases the transverse test is probably to be preferred.

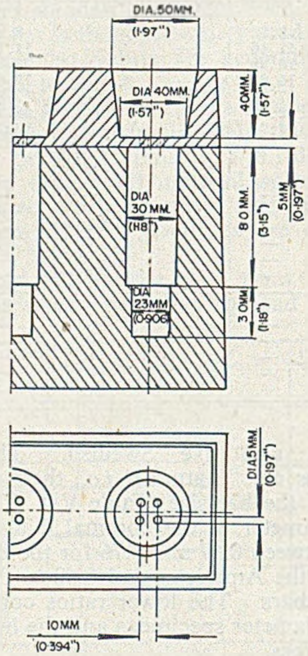

FIG. 16.—*Swedish Standard Mould for Casting Tensile Specimen " Blanks."*

(*b*) *Tensile-test Specimens*

The influence of the " rim " or " skin " factor inclines the Author to the belief that the tensile specimens with a gauge diameter of less than 0.8 in. should be reconsidered. When the nominal diameter of a section exceeds 1.6 in., the inner-section sensitivity, at least in softer irons, renders the testing with " natural " test specimens rather haphazard. It may also be questioned whether tensile-test specimens with gauge diameters above 0.8 in. are really justified.

(*c*) *Correlation of Test-bar and Casting*

Several test-bar sizes are generally advocated, because of the section sensitivity of cast iron and the conception that there is a straight-line relationship between the test-bar and properties. Thus, a given test-bar is thought to correspond to a given sectional thickness of any casting. In order to keep the number of test-bars down, each bar is specified to represent a range of section thicknesses instead of just one. Table VII and Fig. 10 show the consequences of this arrangement. The correlation between nominal diameter of test-bar and main cross-sectional thickness of the castings is very similar in the British, American and German specifications. This is quite in order, since the relationship is based entirely on the cooling rates of bars and simple castings cast under otherwise identical conditions. However, if section sensitivity as a function of tensile strength be allowed to enter into the picture, the similarity does not persist any longer, as can be seen from Figs. 11 to 13. The difference between the British and the German specifications (Figs. 11 and 12) is easily explained by examining Fig. 14, which shows that these two specifications are based on different conceptions of sectional sensitivity. The American specifications do not pay any consideration to sensitivity at all, which accounts for the distinctively different appearance of Fig. 13 as compared to the two foregoing illustrations.

In the Swedish specifications there is no correlation whatsoever between test-bar and casting. Besides, the Swedish specification calls for only one size of bar. The reason for this has been dealt with quite extensively in earlier sections of this Paper. It was the opinion of the Swedish Standards Committee that several test-bars were unnecessary, since a true correlation between test-bars and castings seems to exist for very simple shapes only (Figs. 5

TABLE VII.—*Correlation of Test-bars and Main Cross-sectional Thickness of Casting Represented.*

Nominal diameter of test-bar as cast.			Main cross-sectional thickness of casting represented according to different specifications.							
			B.S.I. (British).		A.S.T.M. (American).		D.I.N. (German).		S.I.S. (Swedish).	
In.	Mm.	Specification.	In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.
0.512	13	D.I.N.	—	—	—	—	0.157–0.315	4–8	—	—
0.6	15.24	B.S.I.	$<\frac{3}{8}$ (0.375)	<9.53	—	—	—	—	—	—
0.787	20	D.I.N.	—	—	—	—	0.315–0.591	8–15	—	—
0.875	22.20	B.S.I.	$\frac{3}{8}$–$\frac{3}{4}$ (0.375–0.75)	9.53–19.05	<0.50	<12.7	—	—	—	—
1.18	30	A.S.T.M. D.I.N. S.I.S.	—	—	—	—	0.591–1.18	15–30	All sections	
1.2	30.48	B.S.I.	$\frac{3}{4}$–$1\frac{1}{8}$ (0.75–1.125)	19.05–28.58	0.50–1.0	12.7–25.4	—	—	—	—
1.6	40.64	A.S.T.M. B.S.I.	$1\frac{1}{8}$–$1\frac{5}{8}$ (1.125–1.625)	28.58–41.28	—	—	—	—	—	—
1.77	45	D.I.N.	—	—	—	—	1.18–1.97	30–50	—	—
2.0	50.8	A.S.T.M.	—	—	1.0–2.0	25.4–50.8	—	—	—	—
2.1	53.34	B.S.I.	$>1\frac{5}{8}$ (1.625)	>41.28	—	—	—	—	—	

and 6). As soon as the casting becomes slightly more complicated, its thermal history changes and the properties vary independently of those of the test-bar.

The committee has planned extensive investigations to be started as soon as some Swedish foundries have begun the production of standard irons according to the new specifications. It is hoped that

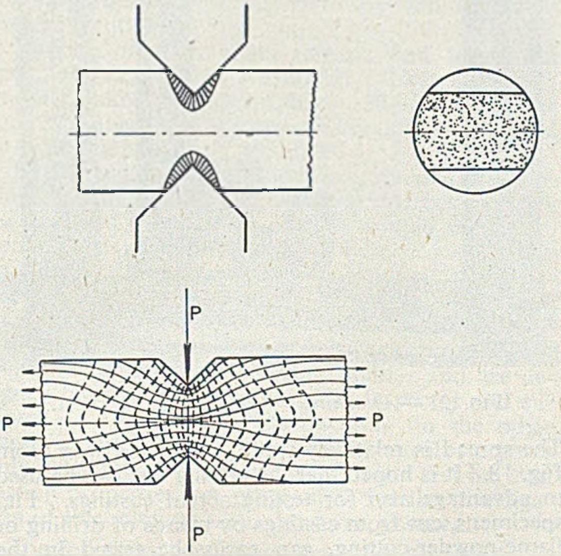

FIG. 17.—*Principles of the "Wedge-cutting" Test. (G. Meyersberg.)*

these investigations will furnish information regarding statistical minimum spread of data, section sensitivity and other valuable data in castings of both simple and complicated shapes. The data thus obtained will be gathered in a "Data Book on Cast Iron" similar to the British B.S. 991, "Data on Cast Iron." It is the definite opinion of the committee that the relationship, test-bar *versus* casting, is too vague to be included in any specifications.

New Swedish Specification Designed for Production Control

The principal aim of the Swedish cast-iron specification in its present form is to provide a tool for production control. When the production control functions perfectly in a foundry, test-bars intended for such control will most probably be accepted for final inspection. This arrangement is at present practised in one of Sweden's most advanced grey-iron foundries and has been accepted by both railway and the War Office. In order to make the production control function satisfactorily, test-bars will have to be cast from various heats and made daily rather than associated with a particular casting as is required by other specifications. Such an arrangement may turn out to be rather expensive. It is, therefore, necessary to bring down the costs of testing as much as possible. The tensile-test specimen has been chosen as small as possible to simplify the machining operation and decrease waste. Fig. 15 (bottom) shows the size of the Swedish tensile specimen as compared with those of other countries. The small dimensions make it possible to turn the waist of the specimen by means of a shaped tool-bit. To save metal, the test-bar from which the tensile specimen is machined is cast to final length (Fig. 16). The bar is equipped with a short shaft to facilitate chucking in the lathe.

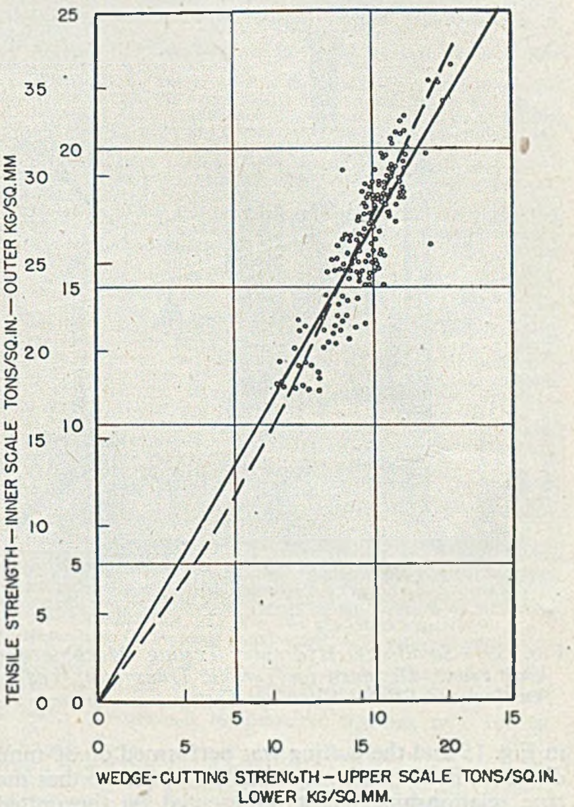

FIG. 18.—*Relationship between Tensile Strength and Cutting Strength.*

The bar is cast under completely standardised conditions. The pouring basin is equipped with a strainer core, which also serves as neck-down core; the mould is designed in such a manner as to bring about directional solidification and thus provide for a sound bar. Even though every precaution be taken to bring down the cost of the tensile specimen, it still remains rather expensive. Other testing methods have therefore been investigated. A simple test, which actually is a modified tensile test, has already been touched upon. It is the "wedge-cut" test and is due to Ludwik and Krystof.[34] The test was suggested for practical application by Meyersberg. Fig. 17 outlines the principle of the test according to Meyersberg; two edges with 90-deg. cutting angle are used to cut off the test-bar. The edges depress the metal in front of them slightly when a load is applied, and sink in a short distance into the test-bar. The stress pattern, Fig. 17 (bottom), indicates that the rupture occurs under tension.

Testing the Metal or the Casting

Ludwik and Krystof found that the tensile strength was 1.2 to 2 times the cutting strength.

Fig. 18 shows cutting strength as a function of tensile strength for a considerable number of test-bars. The tensile-test specimen was the one shown

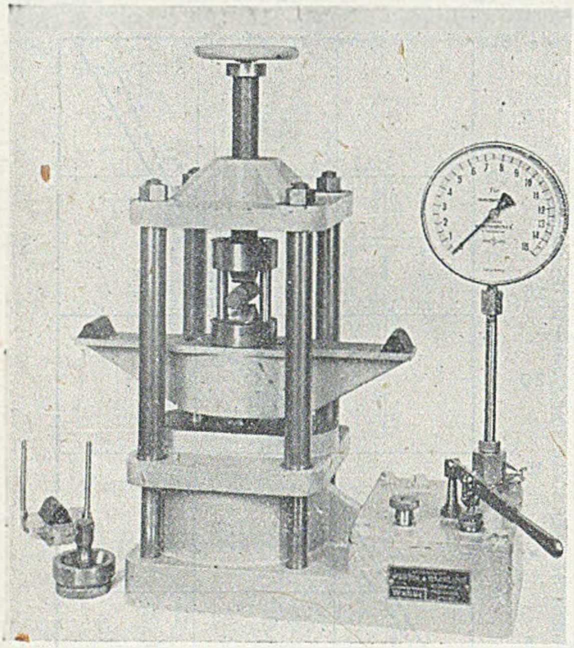

FIG. 19.—*Small-size Hydraulic Testing Machine for Cast Iron. Designed for Tensile, Transverse, Wedge-cutting and Brinell Hardness Tests.*

in Fig. 15 and the cutting was performed on 30-mm. dia. bars in as-cast condition. It is possible that the true relationship is best represented by the dotted line. For practical purposes, however, the straight line in the diagram can be substituted for the dotted line. Under such conditions the relationship will be approximately:—

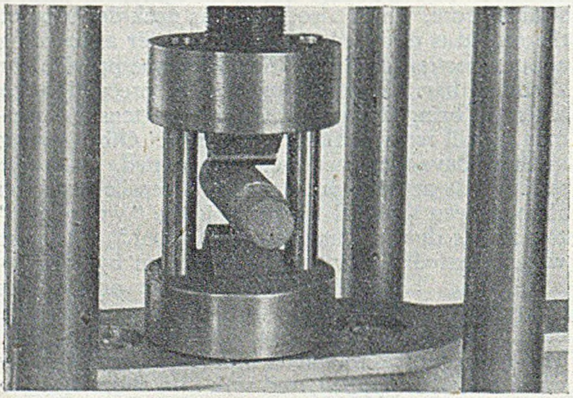

FIG. 20.—*Attachment for the Wedge-cutting Test.*

$$T = 1.72 \times C,$$

where T is the tensile strength and C the cutting strength.

If cutting is performed on bars machined down to 0.787 in. (20 mm.), *i.e.*, the gauge diameter of the tensile bar, the relationship will be roughly:—

$$T = 1.5 \times C.$$

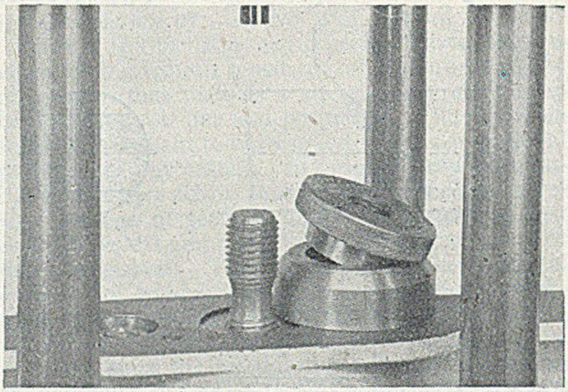

FIG. 21.—*Attachment for the Tensile Test.*

The spread is relatively small, as can be seen from Fig. 18. It is hoped that the cutting test can be used to advantage also for testing actual castings. Flat specimens, cut from castings by means of drilling or flame-powder-cutting, can easily be tested in the wedge-cut apparatus.

In order to facilitate a more general use of the new grey-iron specification, a special low-price testing machine has been designed. The machine is hydraulically operated and can be used for tensile tests, transverse tests, wedge-cutting tests and Brinell hardness testing. The general appearance of the machine is illustrated by Fig. 19. Close-ups of the wedge-cutting test and the tensile test are shown in Figs. 20, 21 and 22.

Summary and Conclusions

A brief survey has been made of the problem related to the testing and specification of grey cast

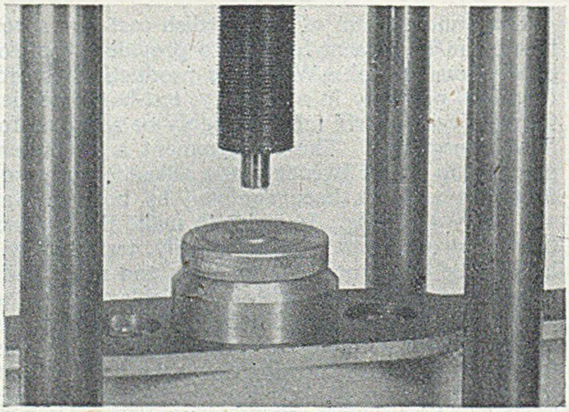

FIG. 22.—*Tensile Testing.*

iron and grey-iron castings. It has been pointed out that the specifications should be a guide for production control, inspection and design. The main problem is the relationship between the properties of the iron, the test-bar and the casting. The correlation of iron and test-bar appears to be quite readily established, if the bar is cast under standardised conditions. The problem, test-bar properties *versus* casting properties, however, seems to be much more difficult of solution.

The factors that affect test-bar and tensile-test specimen, *i.e.*, section sensitivity, volume sensitivity and skin effect have been discussed. Similarly, the factors influencing the properties in different sections of a casting have been accounted for.

Experimental data show that a reliable relationship between test-bar and casting properties can only be obtained for castings of very simple shape. A considerable spread in strength has been shown to exist in similar sections of more complicated castings.

A comparison has been made between the British, American, German and Swedish cast-iron specifications. The first three are quite similar and are designed to be a yard-stick for both inspector and engineer. The Swedish specification, on the other hand, is drafted for production-control purposes only. No attempt is made to correlate test-bar and casting properties. A programme for the investigation of this relationship is, however, planned.

The following conclusions have been drawn:—

(1) The tensile test can be accepted for production-control purposes.

(2) Tensile tests carried out on very small bars are apt to be erratic and should be avoided.

(3) Separately-cast test-bars are to be preferred to cast-on bars.

(4) Separately-cast test-bars should be cast under standardised conditions.

(5) The relationship between iron quality and casting properties should be studied statistically by means of test specimens trepanned from different castings and the "threshold strength" and spread should be determined as a function of the section size.

(6) The correlation between iron quality and casting properties should preferably be presented in a Cast-iron Data book and not be included in the specifications.

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Foundrywork to be Televised

The B.B.C. television programme "For the Children" will include on Thursday evening, November 23, 1950, at 5 p.m., a broadcast dealing with "The Foundryman." This programme is one of a series of documentary programmes on "Men of Action." of which the compere is Mr. Harold Glover of British Instructional Films, Limited. In "The Foundryman" young people will be in the studio to see the film "Casting in Iron" which was produced with the collaboration of The Council of Ironfoundry Associations and a demonstration of moulding and casting by Mr. A. Talbot of Western Foundries, Southall, Middlesex.

I.B.F. National Works Visit

(*Continued from page* 390.)

which are being produced in large quantities.

In the pressure-die-casting bay, a very wide variety of components were seen coming off the machines. There were examples of some of the smallest and largest castings supplied to multiplicity of trades, such as components for toys, electric tools, automatic telephones, camera bodies and electric and gas meters, so that the party were able to gather some idea of the countless applications of pressure-die-cast products. The sand-casting foundry had some interesting examples of the larger and more intricate castings and the visitors were quick to admire the layout of the bay and the extensive use of modern mechanical aids. Crank-cases, cylinder-blocks, supercharger casings and machine-tool bases were all in production at the time, but there was some regret that the visit had not coincided with the casting of what was thought to be the largest component ever produced in aluminium in this country—a rotary filter casing, finished weight 7,000 lb.

Rudge-Littley, Limited, West Bromwich (Machine-tool Iron Foundry and Craft Training Centre)

The senior vice-president of the Institute, Mr. Colin Gresty, participated in the visit by some 22 members to the works of Rudge-Littley, Limited, and which included inspection of the facilities at the National Foundry Craft Training Centre.

At this Centre, moulding trainees from other foundries spend periods at regular intervals during their apprenticeship for more varied and comprehensive instruction than they could expect at their home foundry. The plant and the high standard of work in progress as well as the general attitude of the boys in this training foundry were much admired, and the visitors expressed their enthusiasm for the long-term success and wider application of the scheme.

The main foundry of Rudge-Littley's was established some 50 years ago in a small way, with about half-a-dozen moulders. Now it has grown to an organisation spreading over 7½ acres (about half being occupied by buildings), employing 300 and having an output of about 400 tons per month, mainly of machine-tool and general engineering iron castings. These are made in three sections, divided on a physical basis—mechanised, medium weight, and heavy weight production. While little out of the ordinary is claimed in the way of equipment for this foundry, it was evident that the skill and productivity were of a high order, and much is being done to modernise where possible. For instance, the medium-weight foundry and the core-shop are in process of mechanisation, a Hydroblast plant is being installed and attention is being given to fulfilling in greater degree the implications of the Garrett Report. The visitors were particularly interested in the core-making and core-setting; it seemed that some moulds were built-up almost entirely from cores. Large-casting production, too, received commendation, for here the skill of the moulder, which is being re-born and nurtured at the Craft Centre, was exemplified in high degree.

Jobbing Founding on Scientific Lines

(*Concluded from page* 386.)

on a hydraulically operated hacksaw. Many of the castings produced in the non-ferrous foundry are for Admiralty purposes, and many intricate switch-box castings are produced in aluminium alloys.

All castings are knocked out during the day, decored and transferred to a rotary shotblast machine and from there to the cutting-off machines, which include a 30 in. bandsaw, a Wadkin disc cutting machine and a large hydraulic hacksaw with a 10 in. cut. Afterwards, the castings are transferred to the grinders, who in turn pass them to the dressers. Before being despatched to the stores, castings requiring a superlative finish are once again shot-blasted.

Stockyards and Sand Supplies

Owing to the layout of the factory, the stockyards are at present situated at one end of the site and are equipped with brick-built storage bins. The firm is fortunate enough to obtain Welsh Navigation as its main cupola coke, with Durham coke as an alternative. As the basis for the normal grey-iron mixture, No. 3 Sheepbridge pig-iron is used, other mixtures being based on Goldendale cylinder iron and hematite. The sands used are chiefly Mansfield red, Bromsgrove red and Leighton Buzzard silica (purchased dried and bagged). A certain amount of Erith "medium" sand is also used. These sands are all stored in bins of the type previously described. As far as possible, sand mixtures are limited in number to avoid complications for operators employed on mixing.

To provide the power required throughout the factory, compressed air is supplied by a Broom & Wade compressor driven by a 65 h.p. electric motor. During the periods of the year specified for fuel economy, a Diesel engine is used as a prime mover to drive this compressor.

Amenities

The majority of castings made are delivered to the various customers by the firm's own transport, consisting of three 3-ton lorries. Further expansion of the factory is cramped by lack of space, but extensions continue to be made as opportunity occurs. The most recent addition is a two-storey lavatory, shower-bath and changing-room block for the 140 employees. The upper floor houses the drying room for the men's clothes. A feature of the arrangement is the substitution of fixed and numbered aluminium clothes-hangers instead of the usual lockers. This arrangement was largely in the nature of an experiment, but has proved very successful and popular with the employees. A surgery is also accommodated on the first floor, the four shower-baths being on the ground floor.

An outstanding feature of this progressive firm is the scientific manner in which jobbing founding is approached. It is evident that every angle is first tested out before an idea is allowed to operate. One cannot but feel that the management are very conscious that they are living in a fine country, which expects the best efforts from workers and management alike.

Institute of British Foundrymen

South African Branch Annual Meeting

NEARLY 100 members and guests were present at the thirteenth annual general meeting and dinner of the South African branch of the Institute of British Foundrymen, which was held at the Victoria Hotel, Johannesburg, at the conclusion of last session.

After the loyal toast had been observed, the retiring president, Mr. W. C. Simpson, extended a cordial welcome to the guests, among whom were Professor L. Taverner, of the Government Metallurgical Laboratories; Mr. J. O. Pentz, Acting Chief Inspector of Factories; Dr. A. Rowe, director of the Witwatersrand Technical College; Dr. O. A. E. Jackson, president of the Chemical, Metallurgical and Mining Society; Mr. C. J. Hopewell, president of the Institution of Certificated Engineers (S.A.); Mr. G. Bradford, president of the S.A. Institution of Engineers; Mr. A. C. Wotherspoon, president of the Institution of Production Engineers (S.A. branch), and Mr. F. C. Williams, advisory secretary of S.E.I.F.S.A.

The report of the branch council of the Institute, which was unanimously adopted, showed that the Institute's membership, including the Cape Town section, now stands at 283, comprising 48 subscribing firms, 34 representatives, 77 members, 104 associate members and 20 associates.

During the year the council arranged for a Paper entitled "Foundry Conditions in South Africa," to be sent to the head office of the Institute in England. Prepared by Mr. H. G. Goyns, this Paper* was read at the annual conference of the Institute held at Buxton.

It would be recalled that each year book prizes to the value of £2 2s. were awarded to the two candidates obtaining the highest marks in the subjects of pattern making and moulding in the N.T.C.I. examinations. This year the prize winners were Mr. G. du Pisani, of Durban, and Mr. D. Coleman, of Vanderbijl Park, to whom the book prizes had been forwarded.

In accordance with a suggestion made by certain members of the council, it was agreed during the year to form a metallurgical section of the Institute in order to cater for the needs of the metallurgists. It was proposed to hold four extra general meetings a year for this purpose.

Valedictory Address

After the minutes of the annual general meeting held on June 24, 1949, had been confirmed, the president, Mr. W. C. Simpson, then delivered his valedictory address in the course of which he paid tribute to the help accorded him by his colleagues on the council, and thanked the authors of the Papers. Then he announced the publication of Mr. Oliver Smalley's booklet on "Fundamentals of Casting Design" for distribution to the members. Reminiscing, he pointed with pride to the progress achieved by the Cape Town section. After relating some of the early history of the South African foundry industry, Mr. Simpson quoted the following statistics:—

"In 1900, there were five foundries operating; to-day there are 190. In 1900, the total tonnage per month was 420 tons; to-day the monthly tonnage is 15,000 tons. In 1900, there were 27 moulders employed by the Transvaal foundry industry, while to-day there are approximately 700."

Election of Officers

Mr. Simpson said it gave him very great pleasure to announce that Mr. S. Jane had been elected president of the Institute for the ensuing year, and that Mr. J. J. Marais had been elected senior vice-president. Mr. Simpson recalled the fact that Mr. Marais had become junior vice-president of the branch last year. Mr. H. J. Godwin had been elected to serve in that capacity during the ensuing year.

Three vacancies had occurred on the council, and Mr. V. M. McGowan, Mr. J. Steele and Mr. J. A. de Kiewiet had been appointed to fill those vacancies.

Presentations

Colonel A. H. Guy last year made a donation for the presentation of a gold medal to a member of the Institute for outstanding contributions to the Institute and the foundry industry generally.

After careful thought the council had decided that the first medal should be awarded to Mr. J. Tonge. Although Mr. Tonge needed no introduction to people in the foundry industry, it was fitting to recall that he had been in the country for almost 30 years and had been with the Institute since its inception. He was elected branch president in 1941.

With almost unlimited foundry knowledge at his command and the ability to impart knowledge to others, he had been a tower of strength for many years. In the days past, when meetings had a tendency to fade out, he would come at once to the rescue with his natural gift to take a firm grip on things, and so start a fresh and interesting discussion.

Mr. Simpson mentioned that the medal to be presented to Mr. Tonge was entirely a product of South Africa. The dies had been made and the medal cast solely in the foundry and allied trades in the Union. He then called upon Colonel A. H. Guy to make the presentation.

COLONEL GUY said that the South African branch of the Institute had always been exceedingly fortunate in its selection of presidents, and it appeared that the Institute would be no less fortunate in that connection in the future.

The local branch was carrying out work which

* Printed in the October 26 issue of the JOURNAL. The discussion of Mr. Goyns's Paper appears elsewhere in this issue.

South African Branch Annual Meeting

was of very great importance to the industrial development of the country. It was his opinion that very few people in South Africa had any realisation at all of what the Institute was doing in the fields of foundry education, for example, and in the encouragement and development of new foundry methods and so on.

Mr. Tonge had done a very good job indeed in the industry. He helped to place the industry on its feet, and his achievements had been an inspiration to foundrymen throughout the country.

Presidential Address

Mr. Jane, in the course of his inaugural address, said:

We are living in a time of complexity and confusion. On the one hand there is prosperity such as the foundry industry has never known before, and yet with all this prosperity we seem to live in the deepest depths of depression. Why?

For the prosperity we must thank the mining industry, on which secondary industry, commerce and agriculture depend. Our poverty we must lay at the doorstep of the farmers and commerce. Why should a bag of mealies costing 15 shillings in 1938 now cost 23 shillings; why should a bag of wheat produced by white labour, shipped to us from Australia in 1938 at a landed cost of 12s. 6d., cost us now 41 shillings to produce in our own country? Gentlemen, I am not an economist, but it will take more than an economist to convince me that the increase is justified. Bear in mind that these items are the basis of our food structure.

What of clothing? A 16-guinea suit used to cost five guineas and a 90 shilling pair of flannels 25 shillings in those far-off happy pre-war days. We could go on *ad infinitum*.

Need for Restraint

What of foundry prices? While admitting that there has been an increase of between 10 and 20 per cent. on the prices prevailing in 1939, should we not bring our charges in line with the present trend—say 1s. 4d. to 1s. 6d. per lb. for steel or iron—and assist the farmers and commerce to strangle the goose which lays the golden egg?

Personally, I feel that South Africa is indebted to the masters of our industry for keeping a sober restraint in not joining this mad rush for price increases. If it were not for this I am sure the Free State mines would die before they were properly born — and with them would pass away this prosperous period.

It would be idle speculation to try and evaluate this prosperity in terms of time. Five, 10 or 15 years—who can honestly forecast our future? With the influx of large overseas engineering firms (names in engineering which are famous the world over) who will be requiring castings of all descriptions, the future of our industry looks as bright as the future of South Africa itself.

During a period such as this, when demand is greater than the sources of supply, there may arise a temptation to price castings at " how much can we get for them? " instead of working on a true cost figure. (The former seems to be the system used by the gentlemen in other spheres.) We must avoid this temptation at all costs, realising that our industry is dependent upon the gold-mining industry, which is in turn tied to the price of gold and the cost of extracting it from the earth. When the cost of production exceeds the price of gold, South Africa as a whole will be in for a very lean time.

Cost of Living

In consequence, we find that working conditions and wages are dovetailed into this cost structure, these conditions being better than at any time of our history—not only in our industry but generally throughout the country. This is offset, however, by the extremely high cost of food, clothing, and the high cost of living generally. The worker is becoming demoralised, and a demoralised worker means a demoralised industry which will not make the best of the future.

If commerce and the farmers claim that the increase in cost is justified, and if they cannot work on a reduced margin, then, gentlemen, I can only appeal to them to take stock of the position, increase efficiency and take a leaf out of the iron and steel industries' book. For the hardship that is being caused takes a lot of justifying.

Finally, I wish to appeal to you one and all to support our Institute in the coming year, not only with your attendance but with your foundry problems and ideas. In this way we shall find mutual benefit. Out of life we can only expect what we are prepared to put into it. So it is with the Institute—it can only be as useful as we are prepared to make it.

I wish to thank you all once again, trusting that this year will see the end of these trying times, and praying that *Alles Sal Reg Kom*.

Mr. Holdsworth, deputising for Mr. Teubes, then presented a presidential certificate to Mr. Simpson.

Progress in Founding

Speaking on the development of the foundry industry, Professor L. Taverner said that founding would remain an art long after other trades had developed into a science.

He drew an interesting comparison between conditions in the very early days of the foundry industry and those which exist to-day. Going as far back as the 17th century, one found that in those days workers were given very little respite. Apprentices in brass foundries were never allowed to leave the foundry. They ate there and slept there, and were allowed out of the precincts only after they had been given special permission. Those days were now far behind, the foundrywork in the interim had developed into a trade which possessed definite attractions and could be immensely satisfying to the man who took a real interest in his work.

Professor Taverner felt that the foundry industry owed much for its recent rapid development to the Institute of British Foundrymen and the founder of that Institute, Dr. Faulkner.* In Britain, Dr. Faulkner had fostered a scheme to develop the tuition of foundry workers on sound lines, and the foundry industry as a whole had reaped very considerable benefits from that development.

Another development of major importance in the foundry industry had been the establishment of the British Cast Iron Research Association, which had on innumerable occasions shown how very valuable research could be. He wished to draw attention to the opportunity that existed in South Africa for the local foundry industry to form a similar research organisation and to encourage research. In South Africa there was an urgent and ever-increasing need for organised research. There were many difficult problems which could be solved to reap dividends through a really energetic research effort.

Training

Professor Taverner stressed the fact that foundrymen had to help themselves if they wished to maintain the rate of progress that had been achieved. It had been suggested, for example, that a foundry course should be started at the universities. There was reason to believe that a training course of that type would be established. But foundry education would prove of little value if it were allowed to be a one-sided effort on the part of the universities; to produce the type of fully-trained foundry engineer the industry required, the training would have to be organised on a two-sided basis. There would have to be the closest possible co-operation between educationists and industrialists.

Successful Endeavour

Mr. F. C. Williams said that 10 years was a long time over which to look back on the activities of what one might regard as a very young branch of the Institute.

There were to-day two aspects of the foundry industry that struck him as being prominently to the fore. The first was foundry mechanisation and the second was payment by results. In giving consideration to mechanisation, it was important that foundrymen should have cognisance of the fact that over-mechanisation could be the cause of more problems in the foundry than under-mechanisation. An American foundry expert had recently warned the industry against the danger of over-mechanisation, and this warning had been issued also by a number of prominent foundrymen in other highly industrialised countries. When one was tempted to study American concerns with the object of finding a pattern for production, it would be well to bear in mind that not all of the foundries in the United States were mechanised.

The prominence of the foundry industry to-day was commensurate with the position it achieved during the war period. Import control and the many new projects undertaken in the Union had been largely responsible for the increased activity in the industry. Import control had made very considerable demands on the foundries, coupled with increasing demands from the mining industry and secondary industries. The big customers of the foundry industry were primarily represented by the mines and by agriculture, and the latter source of revenue was fast becoming as important to the industry as were the mines in earlier years.

At this stage he could not see how the labour problem could be alleviated under the circumstances which at present exist in the Union. But human nature and human capabilities being what they were, we would probably find a way out of this difficulty and continue to develop the foundry industry in accordance with the vital position it occupies in South Africa.

Foundry Efficiency

Mr. D. Lion-Cachet, referring to the industrialisation which was spreading throughout South Africa, declared that industrialists could be justly proud of the country's achievements. The foundrymen of the Union could be proud that they shared to a considerable extent in the industrial development of the country.

But he suggested that foundrymen should look at problems realistically. He ventured to suggest that the foundry industry in their country was not quite as efficient as was thought. In the foundry industry what did the word efficiency mean? Did it mean that one was able to make dividends or did it mean one could turn out castings that were acceptable to the customer?

It was their obvious duty to develop this industry economically—economically as compared with the foundry industry overseas. If the existing South African foundry, as it now stood, was placed next to one in Belgium or in Germany, would one be able to compete with the foundry next door? He thought not. The reason for failure would not be lack of foundry knowledge—there can be no doubt that the South African foundryman is an expert craftsman who has as much skill as his counterpart anywhere else in the world. The home concern would not be able to compete because the foundry management would not be as efficient as the management of the next-door concern.

Efficiency in the foundry was not only the making of a good-looking casting. It was good management and good methods of dealing with personnel.

Death of Mr. F. M. Osborn

The death took place on November 8 of Mr. Fred M. Osborn, the chairman of Samuel Osborn & Company, Limited, Clyde Steel Works, Sheffield. Mr. Osborn was born in 1874, and was educated at Leys School. Cambridge, where he was captain of the Rugby team. He joined the family business in 1892 and became a partner in 1898, and chairman in 1948. He played a prominent part in the affairs of the Royal Hospital and was chairman of Board of Governors in 1924 and of the Court of Management of the Royal in 1941. In his early days he was associated with the sons of Mushet in the development of high-speed steel. Mr. Osborn was a member of the Senate of Sheffield University. His character and manner of life endeared him to a wide circle of friends, and Sheffield will long mourn the loss of one of its most prominent citizens.

* We can only imagine an error has crept in here and the reference was intended for Mr. V. C. Faulkner, who though a member of very long standing, was not a founder of the Institute.

Correspondence

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

METALLURGICAL BLAST CUPOLA

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—I have read the letter of Mr. F. C. Evans printed in your issue of September 14. Your correspondent, after having read the title of your editorial "A New Type of Cupola" fails to find anything new under this heading, or in the article on the Metallurgical Blast Cupola, appearing in the same issue. He states he has found nothing which was not already well known. It may be that my Paper was insufficiently lucid, and for this I express my regret.

I am convinced that, assuming a metallurgical knowledge by Mr. Evans, and of this I have no doubt since he is on the staff of the firm of Metallurgical Engineers, Limited, he will understand, when he has studied the problem, that the Editor has been judicial in the choice of the caption of his leading article. It is quite true to say that there are in Europe at least ten hot-blast cupolas using air at 500 deg. C. Personally, I know of more than twenty. It is equally true that some of the makers of hot-blast cupolas have made distinct progress in the field of the elimination of dust which at one time caused so much trouble in recuperators.

These "hot-blast cupolas," properly handled, are capable of giving the advantages pointed out by Mr. Evans—fuel economy; reduction in metallic losses; reduced sulphur content in the product; increased output and hotter iron. Yet it is not thought that amongst them there is one showing the metallurgical possibilities of the "Metallurgical Blast Cupola."

I will ask Mr. Evans one precise question, the reply to which will enable him to understand that there is something fundamentally novel in the Metallurgical Blast Cupola. Does Mr. Evans know of one single hot-blast cupola in which it is possible to obtain quite simply, surely, and practically, a slag of which the composition is rigorously constant and continuously produced?

To the best of my knowledge, only the Metallurgical Blast Cupola gives this result, which allows, as I pointed out in my lecture, the production of any given iron of which the composition is compatible, according to the laws of chemical equilibrium with the slag through which it passes.

Yours, etc.,
ROBERT DOAT

Compagnie Generale des Conduits d'Eau,
Les Vennes,
Liège, Belgium.

(This letter has been translated from the French.—EDITOR.)

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—After reading the articles on the Metallurgical Blast Cupola and later correspondence on the subject, I am reminded of a true story which occurred during the war in this country.

We were given a problem of producing hematite iron from 100 per cent. steel scrap with continuous operation, if possible. At a preliminary technical meeting, a scheme was drawn up in which the cupola was water-cooled, the tuyeres were water-cooled, hot blast was to be blown utilising the waste gases from the top of the cupola, and the fitting of a bell arrangement to close the throat of the cupola was suggested. Further, slag control was to be incorporated in order to try to obtain silicon pick-up without the addition of ferro-silicon. After a long, detailed discussion, the chairman of the meeting suddenly sat back and said, "Boys, you will be pleased to know that we have just invented the blast furnace!"

On the Continent it is quite usual to melt 100 per cent. steel scrap with coke, using hot-blast and slag control to produce hematite iron. Several such installations have existed for the past 30 years, operating continuously, and producing the highest grade of iron. In the trade such installations are known as "Blast Furnaces."

Yours, etc.,
GEORGE L. THOMAS
(John Miles & Partners (London), Limited).

November 3, 1950.

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—Thank you for permission to comment further on the subject of hot-blast cupolas and for a preview of the letters from Mr. Doat and Mr. Thomas.

The latter neatly reaffirms my point that there is little novel in the published description of the "Metallurgical Blast" cupola. While blast furnaces usually produce iron from ore, there have been several installations running for years producing iron from steel scrap. There only remains the difference in the size between a normal blast furnace and a foundry cupola. The application of hot blast heated by cupola waste gas to a cupola furnace of normal size is an engineering problem, the success of which depends on the efficiency of recuperation achieved. This in turn depends on the design of the recuperator and the steps taken to solve the problem of reduction of efficiency by the dust contained in the cupola waste gas.

Unfortunately, Mr. Doat's article gives no clear figures of the fuel consumption, etc., by which the economics of this plant can be judged. From the scale model (Fig. 1 in the original article), however, I would judge that the plant is both costly and still has the deficiencies and inefficiencies of the initial types of hot-blast cupolas.

To sum up, therefore, I would say that the main problem in a hot-blast cupola is the design of the recuperative system and, once this has been solved satisfactorily, water cooling which is not a new development can be applied if required, from designs and knowledge already existent. Moreover, slag control can be instituted just as on a scrap-melting blast furnace.

Yours, etc.,
F. C. EVANS,
Metallurgical Engineers, Limited.

November 13, 1950.

NODULAR IRON

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—With reference to the discussion on Dr. J. G. Pearce's lecture to the Lancashire branch of the Institute of British Foundrymen, entitled "The Foundry, the Engineer, and the Future," as reported in the issue of the FOUNDRY TRADE JOURNAL of October 26, 1950, it is stated that I told Dr. Pearce that during preliminary tests the very good results we achieved in producing nodular cast iron by the cerium process were probably due to the low manganese of the hematite which we used for the base iron.

A correction is necessary here. I asked Dr. Pearce if he could give me an explanation as to why we failed to produce successful nodular structures with such a low-manganese iron and that we did not succeed until we raised this manganese to about 0.50 per cent.

Yours, etc.,
W. J. POLLOCK.

32, Walker Road, Chadderton, Lancs.
November 4, 1950.

Foundry Foremen's Training Course, 1951

A third Foundry Foremen's Training Course, organised by the Institute of British Foundrymen with the aid of funds furnished by the Joint Iron Council, will be held at Ashorne Hill, Leamington Spa, Warwickshire, from March 8 to 10, 1951. The programme for the new course will consist of an entirely fresh series of lectures, but they are again designed to give practical guidance to foremen in charge of men. Only provisional arrangements have yet been made, and it should be understood that the list of lectures is subject to alteration.

The following lectures will be given and discussed:—

Servicing the Foundry Operative—Minimising Lost Production Time.

Handling and Preparation of Materials (dealing with a foundry not highly mechanised).

Relationship of the Foreman to Management (including the views on foremanship of the Grey Iron Founders' Productivity Team.

Production of castings as seen by the Designer.

The Foreman in Relation to Mechanised Production (adjustments necessary when changing to mechanised working).

The "Garrett Report".

During the evening of March 9, discussion groups will be formed.

Accommodation at Ashorne Hill is strictly limited and applications to attend the course will be dealt with strictly in the order of receipt. The charge for accommodation at Ashorne Hill is 32s. 6d. per day, which includes dinner, bed, breakfast, lunch, tea and a snack. Those attending the course who do not require sleeping accommodation at Ashorne Hill may obtain meals at a charge of 10s. per day; 10 per cent. is added to bills to cover gratuities. Delegates will be free to return home on Saturday, March 10, or to remain until Sunday or Monday if they so wish. Forms of application to attend the course may shortly be obtained from the Secretary of the Institute, to whom they should be returned as soon as possible, and in any event not later than February 1, 1951.

Early Castings

An interesting address on the ironfounding industry was given last week in Falkirk by Lt.-Col. R. Leslie Hunter, director of Allied Ironfounders. Limited, and general manager of M. Cockburn & Company, Limited. He made a brief reference to the historical background of the iron industry, and how it came to be introduced into Britain by the Celts around 500 or 600 B.C. The earliest British castings were mainly tombstones, pots, kettles, cannon and shot, and it was interesting to learn that in the Victoria and Albert Museum there was a casting which was made prior to the Union of the Crowns.

News in Brief

THE NEXT Daily Mail Ideal Home Exhibition will be held at Olympia from March 6 to March 31, 1951.

J. & E. HALL, LIMITED, plan to erect a new foundry at Dartford Ironworks, Victoria Road, Dartford, Kent.

BRAZIL produced 183,629 tons of steel, 163,334 tons of pig-iron, and 462,897 tons of coal during the first quarter of 1950.

BRITISH TIMKEN, LIMITED, Duston, Northampton, have opened a new office at 93, Hope Street, Glasgow, C.2 (telephone: Central 7331).

OVER 40 COUNTRIES HAVE been invited to participate in the Indian International Engineering Exhibition to be held in New Delhi in January, 1951.

F. W. BERK & COMPANY, LIMITED, have recently opened a new office in Glasgow to handle Scottish sales. It is at 65, West Regent Street, Glasgow, C.2 (telephone: Douglas 8338).

VULCAN FOUNDRY, LIMITED, Newton-le-Willows (Lancs), have secured contracts worth more than £1,500,000 for 60 oil-burning locomotives for the State railways of Persia and Egypt.

KEITH BLACKMAN, LIMITED, announce that from October 12, Mr. D. S. Woodley, A.M.I.MECH.E., F.R.S.A., their technical director and chief engineer, has been appointed deputy chairman.

A NEW SAFETY DEVICE has been developed and is being marketed by the British Oxygen Company which is claimed to eliminate the possibility of backfire when using blowpipes for welding.

MAY & BAKER, LIMITED, announce the introduction of a new high-speed document copying developer called "Planocop." It is claimed it has a long working life, good storage properties and complete freedom from any tendency to stain or sludge.

THE MINISTER OF FOOD has made an Order which removes price control from soya flour and frees all manufacturers and pre-packers from the need to be licensed. Another Order revokes the Soya Beans (Control) Order, 1943. Soya beans and soya bean oil, however, continue to be controlled under the Oils and Fats (Number 2) Order, 1949.

THE FIRST of 100 overseas engineering graduates to be offered scholarships in the first year of the F.B.I. Overseas Scholarship Scheme has arrived in England. He is a young Chilean engineer. By the scheme, with which Government departments, industrial associations and educational organisations are associated, the F.B.I. overseas graduates training committee has been set up to arrange for the selection and training of suitable overseas graduates in British workshops and to keep in touch with them after their return to their own countries.

THE LATEST ISSUE of "Albion Works Bulletin," the house magazine of John Harper & Company, Limited, and John Harper (Meehanite), Limited, discloses, amongst much of purely domestic interest, that worthwhile reconstruction and rearrangement has been taking place within the foundries. Amongst new plant are the Meehanite cupola stage, cupolas and crane giving improved handling and better technical control at charging level. The coreshop in this foundry has been replanned, conveyors and a continuous stove have been installed. Increased output at lower cost is being contributed also from the use of urea formaldehyde synthetic-resin corebinders. The grey-iron foundry coreshop, likewise, has been rearranged and new coreblowers installed. In the patternshop, new machines have been added and the whole re-grouped. Additional moulding machines have been incorporated in the grey-iron foundry and the semi-mechanised plants.

Personal

MR. R. B. MITCHELL has been appointed managing director of the Aerograph Company, Limited, of Lower Sydenham, London, S.E.26.

MR. F. COLBOURN has been appointed to assist Mr. V. Lloyd, London office manager of John Harper & Company, Limited, of Willenhall.

MR. JOHN JEX-LONG, who has been works manager of the New Town Works, Hebburn (Co. Durham), of A. Reyrolle & Company, Limited, manufacturing electrical engineers for 30 years, is retiring at the end of this month.

MR. JOHN MOORE has resigned from the board of Cox & Danks, Limited, iron and steel scrap merchants, etc., and has started a similar business on his own account under the style of John Moore & Sons, at 182, High Street, Acton, London, W.3.

MR. ROBERT CARSWELL is now manager of the Swanston Street, Glasgow, foundry of Mavor & Coulson, Limited. Another recent appointment at the foundry is that of MR. CHARLES BLEAKLEY, moulder and later chargehand with the company for 30 years, as apprentice instructor.

LORD HIVES has been elected chairman of Rolls-Royce, Limited, in succession to the late Capt. E. C. Eric Smith. Lord Hives will combine his new duties with those of managing director. He is a director of Renfrew Foundries, Limited, Hillington, Glasgow, S.W.2, and of Rotol, Limited, airscrew and accessory driving equipment manufacturers, of Gloucester.

MR. SIDNEY WHEATLEY, a director of Crofts (Engineers), Limited, who has retired after 57 years service, has been presented with a gold watch by Mr. Arthur Croft, managing director of the firm. At the same function, two employees with fifty years' service, Mr. Harold Wheater (chief draughtsman) and Mr. H. Scaife (patternshop foreman), were presented with cheques.

MR. J. W. CARTLIDGE, of Dyson & Company Enfield (1919), Limited, has been elected chairman of the council of the Zinc Alloy Die Casters Association for 1950-51. He will be assisted by MR. E. B. HILL, of Charles Hill & Company, Limited, Birmingham, the retiring chairman, and MR. F. G. WOOLLARD, of Birmingham Aluminium Castings (1903), Company, Limited, the chairman-designate, who takes office as deputy chairman.

Death of Mr. L. Levy

A director and a former chairman of George Cohen, Sons & Company, Limited, Mr. Lawrence Levy died at Loudwater, near Rickmansworth (Herts), last Tuesday. He was 73. Mr. Levy, who was a grandson of the founder of the firm, joined it in 1893. He became a director in 1924, when it was registered as a private limited company. On the death of Mr. Michael Cohen in 1928, Mr. Lawrence Levy was elected chairman; he held that position until 1947, when the company became a public one.

Founder and first president of the London and Southern England Scrap Iron and Steel Merchants' Association, Mr. Levy was one of the best-known personalities in the scrap metal trade, both at home and abroad. Up to the time of his death, he was chairman of the subsidiary company of New London Electron Works, Limited, and of the associated company of Batchelor, Robinson & Company, Limited.

The funeral was at Willesden Cemetery last Thursday. A memorial service was held at the Hampstead Synagogue on Monday.

Steel Output Rate Exceeds 17 Million Tons

For the second time this year steel output has exceeded an annual rate of 17,000,000 tons. The British Iron and Steel Federation announces that production in October was at an annual rate of 17,040,000 tons, this being the highest ever recorded in that month. The previous best October was last year, when the rate was 15,959,000 tons.

Last March the steel industry set up an all-time record, output then being at an annual rate of 17,147,000 tons. The industry's target for the year is 15¾-16 million tons, a target which is expected to be attained comfortably.

Pig-iron output last month was at an annual rate of 10,084,000 tons, which compares with 9,565,000 tons in November, 1949.

Latest output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1950—September ..	186,800	9,712,000	326,200	16,964,000
October ..	193,900	10,084,000	327,700	17,040,000
1949—September ..	185,300	9,634,000	305,900	15,906,000
October ..	183,900	9,565,000	306,900	15,959,000

Hazleton Memorial Library

It will no doubt be recalled that the original Library of the Institution of Production Engineers was totally destroyed by fire in March, 1944. In planning its reconstitution, it was agreed that the new library should take the form of a permanent memorial to the late Richard Hazleton, to whom the Institution owes so much for his work as its first general secretary. Members and friends responded generously to appeals for funds and books, and on October 26 the Hazleton Memorial Library was declared open by the president of the Institution, Major-General K. C. Appleyard, C.B.E., T.D., D.L., J.P., M.I.MECH.E.

The Library contains books covering all aspects of production engineering. These books are available to every member of the Institution, a special postal service being arranged for those unable to visit personally. In addition to the ordinary reference facilities, it is intended to inaugurate an extensive information service to deal with members' enquiries, and also an abstracting service.

In addition to the president, other prominent speakers at the official opening were the chairman of council, Mr. W. C. Puckey, F.I.I.A., the Right Hon. Lord Sempill, A.F.C., chairman of the library committee, and Mr. W. Core, president of the London section.

1951 Foundry Conferences

The Annual Conference of the Institute of British Foundrymen will next year be held at Newcastle in the week ending June 16.

During the preceding week, on June 4, 5 and 6, will be held the Annual Congress of the *Association Technique de Fonderie* in Paris. At this congress the official exchange Paper from the Institute of British Foundrymen will be presented by Mr. V. C. Faulkner, Hon. M.I.B.F. His subject will be "British Foundry Training Facilities."

Imports and Exports of Iron and Steel

Board of Trade Returns for September

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in September. Figures for the same month in 1949 are given for purposes of comparison; respective totals for the first three-quarters of this year and of 1949 are also included.

Total Exports of Iron and Steel.

Destination.	Month ended September 30.		Three-quarters ended September 30.	
	1949.	1950.	1949.	1950.
	Tons.	Tons.	Tons.	Tons.
Channel Islands	975	699	8,636	6,343
Gibraltar	102	288	1,407	1,384
Malta and Gozo	264	276	3,961	3,307
Cyprus	292	749	3,696	6,800
British West Africa	5,839	5,026	60,745	67,452
Union of South Africa	7,415	16,723	111,734	133,452
Northern Rhodesia	1,725	1,670	15,165	22,159
Southern Rhodesia	3,606	3,336	39,551	55,025
British East Africa	7,140	7,088	64,155	74,484
Mauritius	798	476	5,931	6,743
Bahrein, Kowelt, Qatar and Trucial Oman	1,440	485	17,844	5,475
India	5,621	5,577	64,283	77,223
Pakistan	1,792	9,554	28,131	75,560
Malaya	5,976	5,779	43,035	59,160
Ceylon	3,204	2,174	18,486	26,638
North Borneo	346	75	8,498	4,365
Sarawak	394	17	1,373	742
Hongkong	2,014	3,267	25,296	34,480
Australia	20,609	46,917	122,912	299,520
New Zealand	11,266	17,053	79,664	132,525
Canada	4,482	21,354	52,982	145,261
British West Indies	5,371	3,893	46,935	46,758
British Guiana	499	535	3,102	5,588
Anglo-Egyptian Sudan	1,267	1,291	10,323	13,097
Other Commonwealth countries	955	2,434	8,830	10,742
Irish Republic	5,804	9,966	50,229	71,297
Russia	85	16	8,737	529
Finland	6,432	4,927	55,625	54,018
Sweden	4,828	4,948	45,305	64,353
Norway	4,107	7,557	50,357	65,008
Iceland	616	103	6,292	3,407
Denmark	6,828	4,563	66,686	88,241
Poland	31	150	968	1,281
Germany	9	104	451	682
Netherlands	9,073	6,759	85,942	59,247
Belgium	535	1,343	8,432	9,536
Luxemburg	500	10	4,878	382
France	2,593	1,819	25,066	18,835
Switzerland	336	853	8,956	8,236
Portugal	1,058	2,015	14,194	16,277
Spain	751	342	8,027	6,070
Italy	281	2,344	2,444	9,037
Hungary	40	1	819	329
Greece	161	1,305	4,212	6,195
Turkey	1,161	747	13,865	7,427
Indonesia*	1,646	650	20,677	9,818
Netherlands Antilles	1,088	408	6,311	6,674
Belgian Congo	215	190	1,293	1,218
Angola	265	112	5,637	1,909
Portuguese East Africa	376	260	3,437	3,460
Canary Islands	186	357	2,340	1,747
Syria	147	224	1,309	880
Lebanon	919	622	23,334	8,528
Israel	1,741	1,648	13,125	17,408
Egypt	3,238	3,241	43,033	45,210
Morocco	469	903	1,085	2,498
Saudi Arabia	969	88	4,172	2,096
Iraq	2,621	3,109	44,311	27,615
Iran	14,447	4,515	109,309	79,084
Burma	457	1,051	7,097	8,947
Thailand	612	1,803	3,327	5,708
China	109	1,228	2,595	3,207
Philippine Islands	165	229	2,798	7,353
USA	453	5,850	2,765	22,401
Cuba	40	227	342	1,541
Colombia	277	246	3,862	4,923
Venezuela	2,709	1,559	44,381	24,989
Ecuador	213	516	2,508	2,752
Peru	651	1,137	4,437	9,198
Chile	839	1,035	5,283	12,633
Brazil	1,733	2,229	13,819	24,588
Uruguay	507	1,044	6,590	7,194
Argentine	6,011	4,783	39,860	49,071
Other foreign countries	1,317	2,584	9,407	26,134
TOTAL	183,941	249,416	1,736,694	2,224,354

* Includes Netherlands New Guinea in 1949.

Total Imports of Iron and Steel.

From	Month ended September 30.		Three-quarters ended September 30.	
	1949.	1950.	1949.	1950.
	Tons.	Tons.	Tons.	Tons.
Australia	10	—	11,189	44
Canada	4,080	2,953	47,910	29,654
Other Commonwealth countries and Irish Republic	878	202	21,270	24,159
Sweden	1,387	1,415	13,108	9,408
Norway	1,548	3,725	22,577	37,669
Germany	1,637	5,512	17,575	63,000
Netherlands	7,121	3,082	80,449	38,952
Belgium	13,882	8,892	293,340	78,008
Luxemburg	9,350	3,371	140,760	33,114
France	19,640	28,569	167,156	221,634
Austria	329	—	31,102	3,286
USA	35,820	3,938	219,258	50,566
Other foreign countries	251	766	2,766	5,978
TOTAL	95,933	62,425	1,068,460	595,472
Iron ore and concentrates—				
Manganiferous	4,750	—	11,726	10,876
Other sorts	854,474	658,483	6,674,074	6,535,330
Iron and steel scrap and waste, fit only for the recovery of metal	203,384	82,756	1,666,458	1,675,951

Exports of Iron and Steel by Products.

Product.	Month ended September 30.		Three-quarters ended September 30.	
	1949.	1950.	1949.	1950.
	Tons.	Tons.	Tons.	Tons.
Pig-iron	1,192	2,706	5,160	20,926
Ferro-alloys, etc.—				
Ferro-tungsten	56	123	609	880
Spiegeleisen, ferro-manganese	693	249	6,013	1,605
All other descriptions	15	120	799	1,152
Ingots, blooms, billets, and slabs	275	274	1,961	4,924
Iron bars and rods	715	368	4,932	3,295
Sheet and tinplate bars, wire rods	403	2,252	2,876	11,195
Bright steel bars	1,588	3,465	14,317	32,131
Other steel bars and rods	15,369	23,786	127,892	182,755
Special steel	1,099	773	10,707	11,109
Angles, shapes, and sections	10,057	12,034	88,233	108,245
Castings and forgings	788	599	5,895	6,025
Girders, beams, joists, and pillars	3,265	4,762	21,564	48,666
Hoop and strip	4,454	10,787	38,898	84,426
Iron plate	1,233	26	4,364	1,943
Tinplates	11,295	22,675	138,421	186,848
Tinned sheets	240	248	2,970	2,256
Terneplates, decor. tinplates	41	69	249	712
Other steel plate (min. ⅛ in. thick)	19,486	26,118	165,351	240,627
Galvanised sheets	7,059	10,757	65,355	87,836
Black sheets	8,046	11,471	100,707	104,105
Other coated plates	461	1,508	4,968	9,526
Cast-iron pipes up to 6-in. dia.	5,679	5,298	58,297	57,276
Do., over 6-in. dia.	6,881	6,075	62,201	60,783
Wrought-iron tubes	23,754	19,770	245,219	257,283
Railway material	12,692	26,925	143,543	231,858
Wire	5,309	8,278	39,513	58,618
Cable and rope	2,893	2,096	23,025	25,001
Netting, fencing, and mesh	1,445	1,386	15,523	12,638
Other wire manufactures	1,306	2,927	9,549	20,948
Nails, tacks, etc.	322	611	5,353	4,537
Rivets and washers	601	762	7,040	6,171
Wood screws	250	319	2,518	2,776
Bolts, nuts, and metal screws	2,076	2,316	19,384	23,282
Stoves, grates, etc. (excl. gas)	702	922	7,067	8,458
Do., gas	217	176	1,979	1,908
Baths	904	861	7,360	10,375
Anchors, etc.	791	1,010	6,977	6,803
Chains, etc.	695	680	7,608	7,629
Springs	590	441	6,271	6,455
Hollow-ware	8,356	8,604	60,704	64,640
All other manufactures	20,648	24,783	195,313	205,728
TOTAL	183,941	249,416	1,736,694	2,224,354

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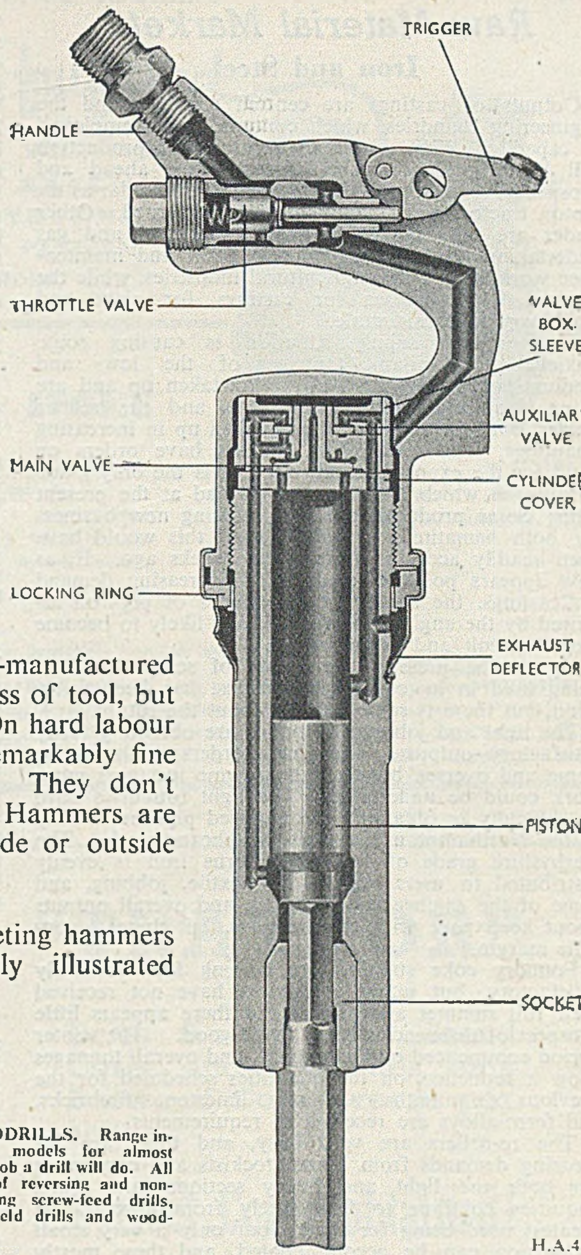

HOLMAN *Pneumatic Hammers* are precision-manufactured to an unusual degree of accuracy for this class of tool, but they are also robust, hardy and powerful. On hard labour or light duties, they allow the worker remarkably fine control, thanks to their sensitive throttle. They don't recoil and they don't waste air. Holman Hammers are available with open or closed handle, inside or outside trigger.

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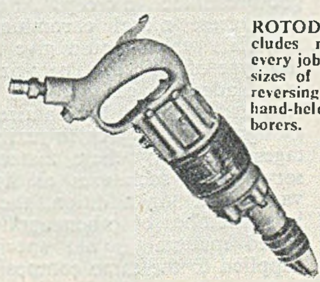

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Raw Material Markets

Iron and Steel

Outputs of castings are centred chiefly round the engineering foundries, which continue to be employed to capacity. Work on hand ensures that production will be at present levels for some time ahead and prospects are very encouraging, particularly as far as the motor, tractor, and allied trades are concerned. Other trades are also specifying freely—electrical and gas undertakings for castings for new plant and maintenance work, textile and agricultural industries, while the demand from oversea for castings for plant and machinery is considerable.

The pig-iron supply situation is causing some anxiety. All available tonnages of the low- and medium-phosphorus irons are being taken up and are being supplemented with hematite and the refined grades, both of which are being taken up in increasing quantities. The refined-iron makers have orders on hand for the export market, but this is the only grade of pig-iron which is being sent abroad at the present time. Some producers are now refusing new business for both hematite and refined iron; this would have been readily accepted only a few weeks ago. If, as now appears possible, there is an increasing demand for castings, the supply of the grades of pig-iron required by the engineering foundries is likely to become more difficult and embarrassing.

Up to the present, the supply of scrap, which is being used in increasing proportions, has been fairly good, but there is some anxiety about the future.

The light and jobbing foundries are obtaining fairly satisfactory outputs. They have orders on hand for home and oversea buyers, but in some instances more work could be undertaken. The light foundries have no difficulty in obtaining the required pig-iron, chiefly in the Northamptonshire high-phosphorus grade. The Derbyshire grade of high-phosphorus iron is evenly distributed to users, chiefly the textile, jobbing, and some of the engineering foundries, and overall outputs about keep pace with requirements, but there is very little margin.

Foundry coke supplies are coming forward fairly satisfactory, but many consumers have not received their full summer allocations, and there appears little prospect of deficiencies being made good. The winter period commenced on October 30, and overall tonnages show a reduction on the quantities scheduled for the previous six months. Ganister, limestone, firebricks, and ferro-alloys are received to requirements.

The re-rollers are very busy, and there are increasing demands from home stockists and consumers for both the light and heavy sections and bars. Inquiries continue to flow freely from abroad, the greatest need being for sheets, but only a very small proportion can be accommodated, and these mostly for deferred delivery, as the mills are fully booked for some months ahead. Strip mills are also busy; in fact, there is now no section of the re-rolling industry which is not excessively engaged.

Steel semis supplies are causing embarrassment. Demands are heavy, and home steelworks are inundated with orders for supplies. The small sizes of billets and slabs are much below requirements. All arisings of defectives and crops are readily accepted. The sheet re-rollers are taking up all available prime sheet bars, as well as defectives.

Non-ferrous Metals

Although everyone felt sure that the fierce uprush in the price of tin would end in a collapse, the break when it came last week was a considerable shock to the market. It is always a little difficult to know the cause of sudden weakness in a market, but on this occasion it seems to have come from a report that tin might be offered to United States consumers through the Reconstruction Finance Corporation at a special price below the inflated levels recently ruling. Moreover, there had been a suggestion that the U.S. authorities had some idea of revising their stockpiling policy, and this more than anything would cause weakness in the London tin market. There are always people ready to suggest that the Metal Exchange is itself responsible for any violent price fluctuations that occur. A fallacy of course, but such reports are harmful.

Metal Exchange official tin quotations during the past week were as follow:—

Cash—Thursday, £1,150 to £1,155; Friday, £965 to £975; Monday, £1,105 to £1,110; Tuesday, £1,070 to £1,075; Wednesday, £1,045 to £1,050.

Three Months—Thursday, £1,110 to £1,120; Friday, £925 to £935; Monday, £1,070 to £1,075; Tuesday, £1,040 to £1,045; Wednesday, £1,005 to £1,010.

Zinc continues in very short supply, and in the United States, and, indeed, in Europe, prices much in excess of 17½ cents have been paid. Questions about the United Kingdom situation have been asked in the House of Commons and from the replies given by the Minister of Supply, it would appear that manufacturers will receive their full quota of zinc for defence work. But unless the Government has been able to amass some kind of a reserve this decision can only mean that the tonnage available for domestic purposes will be reduced in proportion. The trade is, of course, anxious to know whether there is any prospect of the cut being restored, but on that matter the authorities have so far been silent. It is pretty certain that in some directions a reduction in manufacturing activity has occurred in consequence of the failure in zinc supplies. Unless the cut can be restored this tendency is likely to become more pronounced.

Nimonic Alloys

The Nimonic alloys were specifically developed to meet the stringent requirements of gas-turbine designers for a blade material which, in addition to withstanding high stresses at very high temperatures, would have good resistance to creep. At the time of their introduction, these nickel chromium alloys were the only materials which would give the properties required in this type of service. Their first uses were for the moving blades in gas turbines and they soon became standard for every British aircraft gas turbine produced. Designers were quick to realise the outstanding advantages offered by these materials for high-temperature service and such uses as flame tubes, nozzle guide vanes, etc. In addition, the Nimonic alloys have a large number of other applications where the creep-tested material is not specified, but the alloys are supplied to the same composition.

The development of these uses has resulted in the Nimonic alloys becoming available in a variety of forms adopted to the specific need of the designer. To assist in the correct choice of the most suitable grade, the alloys have been re-classified and Henry Wiggin & Company, the producers of the Nimonic alloys, have recently issued a leaflet which summarises the types available. This brochure is available from the Mond Nickel Company, Limited, Sunderland House, Curzon Street, London, W.1.

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

(Delivered, unless otherwise stated)

November 15, 1950

PIG-IRON

Foundry Iron.—No. 3 Iron, Class 2:—Middlesbrough, £10 10s. 3d.; Birmingham, £10 5s. 6d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent P, £12 1s. 6d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si)—North Zone, £12 10s.; South Zone, £12 12s. 6d.

Scotch Iron.—No. 3 foundry, £12 0s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £13 2s. 6d.; South Zone, £13 5s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £13 12s. 6d.; South Zone, £13 15s.

Cold Blast.—South Staffs, £16 3s. 3d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £12 0s. 6d.; Scotland, £12 7s.; Sheffield, £12 15s. 6d.; Birmingham, £13 2s.; Wales (Welsh iron), £12 0s. 6d.

Spiegeleisen.—20 per cent. Mn, £17 16s.

Basic Pig-iron.—£10 11s. 6d., all districts.

FERRO-ALLOYS

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

Ferro-silicon (6-ton lots).—45 per cent., £33 15s.; 75 per cent., £49.

Ferro-vanadium.—35/60 per cent., 15s. per lb. of V.

Ferro-molybdenum.—70/75 per cent., carbon-free, 8s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon free, £100 per ton.

Ferro-tungsten.—80/85 per cent., 15s. 4d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 16s. 10d. per lb. of W.

Ferro-chrome.—4/8 per cent. C, £60; max. 2 per cent. C, 1s. 5½d. lb.; max. 1 per cent. C, 1s. 6d. lb.; max. 0.15 per cent. C, 1s. 6¾d. lb.; max. 0.10 per cent. C, 1s. 7d. lb.

Cobalt.—98/99 per cent., 15s. 6d. per lb.

Metallic Chromium.—98/99 per cent., 5s. to 5s. 3d. per lb.

Ferro-manganese (blast-furnace). — 78 per cent., £30 5s. 11d.

Metallic Manganese.—96/98 per cent., carbon-free, 1s. 7d. to 1s. 9d. per lb.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—Basic: Soft, u.t., £16 16s. 6d.; tested, up to 0.25 per cent. C (100-ton lots), £17 1s. 6d.; hard (0.42 to 0.60 per cent. C), £18 16s. 6d.; silico-manganese, £23 19s.; free-cutting, £20 1s. 6d. Siemens Martin Acid: Up to 0.25 per cent. C, £22 4s.; case-hardening, £23 1s. 6d.; silico-manganese, £26 6s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £19 16s. 6d.; basic, hard, over 0.41 up to 0.60 per cent. C, £21 1s. 6d.; acid, up to 0.25 per cent. C, £23 1s. 6d.

Sheet and Tinplate Bars.—£16 16s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £20 14s. 6d.; boiler plates (N.-E. Coast), £22 2s.; chequer plates (N.-E. Coast), £22 19s. 6d.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £19 13s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £22 6s.; flats, 5 in. wide and under, £22 6s.; rails, heavy, f.o.t., £19 2s. 6d.; hoop and strip, £23 1s.; black sheets, 17/20 g., £28 16s.

Alloy Steel Bars.—1-in. dia. and up: Nickel, £37 7s. 3d.; nickel-chrome, £55; nickel-chrome-molybdenum, £61 13s.

Tinplates.—I.C. cokes, 20 × 14, per box, 41s. 9d., f.o.t. makers' works.

NON-FERROUS METALS

Copper.—Electrolytic, £202; high-grade fire-refined, £201 10s.; fire-refined of not less than 99.7 per cent., £201; ditto, 99.2 per cent., £200 10s.; black hot-rolled wire rods, £211 12s. 6d.

Tin.—Cash, £1,045 to £1,050; three months, £1,005 to £1,010; settlement, £1,050.

Zinc.—G.O.B. (foreign) (duty paid), £151; ditto (domestic), £151; "Pr me Western," £151; electrolytic, £155; not less than 99.99 per cent., £157.

Lead.—Good soft pig-lead (foreign) (duty paid), £136; ditto (Empire and domestic), £136; "English," £137 10s.

Zinc Sheets, etc.—Sheets, 10g. and thicker, all English destinations, £170 7s. 6d.; rolled zinc (boiler plates), all English destinations, £168 7s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £139 10s.

Other Metals.—Aluminium, ingots, £120; antimony, English, 99 per cent., £225; quicksilver, ex warehouse, £31 to £31 10s.; nickel, £386.

Brass.—Solid-drawn tubes, 21⅝d. per lb.; rods, drawn, 28¼d.; sheets to 10 w.g., 26d.; wire, 26⅝d.; rolled metal, 24¾d.

Copper Tubes, etc.—Solid-drawn tubes, 23¼d. per lb. wire, 226s. 6d. per cwt. basis; 20 s.w.g., 254s. per cwt.

Gunmetal.—Ingots to BS. 1400—LG2—1 (85/5/5/5), £187 to £205; BS. 1400—LG3—1 (86/7/5/2), £193 to £217; BS. 1400—G1—1 (88/10/2), £270 to £295; Admiralty GM (88/10/2), virgin quality, £285 to £316, per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £295 to £315; L.P.Bl £200 to £225 per ton.

Phosphor Bronze.—Strip, 34d. per lb.; sheets to 10 w.g., 35⅞d.; wire, 36d.; rods, 33½d.; tubes, 38¾d.; chill cast bars: solids, 34½d., cored, 35½d. (C. Clifford & Son, Limited.)

Nickel Silver, etc.—Ingots for raising, 2s. 2¾d. per lb. (7%) to 3s. 1½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 2s. 8¼d. (7%) to 3s. 7½d. (30%); to 12 in. wide × .056, 2s. 9d. to 3s. 7¾d.; to 25 in. wide × .056, 2s 11d. to 3s. 9¾d. Spoon and fork metal, unsheared, 2s. 5¾d. to 3s. 4½d. Wire, 10g., in coils, 3s. 2¼d. (10%) to 4s. 1d. (30%). Special quality turning rod, 10%, 3s. 1¼d.: 15%, 3s. 5¾d.: 18%, 3s. 10d. All prices are net.

Forthcoming Events

NOVEMBER 20.

West Riding Federation of Engineering Societies

"Stainless Steels," by J. A. McWilliam, M.A., at Bradford Technical College, Great Horton Road, Bradford, at 7.15 p.m.

Sheffield Society of Engineers and Metallurgists.

"Scopes and Aims of the Sheffield University Post-graduate School in Physical Metallurgy," by Professor A. G. Quarrell, at the Royal Victoria Station Hotel, Sheffield, at 6.15 p.m.

Institute of Production Engineers.

North-Eastern Section:—"Foremanship," by A. P. Young, O.B.E., at the Neville Hall, Westgate Road, Newcastle-upon-Tyne, 1, at 7 p.m.

NOVEMBER 21.

Coventry Section:—"Production of Castings for Quantity Machining," by J. Pardoe, M.Eng.A.I.M., at the Geisha Café, Hertford Street, Coventry, at 7.15 p.m.

Western Section:—"Mechanical Handling," by J. R. Sharp, at the College, Swindon, at 6.30 p.m.

Chemical Engineering Group.

"Some Aspects of Semi-technical Scale Experimentation in Chemical Industry," by Dr. R. Holroyd, at the Geological Society, Burlington House, Piccadilly, London, W.1, at 5.30 p.m.

NOVEMBER 21 and 22.

Institution of Mechanical Engineers.

Lectures on "The Gas Turbine," by members of the staff of the National Gas Turbine Establishment, at Storey's Gate, St. James's Park, London, S.W.1.

NOVEMBER 22.

Institute of British Foundrymen.

Birmingham Branch:—"Chill-roll Manufacture," by K. H. Wright, F.I.M., at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3, at 7.15 p.m.

London Branch:—Discussion on "Repair and Reclamation of Castings." Reports of Sub-committees T.S.23 and 26, presented by A. B. Everest, Ph.D., and R. W. Ruddle, M.A., at the Waldorf Hotel, Aldwych, London, W.C.2, at 7.30 p.m.

NOVEMBER 23.

Institution of Incorporated Plant Engineers

South Yorkshire Centre:—"Metallisation and Metal Spraying," at the Grand Hotel, Sheffield, at 7.30 p.m.

NOVEMBER 24.

Institution of Works Managers.

West Midlands Branch:—"Foremen and their Place within Industry," at the Darlaston Works of F. H. Lloyd and Company, Limited, at 7 p.m. (Joint meeting with the Institute of Industrial Supervisors.)

Refractories Association of Great Britain

"Some Trends in Steelworks Refractories," by G. R. Bashforth, F.I.M., at the Queen's Hotel, Birmingham, at 7.30 p.m.

NOVEMBER 25.

Institute of British Foundrymen.

East Midlands Branch:—"Modernising an Iron Foundry," by L. W. Bolton and W. D. Ford, at the College of Technology and Commerce, The Newarke, Leicester, at 6 p.m.

Institution of Production Engineers.

North-Eastern Graduate Section:—Visit to Jarrow Tube Works, Limited, Northbourne Road, Jarrow, at 10 a.m.

McKinnon Industries, Limited, a Canadian firm, intends to erect a malleable iron foundry and power plant on the east bank of the Welland Ship Canal, near Thorold, Ontario. Negotiations for the sale of approx. 130 acres of Crown property have been completed recently. This acquisition will permit the carrying out of long-term development plans to meet the anticipated expansion in the automobile field. This programme includes equipment and tooling for the Buick plan, which provides for the reinstated Canadian manufacture early in 1951 of the Buick car.

SITUATIONS WANTED

SECRETARY / ACCOUNTANT (35) desires change; 18 years experience Foundry Accounting. Preparation of final accounts to balance sheet, monthly trading accounts, costing, commercial administration and secretarial practice.—Box 202, FOUNDRY TRADE JOURNAL.

WILL Iron or Steel Manufacturer requiring MANAGER to improve on present results appoint Technician with sane progressive ideas and no scope at present to use them. Private Enterprise only.—Write BM/LLKL, London, W.C.1.

ASSISTANT to Foundry Manager (42) (Ferrous) desires change. experience general jobbing, machine (precision) moulding, coreblowing, and charge of patternshop.—Box 272, FOUNDRY TRADE JOURNAL.

FOUNDRY (FERROUS) SUPERINTENDENT (50) desires change. Will consider position as Foreman. Loam, dry and green sand; mechanised plant.—Box 264, FOUNDRY TRADE JOURNAL.

AUSTRALIAN FOUNDRY METALLURGIST (25), arriving early December, requires position in Ferrous Foundry. Part experienced in open-hearth and high-frequency furnaces, annealing control, roll manufacture, refractories.—Box 220, FOUNDRY TRADE JOURNAL.

GENTLEMAN (23), C. & G. of L.I. Patternmaking (full technological) seeks post to train for an Executive position. Midlands preferred.—Box 276, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

A VACANCY has arisen for a CHIEF PROCESS LAYOUT ENGINEER in a South Wales light engineering factory. Applicants must have served a recognised apprenticeship in mechanical engineering, have been educated up to Ordinary National Certificate standard, and have had at least five years' experience in layout work. Housing accommodation will be made available. Salary in accordance with age and qualifications.—Write Box 238, FOUNDRY TRADE JOURNAL.

A LIGHT Engineering Company in South Wales requires a DEVELOPMENT ENGINEER. Applicants should be men between 25-45 years of age and possess a good all round knowledge of Engineering Process Layout, Tool Design and Mechanical Handling. Salary approx. £600, according to age and qualifications. Housing accommodation made available.—Write Box 208, FOUNDRY TRADE JOURNAL.

A LIGHT Engineering Company in South Wales requires a CHIEF DRAUGHTSMAN. Applicants should be men between 30-45 years of age, possessing a complete knowledge of Press and Jig and Fixture Design. Salary approx. £650, according to age and qualifications. Housing accommodation will be made available.—Write Box 206, FOUNDRY TRADE JOURNAL.

WANTED.—WORKS MANAGER for Steel Foundry and Engineering Concern situated in the North-East Coast employing approximately 700. Present output of metal 100 tons per week from Basic Electric Furnaces. Large proportion of output finished machined castings. Every encouragement will be given to the right man.—Apply by letter, stating age, remuneration expected, and giving full details of past experience, with references, to Box 166, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

BRITISH STEEL FOUNDERS' ASSOCIATION

RESEARCH AND DEVELOPMENT DIVISION.

THE Division intends shortly to make further staff appointments at Senior Executive level, and applications are invited from candidates who have specialised experience in steel foundry technology, particularly in the following branches:—

FOUNDRY PRACTICE,
PLANT ENGINEERING.

Successful candidates, who should preferably be of graduate standard, will report personally to the Director of Research and will be responsible for the efficient operation of one or more of the major sections of the organisation.

Salaries will depend upon individual ability and experience, and the posts are pensionable. Assistance will be given if so desired in finding living accommodation in the Sheffield area.

Applications, which will be treated as strictly confidential, should be addressed, together with details of experience and qualifications, to:—

THE DIRECTOR OF RESEARCH,
British Steel Founders' Association,
20A, Collegiate Crescent, Sheffield, 10.
October 13th, 1950.

A LIGHT Engineering Company in South Wales requires a TOOL DESIGN CHECKER. Applicants should be men between 30-45 years of age and possess a complete knowledge of Press Tool and Jig and Fixture Designs. Salary approx. £600, according to age and qualifications. Housing accommodation made available.—Write Box 210, FOUNDRY TRADE JOURNAL.

ENAMELLING SUPERINTENDENT required for Vitreous Enamelling Plant in Central Scotland producing Domestic Cooking Appliances and General Enamelware. Applicants should have experience of both Cast and Sheet Iron enamelling and be capable of organising and controlling all stages of the process.—Applications, stating age, qualifications and previous experience, to 02N5, WM. PORTEOUS & Co., Glasgow.

ESTIMATOR AND RATEFIXER required for a jobbing, hand and mechanised Foundry situated west of London. Previous experience and knowledge of Time-study essential.—State salary required to Box 168, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERVISOR required, experienced in Machine Moulding Technique (Steel). North-West Area. Good salary and prospects to right type of applicant.—Full details to Box 244, FOUNDRY TRADE JOURNAL.

MOULDERS required for Iron Foundry experienced in jobbing work from 1 lb. to 1 ton. First-class men only need apply.—Apply H. & E. LINTOTT, LTD., Engineers, Horsham, Sussex.

RICHARDS (LEICESTER), LTD., Phoenix Works, Leicester, have vacancy in their Mechanised Ironfoundry for HEAD FOREMAN MOULDER. Will consider Moulder or Patternmaker, or Engineer with Foundry experience. Also vacancy for FOREMAN COREMAKER, with experience of Coreblowing.

MOULDERS.—Iron Foundry requires skilled jobbing Moulders. Piecework or bonus. Good wages can be earned by good workers.—HOLLAND FOUNDRY, 157, Clapham Road, S.W.9.

SITUATIONS VACANT—*Contd.*

LIGHT Engineering Factory in South Wales require the services of a TRAINING AND EDUCATION OFFICER, to organise all branches of training. Applicants should hold a Degree in Mechanical or Electrical Engineering, have some teaching or industrial experience, and should be between 25-35 years of age. Salary £650 per annum.—Applications, giving fullest details, should be sent to Box 250, FOUNDRY TRADE JOURNAL.

K. & L. STEELFOUNDERS & ENGINEERS, LIMITED, Letchworth, Herts, require the services of a METALLURGIST for works development duties. Applicants should possess, in addition to good professional qualifications, initiative and drive of a degree that will enable them to pursue development projects with a minimum of supervision. Experience in the technical control of alloy steel production and/or steel founding technique would be an advantage. Housing accommodation will be provided, if necessary.—Replies, giving details of professional qualifications and works experience, together with an indication of salary required, should be forwarded to the PERSONNEL SUPERINTENDENT of the above address.

AN experienced MANAGER (age 30-45) required to take complete charge of Iron Foundry (250 tons per week) in the Midlands, which is a subsidiary of a large firm of manufacturers marketing a wide range of products.

Only men with proven record of modern management methods, having initiative, drive, and able to surmount production problems need apply.

Applicants should be capable of instituting modern methods of time study, piece work operation, work planning and loading.

Liberal salary, with housing facility, will be given to selected applicant. The position offers unlimited scope to progressively minded applicant possessing a high degree of administrative ability.

Please write in confidence, giving full details of training, experience and qualifications, with appointments held in chronological order. Applications that do not give this detailed information will not be considered.

Apply Box 290, FOUNDRY TRADE JOURNAL.

CHIEF INSPECTOR required to take full control of Inspection Department of large Grey Iron Foundry in Tipton area. A sound knowledge of foundry and engineering practice is essential. A good education and personality are necessary as the job offers good prospects of promotion to the right man.—Apply, stating age, experience and salary required, to Box 280, FOUNDRY TRADE JOURNAL.

CHIEF DRAUGHTSMAN AND ESTIMATOR required for Foundry and Engineering Works in the Midlands. Thorough experience in the design and manufacture of Gas Purification Plant desirable. Responsible position.—Apply, stating age, experience, and salary required, to Box 278, FOUNDRY TRADE JOURNAL.

JUNIOR METALLURGISTS required for general control work in iron and steel foundry.—Write, stating age, training, experience, and salary required, to Box 194, FOUNDRY TRADE JOURNAL.

SENIOR COMMERCIAL ASSISTANT wanted for Steelworks Sales Dept. in N.E. Coast firm.—Applicants should state age and experience to Box 204, FOUNDRY TRADE JOURNAL.

JUNIOR METALLURGIST required Manchester district. Must be prepared to share night work. Some experience of metallurgical Analysis and Arc Steel Melting preferred.—State age, wage, and experience to Box 256, FOUNDRY TRADE JOURNAL.