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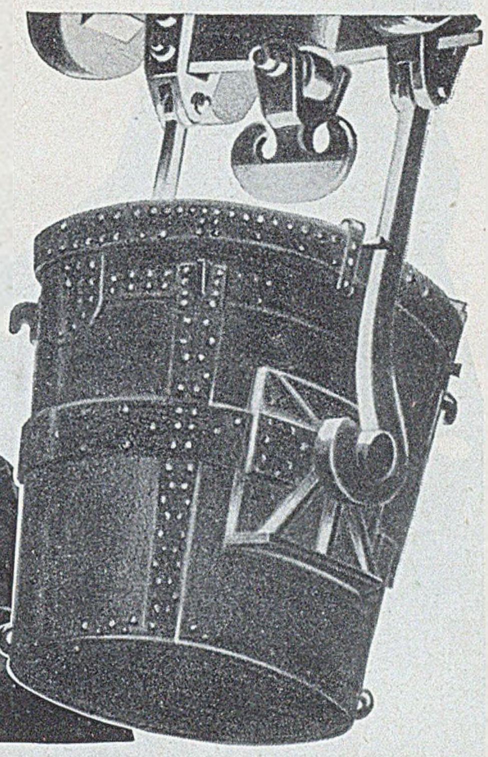

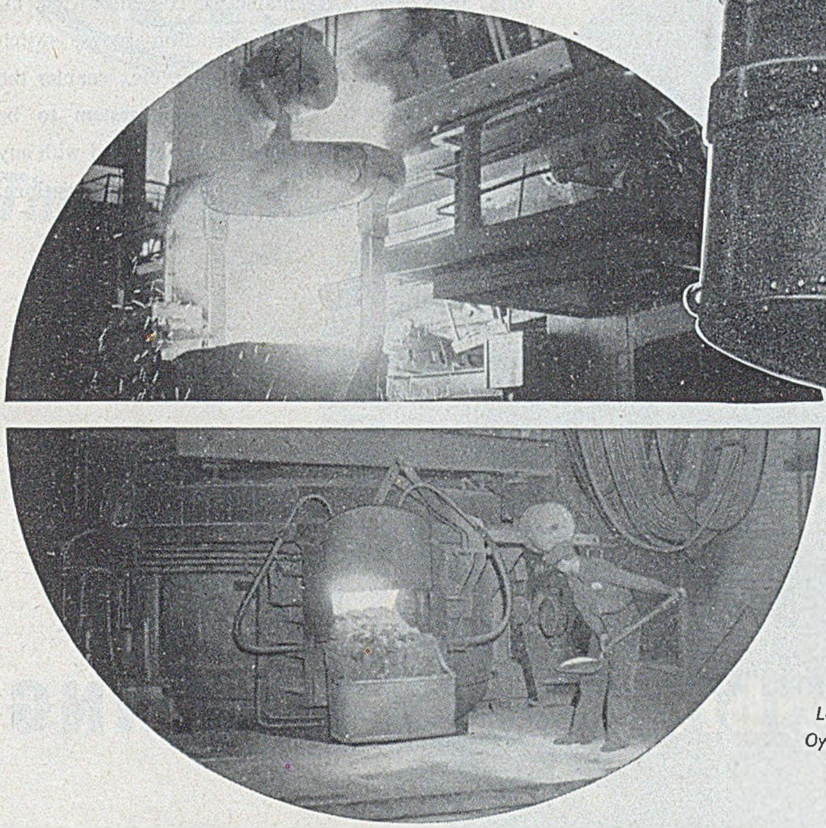

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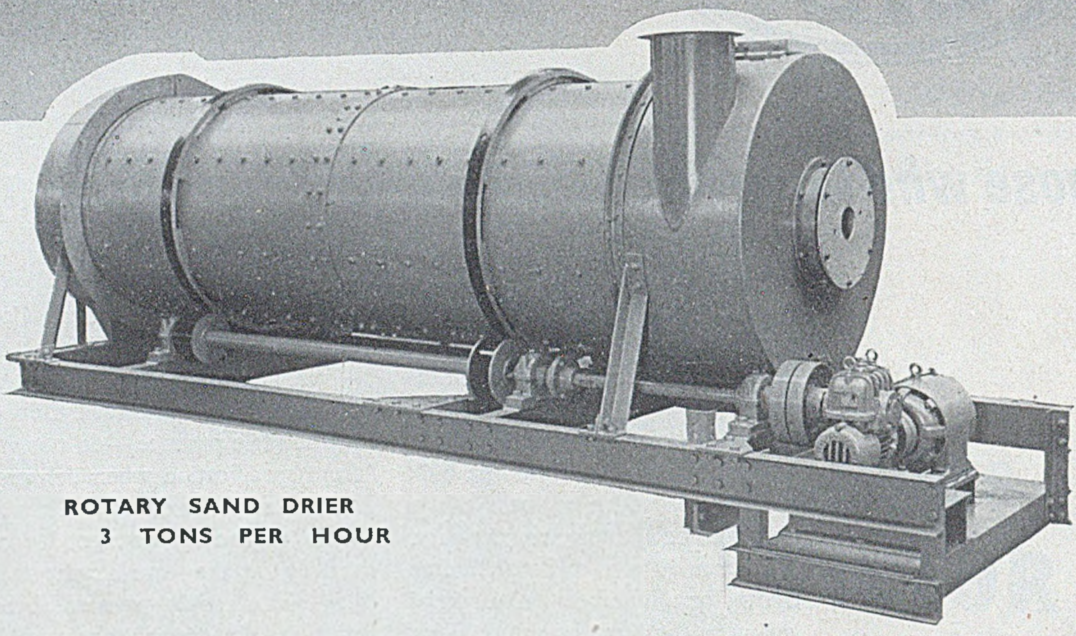

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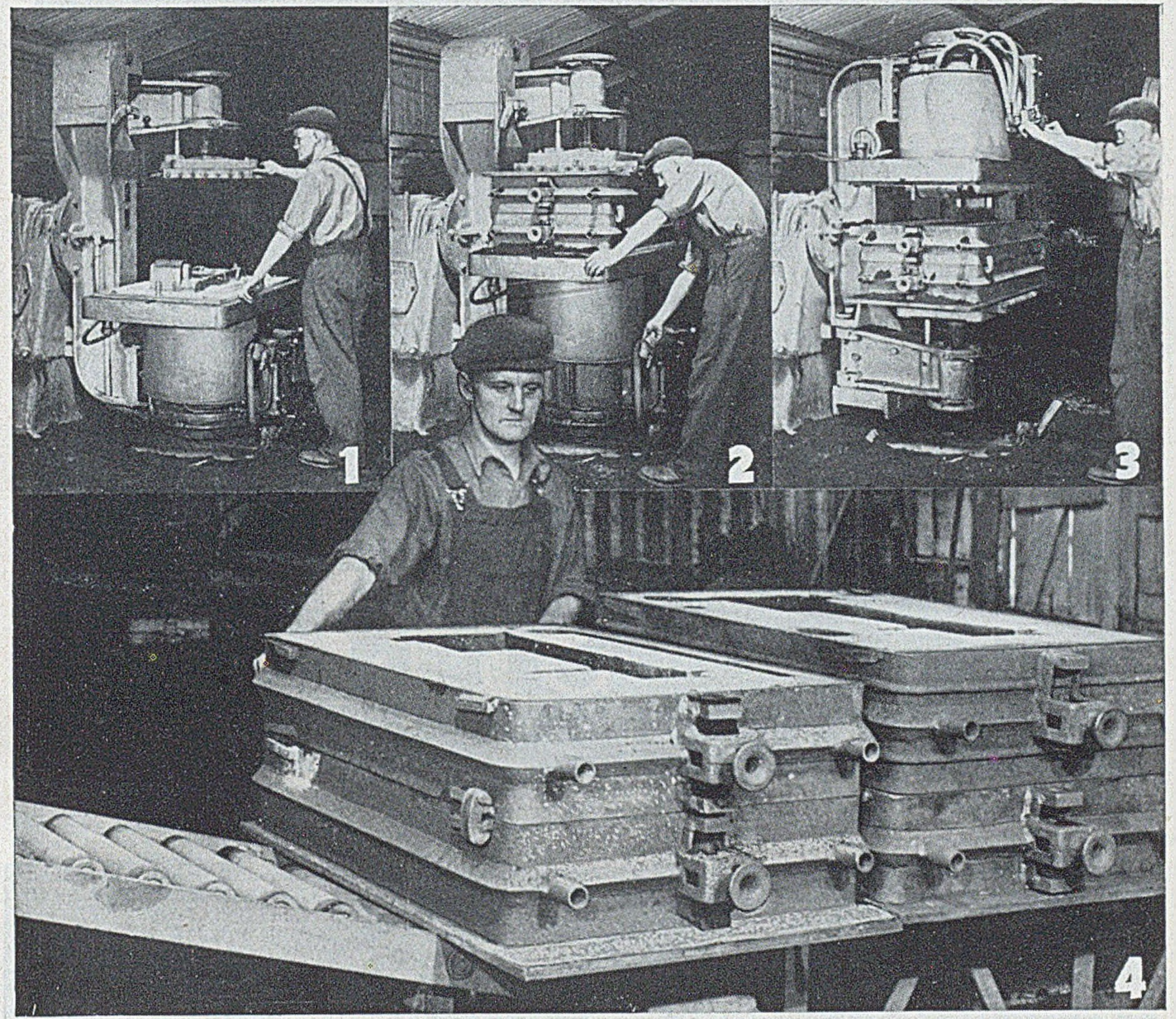

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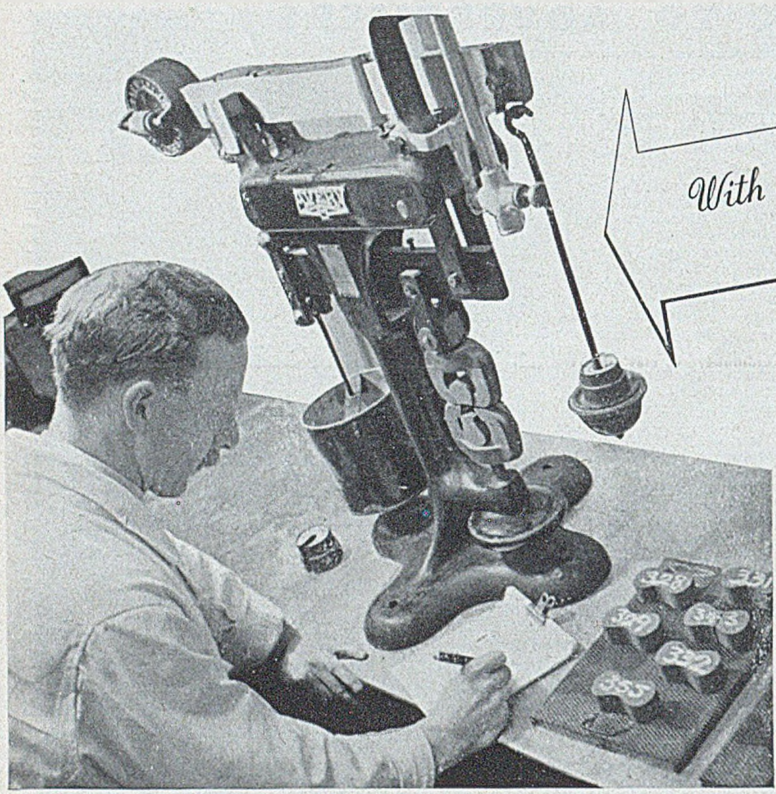

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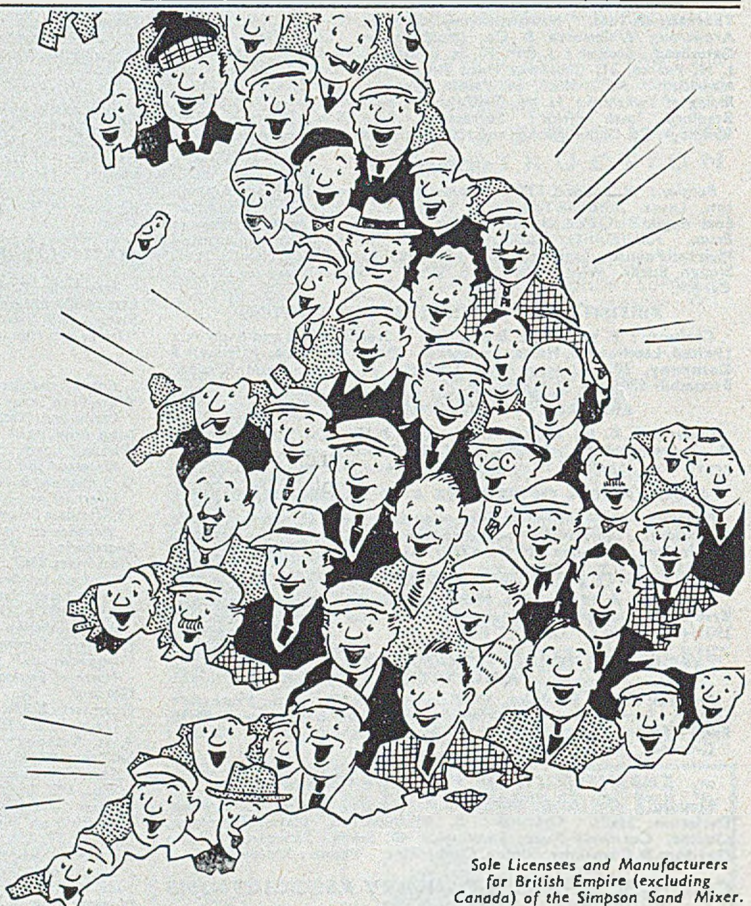

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The Problem of Shortages

During our long occupancy of this chair we have attempted to solve many problems, with varying degrees of success, but the solution of the problem of material shortages which confronts the foundry industry to-day is beyond our ken. Because of the shortage of foundry coke, it is proposed to furnish an Australian foundry with a powdered-fuel-fired furnace instead of a cupola. An English firm newly established just after the war could not find a cupola so it operated an electric furnace instead. Aluminium castings for a time in certain fields replaced cast iron. During the war, substitutes were found for the conventional core- and moulding-sand bonding agents. Economy was effected through the simplification and standardisation of both ferrous and non-ferrous alloys. Now, however, the problems of shortages of aluminium, copper, zinc, scrap, pig-iron, and ferro-alloys, are ones which admit of no such solution. Their incidence is much worse in some areas than in others. Some foundries are receiving a percentage of their normal requirements, others nothing or the full demand. The solution, if there be a solution, must vary in each case.

The first thing to do is to inform one's appropriate employers' organisation so that the Government may be quickly and authoritatively informed as to the exact position. If the outcome is such that a definite portion of standard supplies are likely to be available, then maximum production in a minimum of time must be achieved somehow. Spinning out the work puts up costs and so as to continue to import more raw material, the ability to compete in world markets must obviously be maintained. There is a natural urge to adjust the working pace so that extra time may be taken up in the making of any one job. Yet this is the very system which will handicap the country in its endeavour to feed, house, clothe and warm its population. Many foundries are breaking-up their reserve stocks of moulding-box plant and the like, to supplement their scrap supply. It may be as well to examine cleared areas to ascertain whether better use could not be made of them either by improved methods of storage, or, paradoxically at the moment, for increased manufacturing capacity. Ground is now so expensive, that its use merely for stocking only *potentially* useful box-parts may be economically unsound.

We believe that here we could with advantage make a further plea to our readers to support the scrap drive initiated by the British Iron and Steel Federation in association with the scrap merchants. In this direction there are two methods open to them, one is to sell all scrap unsuitable for re-processing in their own works, and the second is to pester their customers to get rid of their scrap—either process or obsolete plant—without delay, pointing out that the very existence of the manufacturers of castings depends upon their co-operation.

D

Popularising the Foundry as a Career

The Fordath Engineering Company, Limited, of Hamblet Works, West Bromwich, believe they have made a real contribution to the alleviation of the dearth of entrants to the foundry industry by the development of a system of essentially clean experimental foundry practice for demonstrations to students and the like. It is thought that earlier dirty conditions have acted as a deterrent to recruitment. A paragraph in a statement dealing with this development poses the question:

Can the art of "founding" be taught under clean and attractive conditions in the technical schools, so as to create amongst the pupils an interest and a liking for the work? Believing that it could, the originators have drawn up a scheme which under ordinary school conditions can be applied to illustrate all the fundamental features of "founding," and at small cost to the authorities concerned. The practice of the art of "founding" is a fascinating study, and just the kind of work to appeal to youths if properly presented. It offers enormous scope for the ingenuity and initiative, and valuable prizes for keen students. Skilled foundrymen are now highly paid, and the working conditions which got the industry a bad name no longer exist.

Demonstration Scheme

The main factors underlying the scheme are briefly as follow:—

(1) The avoidance of anything dirty or repulsive to students.

(2) Practice and theory are twins. Theory without practice is uninspiring, and has little attraction for youth.

(3) Wooden moulding boxes, patterns, coreboxes, etc.—exact replicas of those used in actual foundry practice—can be made by students.

(4) The sands and the binders used can be of any kind, *e.g.*, red loam sand, sea sand and cereal or other binders, all clean to handle.

(5) The place of metal is taken by wax, which is easily melted, and can be used over and over again.

(6) A stove is necessary to "dry" the cores at a low temperature.

(7) "Runners and risers" will be exactly as in actual commercial practice.

(8) The "castings" in wax can be stripped from the mould and cores by ordinary cold or hot tap-water.

(9) A wide variety of "castings" can be produced equally well.

(10) Boys can carry out their own ideas at home.

(11) Faults, due to insufficiently-heated wax, or too-rapidly-cooled wax can be seen (short "runs" and brittle castings), just as in metal castings.

Actually, the whole range of foundry practice can be reproduced, using wax instead of metal and reduced temperatures in place of the high temperatures of molten metals. Core-binders are selected to conform to low-temperature disintegration under water. The high costs of producing and casting metals are avoided, whilst all the materials used can be used over and over again. Older readers of the JOURNAL will remember that the late Mr. Harry Brearley used stearine wax to demonstrate the freezing of steel ingots.

Those who visit the British Industries Fair at Castle Bromwich will be able to inspect this teaching process on the company's stand, No. D146. Interested foundrymen, teachers, and instructors can obtain additional information by writing to Hamblet Works.

Iron Foundry Advisory Team

The team set up by the British Cast Iron Research Association, with the support of the Joint Iron Council, has now been completed and will visit iron foundries in the United Kingdom to study and report on their operating efficiency. The leader of the team is Mr. J. Hunter, who has had considerable experience in the design and equipment of foundries, and who has been for the last six years manager and chief designer of the foundry-equipment division of Stone-Wallwork, Limited. Mr. A. A. Timmins was trained in the laboratories of the Association and has since had responsible managerial experience in the industry. Mr. J. A. Ballard took the Diploma of the National Foundry College in 1948 and then spent two years in a number of foundries as a holder of a Fellowship of the Worshipful Company of Founders. The reports of the team will be confidential to the member-firm, and any British iron foundry may become a member of the Association by completing an application form, which will be furnished on request. An engineer, Mr. W. D. Bamford, A.M.I.E.E., has also been appointed to advise foundries anxious to meet the requirements of the "Garrett Report" on heating and ventilation problems.

Lectures in Foundry Practice

The Institute of British Foundrymen, St. John Street Chambers, Deansgate, Manchester 3, announces that a revised edition has been produced of "Lectures in Foundry Practice—Specimen Notes for Teachers," based on the Intermediate Examination in Foundry Practice of the City and Guilds of London Institute. The new edition (the first appeared in November, 1945) has been thoroughly revised, and is available free of charge to teachers of foundry subjects, Technical Colleges, Education Authorities and firms operating works' schools. This is a good example of how the Institute materially assists the industry for which it caters.

Spanish Metallurgical Conference

The Spanish Iron and Steel Institute is holding its second annual meeting in Madrid next October. The conference will last about a week and will include visits to the more important industrial regions of Spain as well as social gatherings and sightseeing excursions in the capital city. Details of this meeting can be obtained by writing to Señor Don Ingenerio Augustin Plana, Instituto del Hierro y del Acero, Villanueva 15, Madrid, Spain.

UNEMPLOYMENT FELL between January 15 and February 12 by 31,600, bringing the total out of work to 302,000. Details of the employment situation issued by the Ministry of Labour indicate that the switch-over of labour to rearmament may have already begun. Particularly significant is an increase of 23,000 in the labour force at the end of January in the metals, engineering, and vehicles group of industries, where the bulk of defence orders has so far been placed.

Correction.—In the Paper "Oxygen in the Production of Carbon Steels from the Arc Furnace," by Mr. A. C. Brearley, printed in last week's issue, it was stated that the depth to which the oxygen lance was inserted in the bath was 4 ft. 6 in.; this should have read 4 to 6 in.

Conference on Malleable Cast Iron

Well-attended Technical Sessions at Ashorne Hill

ON WEDNESDAY, Thursday and Friday, March 14 to 16, there was held at Ashorne Hill, near Leamington Spa, a technical conference on malleable cast iron, organised by the British Cast Iron Research Association, and attended by some 150 delegates from both large and small foundries all over the country. Perhaps the most stimulating of the contributions were those devoted to hot-blast cupola melting, and these, when the Papers are published by the organisers, will be welcomed by all ironfounders, not only malleable. All other phases of malleable practice ranging from raw materials to finished product were ably dealt with in a programme which included 19 Papers, by Authors each eminent in respective sections of malleable founding. Considerable discussions followed the reading of the Papers, those on hot-blast cupolas being prolonged to late sessions. In the evenings, films were shown, including the series of four American films on gating systems for metal castings, prepared by the U.S. Naval Research Laboratory, which have been reviewed previously in these columns.

Generally speaking, the conference was divided into three sections; the first, on the Wednesday afternoon, concerned mainly founding considerations; then there was a whole day devoted to melting and annealing furnaces; finally, on the Friday, metallurgical aspects were considered. In the brief report which follows, the Papers are dealt with *seriatim*, but it should be realised particularly with the discussions that there was inevitably some slight overlapping.

Dr. J. E. Hurst, J.P., president of the Association, opened the conference and welcomed those attending. The objects of the proceedings were, he said, to stimulate interest in new processes and developments in the malleable field and to discuss the merits or demerits of the various proposals. Following the president's speech there was a short address by Mr. H. G. Hall (president of the Association's malleable castings sub-committee), who occupied the chair at this session. Mr. Hall was impressed with the need for close scientific control of the industry from knowledge accumulated and arising from research at headquarters as well as experiences freely interchanged among members. So far, however, he said, there was little evidence that the increased knowledge was being applied, save in isolated cases. The present conference should help to remedy the matter, as well as providing an indication of terrain where further investigations were necessary. Secrecy, said Mr. Hall, was still too common in the malleable industry, and he quoted the value of free interchange of ideas without detriment to healthy competition, which was such a feature of American industry.

Founding Matters

The first of the Papers started appropriately enough with raw materials, and was by Mr. N. Gray (of Guest Keen Baldwin's) on the pig-iron position. After brief historical notes, the reasons for the present dire shortages of suitable pig-iron for the malleable trade were given as (*a*) that government control prevented the accumulation of adequate stocks of blending grades, and (*b*) the dearth of Spanish ore and stockpiling by America had aggravated the position. The high manganese content of the available irons was causing much difficulty in processing. In the discussion several speakers confirmed Mr. Gray's remarks from their own experience, but it was left for Mr. Hall from the chair to point the complaint that as only some 60,000 tons of the required grades of pig-iron was needed, surely this comparatively small "parcel" could be furnished if producers really got down to the job.

Leaving raw materials, the second Paper, by Mr. J. Hunter (B.C.I.R.A.) dealt with mechanisation of malleable foundries. Particularly valuable features of this Paper were the theoretical approach from the viewpoint of labour saving and the applicability of mechanisation in stages to small, medium and large foundries. It appears that the manual effort required to produce one ton of castings involves the movement of 55 tons of material, an operator walks 5.55 miles, and 100 ft.-tons of energy are expended. On this Paper, discussion from the body of the hall was mainly concerned with points of detail—time required for cooling on conveyors, merits of different systems, segregation of types of castings, trouble with hot sand, and so on. Mr. Roxburgh reported satisfactory experience of mechanisation of a large malleable foundry, and Mr. Hall of a small one.

The final paper of this session was by Mr. J. Roxburgh (Ley's Malleable) on the feeding and gating of malleable iron castings. This was particularly well illustrated, many types of conventional and experimental methods being described as applied to this metal. Blind and open risers, whirlgates, Connor runners (modified), strainer cores, dimensions and yields all were ably considered from a very practical standpoint. It appeared in discussion that the average yield in a range of malleable castings from ozs. to one cwt. (majority 5 to 6 lb.) was 50 to 55 per cent. over-all.

Hot-blast Cupolas

Two papers which opened the proceedings on the Thursday morning, with Mr. Hall again in the chair, provided what, without being derogatory to the balance of the papers, might be termed the high-lights of the Conference. These concerned hot-blast cupolas and were respectively "The Hot-blast Cupola" by Mr. O. Mattern (Steinmüller, Gummersbach, Germany), dealing mainly with the theoretical side and "Practical Experiences with the Hot-blast Cupola" by Dr. K. Roesch (Bergische Stahl-Industrie, Remscheid, Germany) which concentrated on constructional and operational aspects.

Conference on Malleable Cast Iron

The Authors had come from Germany on the invitation of the Association personally to present the papers; Dr. F. Schulte (Birlec Limited) agreeing at short notice to act as interpreter during the discussions; both papers were read by Mr. H. Morrogh (B.C.I.R.A.).

In his opening remarks, Mr. Mattern said that all the hot-blast cupolas which have been put into operation in the last few years have proved successful after overcoming initial difficulties. The difficulty of operation varied with the design. It was clear to-day that only the waste gas of the cupola should be used for preheating the blast as a separately-heated preheater was not so satisfactory economically. However, it must be kept in mind that the cupola waste gas was a weak heating gas and that the sometimes rather considerable amounts of dust in this gas could produce some troubles. The following requirements must be satisfied by a hot-blast cupola:— Fulfilment of the metallurgical and thermal technical requirements; a simple and clear layout which is economical; easy handling and reliability in operation, and easy cleaning of the air preheater. Continuing, the Author, aided by diagrams, dealt lucidly with the logical developments of the well-known heat-conservation, transmission and conversion formulæ applied to blast-heating and their effect on cupola practice. An interesting apparatus for determining ignition points of cupola-gas mixtures was described, the Paper concluding with general theoretical observations on water cooling. Points from a short discussion, which was all time permitted at this juncture, concerned stratification of charges, effect of cold starts, maximum economical blast temperatures and coke ratios, possible danger of explosive mixtures (discountenanced) and efficiency of recuperators. It was mentioned that furnaces at Stanton's "Dale" foundry are shortly to come into operation with hot-blast systems of the Steinmüller type.

Dr. Roesch's Paper likewise was greeted with much enthusiasm. This described several designs of hot-blast systems developed in Germany, with remarks on the metallurgical and financial advantages accruing. In the main, it was the foundries specialising in malleable cast iron and in the production of very high quality grey irons which were interested in the use of hot-blast cupola. These foundries have a high coke consumption owing to the relatively large proportion of coke they are forced to incorporate in the charge. Then were listed seven factors favouring hot blast and the Paper dealt with these severally in the installations so far worked. Boiled down, it would appear that under German conditions, a 30 per cent. saving of coke was possible and that installation charges for a small furnace could thus be written off in 2½ yrs. and in 1½ yrs. for a large one. Whether the same saving would obtain with good-quality coke was a question raised in discussion, the answer being that economies would be less but would remain substantial. Conversely hot-blast permitted the use of poorer coke and, as steel carburisation was easier in the new set-up, more steel could be incorporated in the charge, thus cheapening the mixture. Discussion also disclosed that 19 installations of hot-blast systems are under construction or operating in this country, eight being for white-heart malleable. One of the latest German designs with a spiral type of blast heater was said to be very promising, particularly with cupolas up to 7 tons per hour capacity. This plant heated the blast to a maximum of 450 deg. C.—quite adequate for malleable production—the installation being relatively cheap.

Pulverised-fuel Melting

Pulverised-fuel melting of metal for malleable was the next sub-group. In this section was a Paper by Mr. H. W. Perrott (Alfred Herbert, Limited) on historical aspects and physical factors governing malleable iron production from stationary air furnaces and concluding with the Bracklesburg rotary. Much use in these plants is being made of unit pulverisers for each furnace and their construction and *modus operandi* was detailed. The advantages claimed for this type of fuel firing were low first cost, large-batch operation (a 23-ton furnace will produce its first charge at 1,500 deg. C. in 8½ hr. and the second in 6½ hr.). Over-all fuel consumption was of the order of 10 cwt. per ton melted; the power required was about 65 h.p. for the 23-ton furnace, and maintenance was very moderate. It appears that 90 per cent. of American production of black-heart iron is from the stationary air furnace, duplexing from the cupola being sometimes arranged.

In the early afternoon, the second Paper on this method of melting was given by Mr. P. Fassotte, the well-known Belgian foundry engineer, on the Sesci rotary pulverised-fuel-fired furnace. Here a number of operational charts were used to demonstrate the uniformity of metal temperature (consistently over 1,450 deg. C.) and reliability of composition of metal emanating from this source.

Oil-firing

The Paper by Mr. W. D. Bullows (Castings, Limited) also dealt with a rotary-furnace installation (in the Author's foundry) but this was of the oil-fired variety. The foundry layout for two 3-ton capacity furnaces was detailed, particular attention being paid to the special controls applied to the fuel (Creosote pitch) and air supplies, which play so important a part in the uniformity and reproduceability of metal-melting schedules. Discussion of the two previous Papers was grouped, such items as hydrogen contamination, carbon pick-up, lining consumption (60 lb. per ton melted with a monolithic siliceous lining for the oil-fired furnace quoted), fuel consumption and space economy were among points raised.

Next in the series on melting was a Paper by Mr. E. Kay (Gloucester Foundry, Limited), entitled "Practical Aspects in Duplexing." Although three systems of duplexing arrangements—(*a*) cupola/receiver/rotary, (*b*) cupola/air-furnace, and (*c*) cupola/electric-furnace—were described, chiefly in respect of American practice, the Author, from his own experience, gave a detailed account of the first system. Points of major consequence included the use of a heated ladle as a receiver and the report of an American de-sulphurising practice using soda ash in a flow-through reservoir with a syphon slag trap, the whole being situated in the cupola spout. Sulphur reduction and permissible contents, basic-lined furnaces, cupola controls and other operating details subsequently formed the basis of expressions of opinion among the delegates. The temporary reluctance of a speaker during this discussion to disclose information unilaterally was seized upon by Mr. H. G. Hall as a case illustrating his initial remarks from the presidential chair deprecating this non-co-operative attitude. On an invitation being extended by Mr. Hall to open his own organisation for a full inspection, the speaker withdrew his objection and offered full reciprocatory service.

Malleablising Furnaces

The last Paper of the afternoon session brought the conference to the subject of malleablising furnaces, Mr. H. W. Perrott opening consideration of this phase with "Pulverised-fuel Furnaces for Annealing Malleable Cast Iron." For annealing, it appeared that the ring-main system of pulverised fuel conveyance as distinct from the individual pulveriser unit held advantages where numerous furnaces had to be served, some on "heat" and some being charged or discharged. Much valuable detailed information was given as to layout, methods of working and costs. For a continuous, pulverised-fuel-fired furnace working for 2½ years on the annealing of conduit fittings, typical figures were as follow:—

	Per ton Annealed. £	s.	d.
Depreciation	1	0	4
Annealing cans		19	6
Ore	1	1	3
Maintenance (oven)		1	6
Maintenance (crusher)			2
Fuel (coal at 53s. 10d. per ton)		14	6
Power		3	6
Wages	3	12	0
Total	£7	12	9

In the late evening, after the technical film show, the discussion on hot-blast cupolas was prorogued. A further 1½ hrs. were occupied in considering mainly the possibilities of advantageous carbon pick-up at the higher operating temperatures of hot-blast cupolas. It appeared that the difficulties initially encountered with dust in the cupola gases had been somewhat over-emphasised.

Metallurgical Aspects

The Friday session opened with a Paper by Dr. F. Schulte on "Metallurgical Considerations on the Gaseous Annealing of White-heart Malleable." Although the two phases—decarburisation and graphitisation—take place simultaneously, for the sake of clarity they were considered separately in this well-balanced summing-up of malleablising reactions. It was stated that for thin sections (up to ⅛ in. thick) decarburisation predominated and above that thickness graphitisation became increasingly important. The conditions required in each phase to give maximum desirable properties for the shortest annealing cycle were next described in detail, the Paper concluding with a listing of advantages and possibilities of the gaseous process. The complementary Paper which followed was on the present position of the gaseous annealing of malleable castings by Mr. P. F. Hancock (also of Birlec, Limited). Dealing first with annealing of white-heart, the Author said that, at the present time, there are nine foundries in Great Britain using a total of 14 furnaces; abroad 10 furnaces are working, including two in France, four in Italy, and one each in Holland, Finland, South Africa and Australia; additionally, 16 are under construction.

The furnaces described were mainly of the elevator type, electrically heated, with two independent hearths for a single furnace, each raised into position in turn by means of a hoist. Typical dimensions were 14 ft. by 5 ft. by 2 ft. 6 in. high for the heating chamber. The electrical system was rated at 300 kw. maximum. Atmosphere control was established by injecting steam from a small boiler into the furnace and relying on the water-gas reaction with the charge to maintain the desired balance. Detailed constructional and operational features were described. Annealing times from 48 hrs. for thin sections to 3 to 4 days on up to 3-in. sections were said to be normal. The heating period on full electrical load was usually arranged at night-time. Black-heart annealing in this furnace was so far less practised, but no difficulties were apparent. For this process the atmosphere generated by the castings themselves in the sealed furnace was satisfactory. A short Paper on the general economics of gaseous annealing, as carried on in Germany, was next read by Mr. Morrogh on behalf of Dr. Roesch. A Table was given comparing the performance of modern gaseous methods of annealing with the old ore-packing method in pit furnaces.

The three Papers on gaseous annealing were then shortly discussed. One member said his firm encountered more distortion of castings with gaseous annealing but he appeared to represent a minority; it being agreed that careful packing and segregation of the work was the secret of securing freedom from distortion. One contributor said that a process had been developed for "bright" gaseous annealing. Costs for gaseous annealing were quoted of the same order as those given for the pulverised-fuel-fired furnace.

After short break, Mr. E. Hunter (Incandescent Heat Company, Limited) described a controlled-atmosphere furnace for black-heart annealing (the Lee-Wilson furnace) utilising radiant gas-fired tubes. Elaborate automatic control of the heating cycle was a feature claimed for this furnace. As distinct from the electric elevator-type, the gas-fired furnaces operated on the lift-off cover principle. Full working details were quoted. Further discussion then followed on the whole of the morning's Papers, many points as to operating methods, fuel consumption, and costs being raised by questioners. With so many advantages apparent from gaseous annealing it might have been illuminating to hear why so many plants still operate the old processes; one was left with the impres-

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sion that the high capital outlay must figure largely in the apparent reluctance of the smaller founders to change.

Miscellaneous Papers

In the afternoon, under the chairmanship of Dr. J. G. Pearce (director, B.C.I.R.A.) the conference delegates considered a number of Papers on miscellaneous aspects of malleable practices. Metal composition and annealing of black-heart malleable from the point of view of the practical operator was dealt with by Mr. P. H. Shotton (Shotton Bros., Limited). He described rotary-furnace melting, with stress on the importance of correct C/Si ratios, in conjunction with can-annealing in ground slag, neutral ore or sand in the orthodox manner. Next was a Paper by Mr. S. W. Palmer (B.C.I.R.A.) on the function of the Mn/S ratio in annealing processes. In this connection it was said that about one-third of the British malleable industry pays too little attention to this matter of sulphur control. Items that need watching were enumerated, as well as a few freak results which could be given by fracture tests and the like.

Once again, discussion of these Papers was fruitful on matters of details. Some amazement was expressed generally that American producers seemed to "get away with" such high sulphur contents in their malleable production

A third Paper by Dr. Roesch, this time on special varieties of white-heart malleable, was next read, this again being done by Mr. Morrogh. Two variants (*a*) and (*b*) were described:—

(*a*) The first process involved the preparation of an iron to a typical composition of: S. and P., below 0.08; Si 0.40, Mn 0.6 to 1.0 per cent. with carbon as low as possible. This was being made in Germany by a rotary or duplex melting process in conjunction with de-sulphurisation in basic-lined ladles and with further S. and P. reduction in a basic furnace. A metal much resembling ordinary cast steel with a yield point at 18 to 25, tensile at 32 to 42 kg. per sq. mm. and an elongation of 26 to 30 per cent. was the result.

Process (*b*) required a secondary annealing operation to be carried out at 730 deg. C on normal white-heart iron to produce a spheroidised-pearlite structure, much favoured by the automobile industry because of its easy machining properties. At question time it was disclosed that the type (*a*) material was preferred to steel castings only in so far as very thin sections could be produced. Weldability was also a desirable property. For type (*b*) a typical secondary anneal was 18 to 20 hrs. at the temperature quoted.

The penultimate Paper represented a new approach to the problem of refractories for the malleable industry. With a view to acquainting malleable founders with some of the characteristics of materials which might usefully be incorporated into furnace lining practice, the properties of basic refractories were described in detail by Mr. C. S. Hedley (Oughtibridge Silica Firebrick Company Limited. He also circulated among the delegates a Chart showing the properties of basic furnace-lining materials. Proposals for ladles, cupolas and rotary furnaces were next put forward. One member of the audience later quoted his experiences with basic-lined cupolas, much trouble with patching both from a mechanical and from a service point of view being encountered. The opinion was expressed that the high carbon pick-up in basic cupolas might be unsuited to all but steel-scrap-based malleable melts.

Nodular *versus* Malleable

It was fitting that the final Paper—on nodular cast irons *versus* malleable irons—should be given by Mr. H. Morrogh (B.C.I.R.A.) speaking, as it were, for the first time in his own right. What promised to be highly controversial, in fact proved less so by reason of the Author's well-balanced and carefully-reasoned summary. The relative merits of magnesium-processed nodular iron were placed in perspective *vis-à-vis* steel, malleable and grey cast iron. Fields which *might* be explored as possible spheres of interest for the new material were indicated. It appears that, to date, nickel is the only really satisfactory carrier for the magnesium; that the production of low-sulphur base iron is still a primary requisite and that toughness and uniformity in thick sections is the special property of nodular iron which seems to commend itself to malleable founders. Treatment at present was said to cost betwen £12 and £18 per ton of castings. Very little of significance could be added in discussion of such an admirab'e *resumé* of the facts, although a question on impact resistance did produce the news that the Association is at present attempting to produce order from the rather chaotic position obtaining nowadays with regard to this property and the devious means taken for its evaluation for modern cast metals.

Conclusion

Summing up, the conference was undoubtedly a major advancement of malleable foundry technical knowledge, much credit devolving upon organisers and lecturers alike, not forgetting those members who, from the body of the hall, contributed pertinent comment. Here and there, the impression was received that people connected with sales were perhaps a little too enthusiastic as to the worth of their productions, but on the whole commendable efforts were made to stick to facts and figures.

The experiment of having preprints available for some at least of the papers was by majority vote approved. In this connection, private discussions among the delegates seemed to favour advance study of the papers which might supplant their reading in full at the conference proper. Ten minutes or so could be perhaps allocated in future for the author to emphasise salient points, with a consequently increased allocation of time for free discussion of items earmarked by those attending.

At the close, thanks on behalf of the delegates to lecturers, organisers, and Association staff were warmly accorded.

G. & J. Weir's Foundry and Heat-treatment Facilities

Manufacture of Auxiliary Machinery for Marine and Land Engineering Plant

THE products of G. & J. Weir, Limited, at Cathcart, Glasgow, cover a range of auxiliary machinery for marine and land installations. Since 1886, this works has manufactured such products as pumping equipment (*e.g.*, for boiler feeding), heat-exchange apparatus, evaporators, air compressors, refrigerating plant, etc. Some 3,200 workers and staff are engaged, at present largely concentrating on British shipbuilding, power stations and equipment for export. The following companies are subsidiaries:—The Argus Foundry Limited; Drysdale & Company, Limited; Zwicky, Limited, and Weir Housing Corporation, Limited. Since the war, the various departments at Cathcart have been extensively rearranged. The visitor first enters the despatch, test and assembly shops, then the machine shops where the system of grouping machine tools by type has been adopted. The toolroom is conveniently located in the centre of the machine shops; other service and supply departments have similarly been arranged round the machine and assembly shops. These include a separate repair department, pattern-shop and stores, welding shop and smithy, heat treatment department, millwrights' shop, etc. The manufacture of the Weir piston valve chest and small refrigerating plants takes place in a separate building. The works generates its own electricity; ample steam is available not only for the turbo-alternators but for testing, processing and heating purposes as well. Descriptions of the foundry and heat-treatment facilities are given below in some detail.

Holm Foundry

Holm Foundry, Cathcart, is essentially a jobbing foundry, producing castings required for the manufactures of G. & J. Weir, Limited. Repetition castings, suitable for mass production, are made at the Argus Foundry, Thornliebank, about three miles from the main foundry at Cathcart, where a mechanised plant is specially laid out for this type of work. Fig. 1 is a general view of the foundry at Cathcart.

The products of Holm Foundry are in cast iron and non-ferrous, including Monel metal. Castings are principally shells for evaporating and distilling plant, de-aerators, the larger sizes of pump bodies and other jobbing work not suitable for a mechanised foundry. The main building at Holm Foundry occupies seven bays and there is a small annexe used as an experimental foundry.

Two cupolas supply metal for iron castings. Originally these were both of the same capacity of 8 tons per hour, but one has since been lined to give a melting rate of 5 tons per hour. Both cupolas are fitted with receivers. Behind the cupolas and under cover is the stockyard, and serving them is an overhead 2-ton charging crane. Charging is effected by use of a drop-bottom buckets operated by the crane man.

Different types of sand and coke are all hopper stored. A 20-ton lift takes loaded lorries to an overhead platform to be discharged into their respective hoppers. Distribution of materials to various parts of the foundry is by electric power truck and trailer. The bulk of the work in this foundry is made in dry-sand and loam; there is a small green-sand section for small non-ferrous castings.

Sand Plant

A central sand-preparation plant in the centre bay of the foundry supplies all sand used for moulding, and from the mould knock-out, sand is carried by apron conveyor into a rotary screen where foreign lumpy material and dust are extracted. The sand then passes over a magnetic separator for removal of scrap, sprigs, etc., and is elevated to a storage hopper, and from there by bucket elevator to the mill. Prepared sand can be obtained from one side of the mill and distributed by crane tubs to different moulding stations, and from the other side it is elevated to a 20-ton storage hopper to feed the Sandslinger. The capacity of the plant is 15 tons of prepared sand per hour.

The Sandslinger operates on rails across the ends of the four centre bays and the operating arm has a radius of 20 ft. from the centre of the track. Practically all dry-sand moulds are rammed by the "Slinger," only the most awkward points of large moulds are rammed by hand or pneumatic rammers.

Mould Drying

Drying of moulds is by five large pit stoves. Four of these stoves are independently fired by coke dry producers, and the fifth has been recently modernised using air recirculation and is fired by a thermostatically controlled under-feed coal stoker. Moulds for the large evaporators, both dry-sand and loam, are dried *in situ* by portable coke-fired dryers.

In the oil-sand core-shop, all sand is dried by a static drier, and prepared in two "Rotoil" mixers. Four batch-type drying stoves are in use in this bay for core drying and all are fired from one unit; temperatures are controlled and recorded. There are four larger batch stoves in the loam core shop, three of which are fired from one unit, the fourth having its own independent unit, where very high drying temperatures can be obtained if desired. Situated in two of the bays are four pits for use of heavy loam and dry sand moulding.

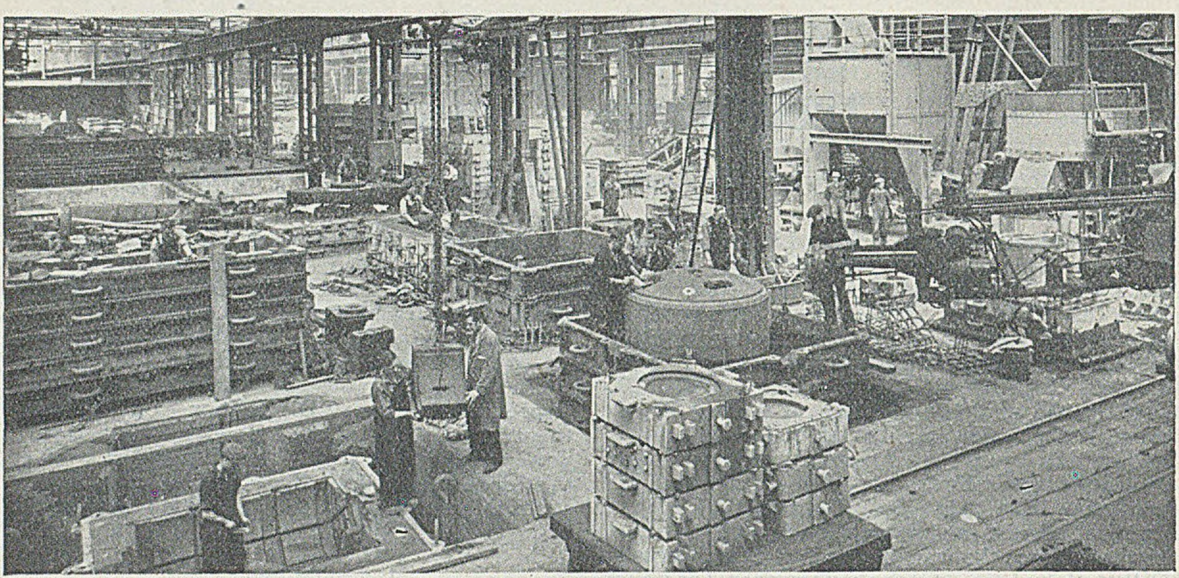


FIG. 1.—*General View of the Holm Foundry of G. & J. Weir, Limited, Cathcart. The Dry-sand Bay with a Sandslinger in Operation is on the Right-hand Side.*

Non-ferrous Sections

Ample melting capacity serves the non-ferrous section. A 5-ton air furnace copes with the large gunmetal and manganese-bronze castings. For smaller heats there are four 450-lb. coke-fired tilters and four natural-draught pit furnaces. The capacity of the lift-out crucibles is 200 lb. each.

Monel metal is melted in two 400-lb. and one 600-lb. oil-fired tilters. A half-ton capacity electric-arc furnace is used chiefly on reclaiming Monel borings and bulky Monel scrap. A transformer supplies current at 2,500 amps. and 66 v. to the two manually-operated electrodes. The bulk of Monel is used for impellers where high strength and corrosion resistance are required. Miscellaneous castings demanding the same properties take up the remainder. In connection with impellers, a special section of the foundry, located in the annexe, is devoted to experimental work. The chief object of this section is to explore means of producing better surface finish, especially in the passage ways of impellers, greater dimensional accuracy, and production of prototype castings. Even so, the bulk of the work of this section goes into direct production along with the main foundry. Melting equipment in the section consists of two 120-lb. oil-fired lift-out furnaces and one oil-fired 250-lb. tilter. One central metal control store serves the whole of the non-ferrous sections. All the metallurgical aspects of melting throughout the foundry are under direct laboratory control.

The dressing shop is equipped with a shot-blasting chamber and four large power-driven saws for the removal of heads from large non-ferrous castings. Fourteen overhead cranes, ranging in capacity from 3 to 25 tons, plus three small jib cranes, serve the seven main bays of the foundry; there is a 1-ton crane in the annexe. Heavy moulding boxes are stored in the yard and this is served by a 5-ton overhead crane.

Heat-treatment Department

The heat-treatment department contains all the essential equipment for a large works of this nature, for treating cast iron, stainless steel, S.11, nickel-chrome, for normalising mild steel, and heat-treating all fabricated work within the size of the furnaces. There are five coal-gas, natural-draught regenerative furnaces of varying sizes, the smallest being 3 ft. deep by 18 in. wide by 12 in. high and the largest 8 ft. deep by 3 ft. wide by 27 in. high. The maximum temperature of these furnaces is 1,150 deg. C. They are controlled by Cambridge regulators, which maintain the temperature automatically to within ± 3 deg. C. of the predetermined figure, and also shut the furnace down at a specified time. The method of control is by the operation of a magnetic valve in the gas line to each furnace. Near the furnaces are two large quenching tanks, one for oil and one for water, and a cooler through which the oil is circulated to dissipate the heat. All welded structures are heat-treated to remove any stresses.

Adjacent to the gas furnaces are two electric salt baths, one for heat-treatment of high-speed steel up to 1,230 deg. C. and a low-temperature salt pot for stress relieving high-speed steel. The pots are interchangeable for nitriding. A double-chamber gas-fired tool furnace is installed beside the salt pots and operates at the same temperatures. The high-temperature chamber is a muffle with a gas curtain to prevent oxidation. Tools are quenched in an air blast at the side of the furnace and tempered immediately.

(*Concluded on page* 343.)

Technical Control Emphasised at a Rochester Foundry

Kent Alloys, Limited, was established in the late 'thirties as a " tied " concern serving the non-ferrous casting needs of Short Bros., then of Rochester. It has changed hands, grown and developed much since that time and an iron foundry, die-casting shops and ancillary sections have been added. To-day, in many respects, the foundries may be described as a model establishment, the underlying motif throughout being quality through the medium of superlative technical control.

JUST BEFORE the war, Short Bros., Limited, established a foundry at Rochester to provide non-ferrous castings for their own production of aircraft, a company known as Kent Alloys, Limited, being formed to operate this new undertaking. Due to the exigencies of the situation which developed, the foundry was soon called upon also to supply castings to other manufacturers of service equipment, and capacity was increased by the addition of a mechanised foundry.

In 1946, the establishment was taken over by private interests. Owing to the decreased demand for aircraft castings, it was considered desirable to extend the scope of the business and an iron foundry was therefore started up. Gravity and pressure die casting production of non-ferrous castings was extended. In addition, various manufactures were developed such as the " Airofier " space heater and other items, which have since been discontinued. Three years ago a change of management took place, which was followed by further reorganisation and expansion.

Scope

The iron foundry side of the business has been considerably developed and further extensions are still in progress. The products of this foundry include hand-moulded work from loose patterns up

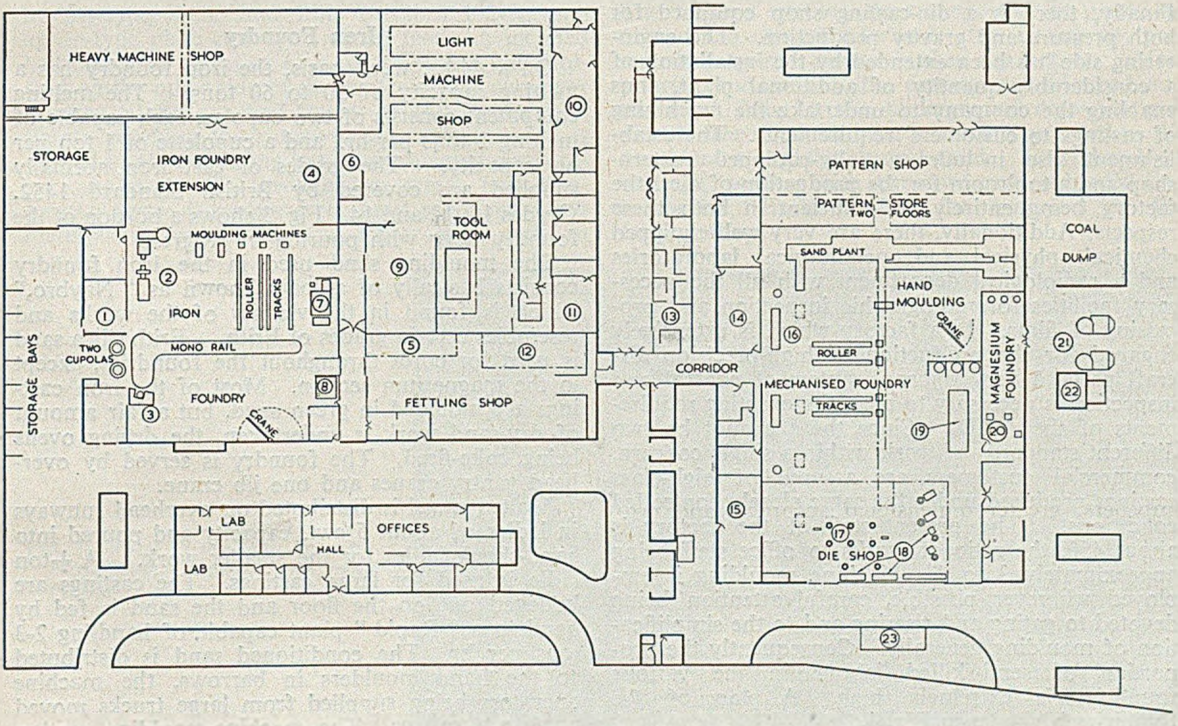


FIG. 1.—*Plan View of the Foundries of Kent Alloys, Limited, showing Ancillary Departments and the Locations of Some of the Plant.*

1.—Sand store.
2.—Sand plant.
3.—Cupolette.
4.—Coremaking.
5.—Shot blast.
6.—Inspection.
7.—Core oven.
8.—Wheelabrator.
9.—Heat-treatment.
10.—Planning dept.
11.—Test house and drawing library.
12.—Despatch stores.
13.—X-ray dept.
14.—Maintenance and training shop.
15.—Metal store.
16.—Lift-out furnaces.
17.—Bale-out furnaces.
18.—Die-casting machines.
19.—Core oven.
20.—Moulding machines.
21.—Gas producer
22.—Sand mill.
23.—Sand drier.

FIG. 2.—*General View of the Patternshop at Kent Alloys; Note the well-spaced Work Benches and the Good Natural Lighting.*

to about 6 cwt. and also machine-moulded castings. There is a fully-mechanised non-ferrous foundry where hand- and machine-moulded castings are produced in aluminium and copper-base alloys, as well as a magnesium foundry similarly equipped. Finally, there is a die-casting shop equipped for both pressure and gravity production. The engineering side has been extended by the installation of a considerable quantity of additional plant, thus enabling the company to undertake the machining of castings to customers' requirements. The establishment also includes a fully-equipped patternshop and a toolroom for the production of dies, the factory being entirely self-sufficient in both these respects. Additionally, there are very well-equipped chemical, physical and metallurgical laboratories and a radiological department with all the necessary facilities for radiographic inspection and processing of films. In a factory which is extensively engaged for the production of high-precision aircraft parts, a very rigorous system of control and inspection is necessary to meet the exacting requirements of the A.I.D. Since there cannot be two different standards of work within a single concern, commercial customers are assured of high-class castings produced under the same closely controlled conditions. The present staff of the factory is about 450, the ratio of works to office staff being approximately 3 to 1. Machine moulding is employed wherever possible, careful attention being devoted to gating and risering and to the simplification of moulding generally. Consequently the proportion of semi-skilled labour in the various foundries is extremely high. A plan of the foundries is shown in Fig. 1.

Patternshop

The foundries' substantial requirements of both wood and metal patterns are produced in a large, exceptionally well lit and fully-equipped shop (Fig. 2). Both ends and one side of the shop consist mainly of glass and each bench is provided with two lamps. Most of the wooden patterns are produced in mahogany. Metal patterns are used wherever the batches are large enough or likely to be repeated.

Iron Foundry

On a 44-hr. week basis, the iron foundry has a melting capacity of 50 to 60 tons. The melting equipment consists of two cupolas, each capable of melting 2 tons per hr., and a cupolette of 1 ton per hr. capacity. The grades of cast iron normally supplied are covered by British Standard 1452, Grades 10, 12 and 14. Fig. 3 shows a portion of the foundry floor with pouring in progress.

The moulding sand used in the iron foundry consists basically of a loam known as "Naybro," which is found in the vicinity of the works and resembles certain grades of Erith. Erith silica sand is used for cores throughout the foundries, except in the magnesium section. Most of the iron castings are moulded in green sand, but a fair amount of dry-sand work is undertaken, the drying ovens being coke-fired. The foundry is served by overhead gantry cranes and one jib crane.

Molten metal is distributed on overhead runways in ladles of about 5 cwt. capacity and poured into hand-shank ladles for the smaller work. A $\frac{1}{2}$-ton ladle is used for large castings. The castings are knocked out on the floor and the sand is fed by hand to a "Rapid" plant capable of handling 2-3 tons per hr. The conditioned sand is distributed to the hand moulders in barrows, the machine operators being supplied from large trucks moved on hand trolleys. The machine-moulding section is well-equipped with 12 in. and 14 in. jolt machines, in addition to roll-over machines for larger work.

A feature of the iron foundry coreshop is the extensive use of female labour, even for relatively heavy work, special equipment having been developed to facilitate the movement of the larger cores. A special cradle device enables two women to ram up and handle with ease a box weighing ¼ cwt. when full of sand. After ramming, the box is turned over on to the cradle, on which the core plate is supported at such a height that its base is level with the top of a second table. Thus it requires little effort to slide the plate on to the second table and thence on to a roller track, from which the work is loaded on to trucks for conveyance to the drying oven and subsequently to the core stores for issue to the moulders in due course. For quantity production of some of the smaller work a core-blowing machine has been installed.

Non-ferrous Foundry

The non-ferrous foundry produces castings in a large number of aluminium and copper alloys, a typical casting being shown in Fig. 4. This section is served by a fully-mechanised sand-treatment and distribution plant supplied by Augusts, Limited, which delivers from 4 to 5 tons an hour and is large enough to cope with a considerably increased shop production. The sand mainly used in this foundry is a different grade of "Naybro" from that employed for ferrous castings, a limited quantity of Mansfield being also used.

Sand System

Sand from the knock-outs is collected by a hopper-type chute and falls on to a 132-ft. long apron-type plate conveyor, which feeds an inclined belt conveyor elevating to a rotary screen unit situated on the other side of the gantry. This conveyor is some 60 ft. long and travels at 150 ft. per min. Before reaching the rotary-screen unit the sand is carried under a rotating band-type magnetic separator. As it travels through the screen unit, non-ferrous scrap, large pieces of hard sand and other materials are eliminated, the lighter dust and silt being removed by an extraction plant. From the base of the screen unit the sand discharges on to another inclined belt and can be fed into either of two large storage hoppers. From the base of the hoppers the sand discharges into a bucket loader, where a percentage of new sand is also added when necessary before the bucket is elevated and tipped into a Simpson mixer. After milling, the sand passes over an aerating pulley and is discharged into a hopper from which it feeds on to a horizontal rotating table. A plough then guides it on to an inclined belt conveyor leading up to a central overhead belt conveyor. This belt discharges sand into 20 overhead hoppers arranged in pairs along the centre of the foundry-bay.

Formerly 16 hoppers supplied pairs of straight-lift machines placed back-to-back, the remainder feeding roll-over type machines arranged side-by-side. This arrangement was designed for the simultaneous production of copes and drags by each pair of machines, but the set-up and moulding methods have been modified to suit the requirements of a more varied production programme. At present, the machines are so laid out as to form five self-contained units. Each unit has its own knock-out, on either side of which are roller-conveyor tracks serving the machines. Within the area enclosed by these two outer tracks is an overflow track and a sloping central roller track for the return of empty boxes. The finished moulds are transported on plates on one of the outer tracks and, after coring up, previously-prepared runner bushes are put on. After pouring and cooling, the castings are knocked out, the sand falls to the underground conveyor previously described, and the boxes are returned to the moulders along the central track. Each batch of castings, together with its record card, is loaded into a special "Eccles" truck for transport to the fettling shop.

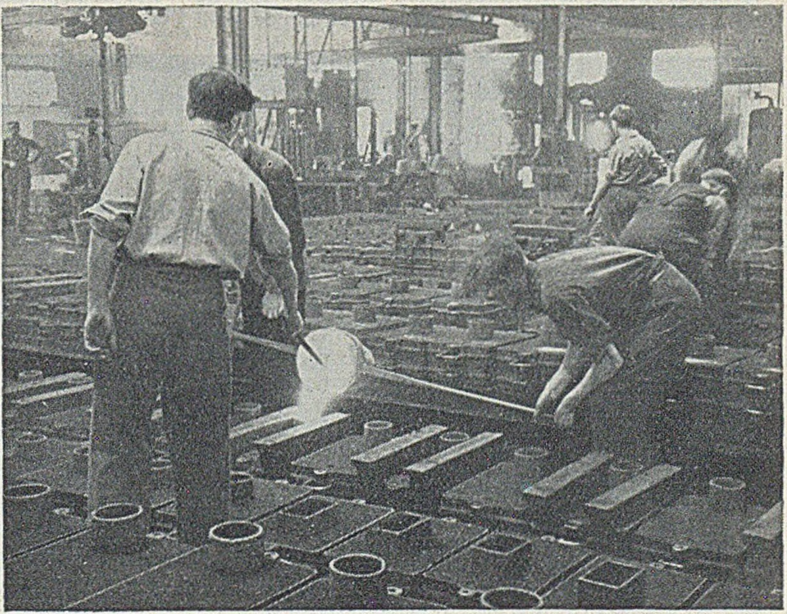


FIG. 3.—*View of the Iron Foundry. Floor-banked Moulds are being Poured.*

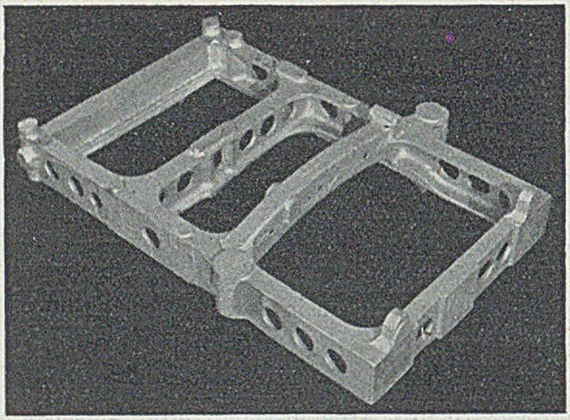


FIG. 4.—*Light-alloy Sand Casting; Note the Intricate Coreing and Contrasting Sections.*

This foundry has a melting capacity of 15 tons weekly and can handle castings up to 120 lb. The melting units are arranged in line opposite the five knock-outs and include oil-fired tilting and gas-fired pit furnaces, an electric furnace, and a bale-out unit. Altogether there are 12 furnaces, so placed as to allow pouring with the minimum delay.

Hand Moulding

The hand-moulding section is located on the opposite side of the overhead sand conveyor from the machines. As the machines are no longer grouped in pairs throughout the entire plant, hand moulders are able to draw their sand from a convenient hopper on their side of the bay. The area occupied by the hand moulders being relatively small, provision has been made on their side of the foundry bay for a well-appointed core-shop for the light-alloy department. This shop is equipped with its own battery of sand mills for light-metal and copper-alloy moulding, a proviso being that the sand used for cores and moulds for DTD. 300A aluminium is a special mixture and has to be separately milled.

As in the iron foundry, women are extensively employed in making cores. The cores are loaded into steel storage racks and transported by lift trucks to coke-fired drying ovens. On emerging from the oven, they are checked, re-loaded on to the racks, and taken to the core stores. When cores are issued to the foundry, the racks, each containing a complete set, are moved to a convenient position for the moulders, and when empty are returned to the core shop. This system eliminates unnecessary handling and minimises the risk of damage to the cores.

Heat-treatment

The heat-treatment of alloy castings is carried out under direct laboratory control. Methods of loading and supporting castings during heat-treatment are carefully considered for each new type of component in order to avoid distortion. High-temperature solution treatment is given in electrically-operated pit-type furnaces (Fig. 5), with pyrometric control, transference to the quench tank being effected by a rapid electric hoist. Ageing or low-temperature treatments are carried out in long, resistance-heated ovens equipped with air circulating fans.

Die Casting Shop

The die casting shop is capable of producing pressure die castings weighing up to 1½ lb. and gravity die castings up to 10 lb. The pressure work is done in four Polak and two Edgwick machines. The metal is melted in 11 bale-out and one oil-fired tilting furnace, having a total weekly melting capacity of 25 tons. Examples of die-castings produced are shown in Figs. 6 and 7.

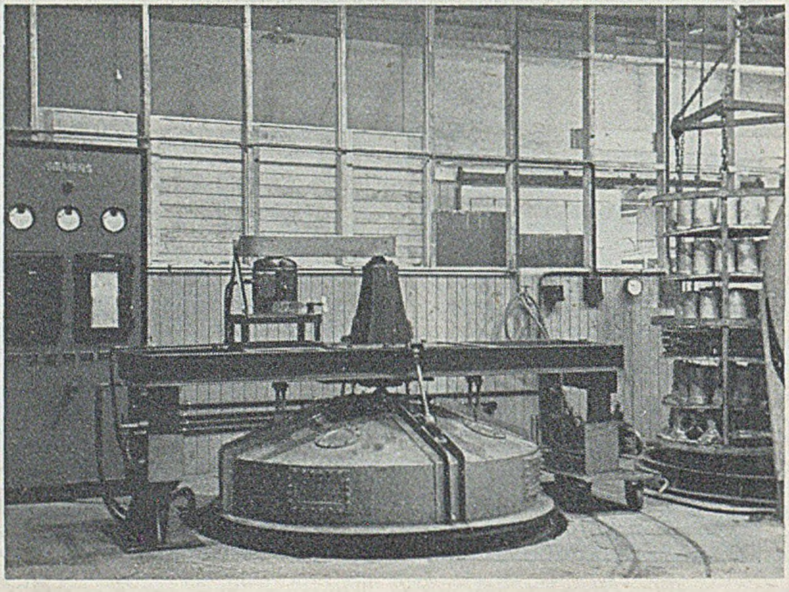


FIG. 5.—*Part of the Heat-treatment Department, showing a Pit-type Electric Furnace and* (R.H.S.) *a Loaded Cage of Castings awaiting Heat-treatment.*

Magnesium Foundry

The magnesium section is, of course, segregated entirely from the other foundries and has its own coremaking and fettling arrangements, as well as its own sand mill. The sand used is a "synthetic" made up of a rather coarser, clay-free Bedford silica sand with "Fulbond" as the binder and sulphur and boric acid as inhibitors. Three Macnab moulding machines are used in this foundry and floor moulding is also undertaken. Certain special precautions require to be taken during moulding, such as harder ramming and closing twice. Melting is done in three pit furnaces having a total weekly capacity of 2½ tons. Visors are worn during pouring, and, due to the rapid cooling of the metal, all doors and windows have to be closed whilst casting is in progress. The fumes are removed by two extractor fans and the atmosphere clears very quickly when the doors are opened after pouring has been completed, the finished castings are given the usual chromating treatment. Fig. 8 shows half a landing wheel cast in magnesium alloy.

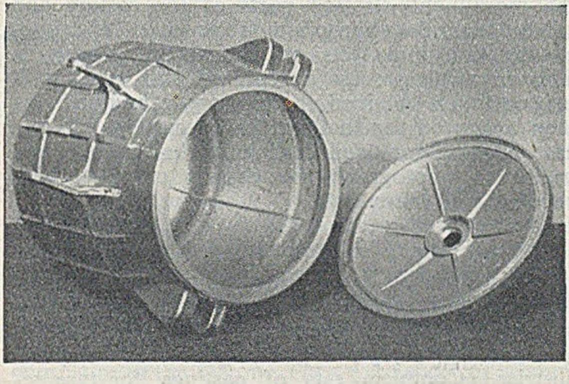


FIG. 6.—*Light-alloy Gravity Die-castings, comprising Body and Lid for a Domestic Pressure Cooker*

Fettling Shop

With the exception of the magnesium products, castings from all the foundries are transported to a central fettling shop. After the cores have been knocked out and the runners and risers removed, all castings are treated in a Wheelabrater machine. They are then given a preliminary inspection and pass in the truck, as a complete batch, to the fettling benches. These are equipped with both bench-type and floor-mounted buffs, and each operator buffs as well as fettles his own castings. Every casting is viewed and stamped by an inspection department situated inside the fettling shop and is then passed out for any radiographical inspection or heat-treatment required.

Laboratory Control

Samples from a proportion of each day's melts are sent to the chemical laboratory, so that a full chemical analysis of both alloying elements and impurities may be carried out. For most of the routine analysis, the laboratory uses modifications of well-established volumetric and gravimetric wet methods, supplemented by electrolytic methods. These processes are constantly reviewed in the light

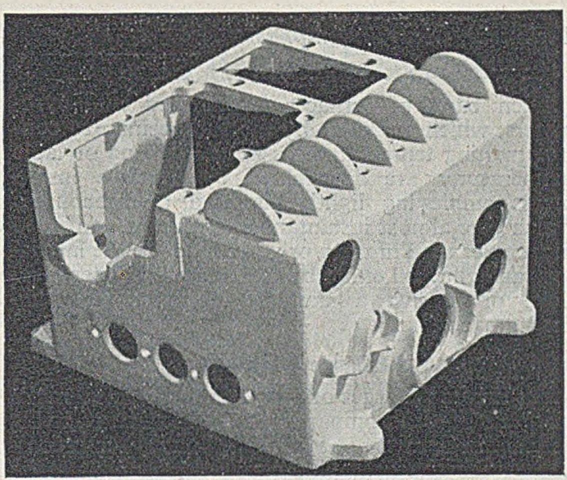


FIG. 7.—*Complicated Light-alloy Gravity Die-casting for which a Multi-part Die was used.*

of fresh information and experience. The equipment of the laboratory includes a Spekker photoelectric absorptiometer and a Hilger medium spectograph and microphotometer, together with a comparator and projector. This equipment makes it possible to detect and determine minor impurities which might be missed during general routine analysis by wet methods.

Melting procedures have been worked out for each type of alloy, and it is the responsibility of the furnace charge-hand to see that the desired melting conditions are maintained. Each furnace operator keeps a daily log-sheet on which are recorded the details of every melt. These sheets are sent each morning to the laboratory, where the recorded figures are analysed and transferred to monthly records. This procedure gives valuable information regarding the behaviour of various types of refractories, the efficiency of furnaces and comparative melting costs.

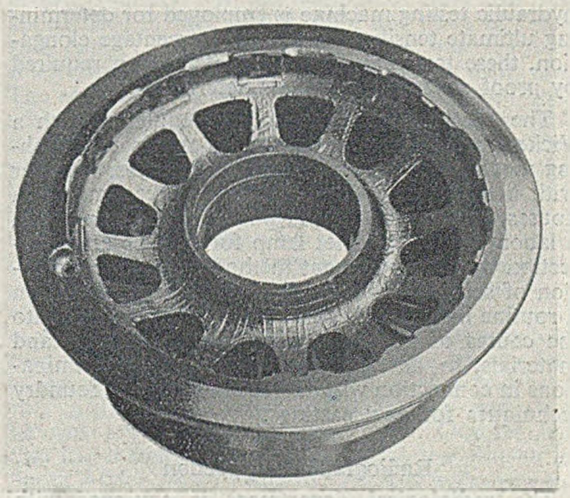


FIG. 8.—*Magnesium-alloy Casting comprising a Half Landing Wheel Hub for Aircraft.*

Technical Control Emphasised at a Rochester Foundry

Each bank of furnaces is provided with pyrometers, which are used by the furnaceman to control melting temperatures. Actual casting or ladle temperatures are determined by portable instruments employing lightly insulated thermocouples, which give almost instantaneous readings. All thermocouples used in the works are made in the laboratory and checked either by freezing point determinations or against a standard platinum/platinum-rhodium couple.

Charge Make-up

All furnace charges originate from a central metal store and are accompanied by a melt card giving details of the raw materials and foundry scrap comprising the charge. This card bears a melt series number, which is ultimately assigned to the fettled castings. In addition, aluminium identity tabs are later inserted into the liquid heads of test-bars and one or two of the castings, as well as into any excess metal cast into chill moulds. At the time of pouring, the types and numbers of castings, temperatures, and other relevant details are recorded on the card, which remains with the castings throughout subsequent operations. One copy of the record is returned to the store with the scrap, which is weighed into the store. In the case of non-ferrous alloys, a fresh furnace charge is then made up by the addition of virgin metals. In this way it is possible to identify the scrap with the melt from which it came, or to deal with any queries arising in regard to materials even after an interval of several years.

Physical Testing

Test-bars from each melt are delivered to the mechanical testing section and identified by the numbered aluminium tabs, which are then transferred to the ends of the bars. After the bars have been machined to standard size, a 15-ton Amsler hydraulic testing machine is employed for determining ultimate tensile strength and percentage elongation, these tests being supplemented when required by proof stress and hardness determinations.

The metallography section is equipped with a Vickers projection microscope, an automatic polishing machine and a Fisher mounting press, together with a thermostatically-controlled darkroom which houses, in addition to the photographic apparatus, a laboratory ultra-violet lamp for surface crack detection by the fluorescent method. Micro-examination of sections from castings is not carried out on a routine basis, but is confined to investigations into the causes of abnormal properties in castings and materials, to development work, and to examinations in connection with the development of foundry techniques for new castings.

Radiographic Inspection

The radiological department is equipped with three X-ray units. Radiographing of castings and processing of films are carried out by trained girl operators, but for fluorescent-screen examination and the interpretation of negatives only qualified radiologists are employed. All castings for service aircraft are individually inspected, an average of 10 per cent. of the castings for civil aircraft being similarly examined after the founding technique for that particular casting has proved to be satisfactory. In addition, requests for radiographic examination are constantly received from commercial customers as a safeguard against any possible wastage of machining effort. Since an individual casting has frequently to be photographed from several angles in order to cover all the stressed positions, the number of films is extremely large, necessitating the employment of a staff of ten, including the radiologist, his two assistants and the girl operators.

"First off" castings, after being checked dimensionally, are passed to the X-ray department. The radiographs taken are jointly examined by the radiologist, metallurgist and foundry foremen, who discuss any faults shown and the methods by which these may be corrected. Test-pieces are cut from the more-highly-stressed parts of the casting and submitted to the appropriate laboratories for micro-examination and tests of mechanical properties. This complete process is repeated until a satisfactory casting is obtained, the foundry technique being then approved for that particular casting. In the case of hand-moulded castings, it has been found useful to photograph the casting complete with runners and risers.

Products

In addition to the production of aircraft components, the company caters for a very large variety of commercial customers, such as the motor-car, electrical, textile, printing and grain-machinery industries. Complete sets of castings for tyre re-treading machines are produced, as well as numerous machine castings for shoe manufacturers. Typical of work undertaken is the casting and machining of components for the printing trade. Orders are despatched mainly in the company's own lorries, which deliver within a 50-mile radius of London and sometimes even further afield.

A considerable staff is employed on maintenance work. All moulding boxes are checked for accuracy every week and all pinholes and pins are also checked. Besides keeping the foundry equipment in satisfactory order, this department is responsible for repairs and building maintenance throughout the factory.

The company is keenly interested in the welfare of its workers. The establishment includes very well-appointed first-aid and medical centre under the charge of a certificated nurse, where such facilities as violet-ray treatment are available. A canteen is shared with the neighbouring factory. Fine sports grounds adjoining the works include a football field, a bowling green and three tennis courts. There is a social club which organises such activities, as the various sports clubs, holds social events at regular intervals in local halls, and arranges Christmas parties for employees' children.

Foundry Conditions in Great Britain

Discussion of Mr. J. Gardom's Paper to the I.B.F. South African Branch

AT A MEETING of the Institute of British Foundrymen (S.A. Branch) held at Barclays Bank Building, Johannesburg, on October 26, 1950, Mr. H. Godwin read a Paper written in England by Mr. J. W. Gardom and entitled "Foundry Conditions in Great Britain."* This Paper was contributed by the London branch of the Institute in exchange for a South African Paper by Mr. H. G. Goyns, entitled "A Review of the South African Foundry Industry."

The meeting was attended by about 30 members and visitors. The president of the branch, Mr. S. Jane, was in the chair.

In his introductory remarks, MR. GODWIN explained that he was deputising for Mr. Goyns, who was in Britain on a business visit. He said that Mr. Goyns's Paper had been read by Mr. Gardom at the 47th annual general meeting of the Institute at Buxton, England. During a recent visit to England he (Mr. Godwin) had had the privilege of attending the annual meeting of the Institute and it had given him great pleasure to see how very well the South African Paper had been received there.

MR. JANE opened the discussion on Mr. Gardom's Paper by thanking Mr. Godwin for the able manner in which he had read it. In his opinion the Paper was crammed with good points on which there could be some healthy argument. It was good to know that foundrymen overseas seemed to be suffering from many of the troubles that caused complaint in the Union. They were short of labour, existing apprenticeship training was not all that it might be, and so on. Mr. Gardom's remarks on sands seemed to offer a good subject for discussion.

Vote of Thanks

MR. HOLDSWORTH, in proposing a vote of thanks to Mr. Gardom and Mr. Godwin, said that 15 years had passed since he left England but it appeared that fundamentally the conditions in the foundry industry had not changed much. One point that came into prominence when comparing the development of the foundry industries in Britain and South Africa was that in Britain they were able to take foundry labour from the floor and advance it to the machines. The labourers therefore got an opportunity to learn the foundry trade thoroughly. In South Africa it often happened that a man who didn't know what a foundry looked like inside would be taken off the street and made to serve as a machine moulder. On the whole, however, Mr. Holdsworth felt that the foundry industry in South Africa had nothing of which it should be ashamed.

He went on to say that the Author's remarks on apprenticeship training had been particularly interesting. He would like to hear from Mr. Godwin something of what he had seen in regard to apprenticeship training during the time he spent in England. Mr. Holdsworth expressed the opinion that an apprentice could never be too well trained.

He personally had served his apprenticeship in Britain the hard way. All the apprentices at that time had served as general helps, passing from one job to another, and then at the age of 19 they were put to work with a journeyman.

MR. MARAIS said he definitely agreed with the Author that better control was possible through the use of a semi-synthetic sand. Synthetic sand, as everybody knew, was inclined to rat-tail very badly; such difficulties could be avoided by starting with semi-synthetic sand.

Dealing with the general picture of development in the Union's foundry industry, Mr. Marais expressed the opinion that South Africa could hold its own against any industrial country in the world. With her labour resources the Union was favourably placed. If the stage could be reached where each native was applied only to one particular operation, and if the foundry industry were given the opportunity to handle production with a really large "number off," South Africa would be able to produce castings cheaper than any other country.

Apprentice Training

Referring to Mr. Holdsworth's remarks on apprenticeship training, MR. GODWIN said his short visit to Britain had not given him an opportunity to study apprenticeship training as a whole. He had been able to see a few schemes in operation, however, and he had been particularly impressed by a Meehanite apprenticeship training school in a private foundry. It was worthy of note that the apprentices in that school were not there to fetch and carry. They worked in what was really a small foundry set aside especially for their use. The apprentice, to start with, was given a thorough schooling on patterns. Before he ever started moulding he was made to realise that a pattern was a work of art and that it should be carefully looked after. Secondly, the apprentice had to mix his own sand. The result appeared to be that the young men in the school were really interested in their job, and they were learning fast. Another important point was that the apprentices were allowed to make their own tools. As far as actual moulding was concerned, the apprentice was told how the job should be done and then he was left to do it—if he made a scrapper he was told why the casting had turned out that way and then he was left to make another. Mr. Godwin felt that the introduction of such a training scheme in South Africa would result in a marked improvement in the training of foundry apprentices.

MR. BILL referred to the remarks made by the Author on the development of British foundries

* Paper printed in our issues of February 8 and 15, 1951.

Foundry Conditions in Great Britain—Discussion

and said he would like to place on record, as a parallel to Mr. Gardom's survey, the outstanding development of the foundry industry in South Africa. Mr. Marais had not been guilty of exaggeration when he remarked that, given the quantities, South Africa could compete with any country in the world.

Mr. Bill went on to say that it had been interesting to hear about the malleable foundry in Britain which had a regular production rate of 90 boxes per hour from one pair of pin-lift moulding machines.

Mr. Gardom had mentioned that it was not always wise to change over to synthetic sand, and he (Mr. Bill) had been glad to hear that a South African sand expert—Mr. Marais—held the same opinion. A study of sand practice was always invaluable because any step in the direction of improving sands led to sand control, which after all was the criterion—and not necessarily the sand used.

Another point in the Paper which was of extreme interest to South African foundrymen was that Mr. Gardom apparently preferred the rigid moulding box. Mr. Bill felt that when smaller boxes were used the steel box was much superior. Aluminium boxes were such a recent innovation that few foundrymen could claim to have had much experience of them, and in any case it would appear that the initial cost would be prohibitive in all but highly mechanised foundries.

Mr. Bill said he had seen the overhead vibratory knock-out device referred to in the Paper, and it was true that it had definite advantages in certain applications.

Sand Cooling

It was interesting to know that Mr. Gardom recommended the cooling of sand after knocking out. In his (Mr. Bill's) experience such cooling caused weak moulds, and to overcome the weakness and the "sticky" tendency it was necessary to use linseed oil. Very regular pattern cleaning was also necessary.

Mr. Ward pointed out that the use of pattern-plate heaters would eliminate sticking.

On the question of apprenticeship training, Mr. Ward said the remedy was in the foundryman's own hands. A general shortage of European labour of all kinds was at present making itself felt in South Africa. As far as the attracting of youths to foundries was concerned, there had been a tendency for the other trades to skim the cream of the country's youth. That was a state of affairs that should not be allowed to continue. The foundry was a difficult place to make beautiful; the foundry trade was not a luxury one and there was a certain amount of hard work attached to it, but nevertheless the foundry industry in the Union had to find some way to make the trade more attractive.

As far as the actual training of apprentices was concerned, only the large shop could take a number of apprentices under the wing of craftsmen, and in the large shops the young men certainly underwent a comprehensive training course; but the training of apprentices in large shops only would never keep the industry supplied with the required number of skilled men. Apprentices generally disliked having to attend school for five years, and there was a committee sitting at present which would consider the possibility of shortening the time spent in the classrooms; the school syllabus and the terms of apprenticeship would also come up for revision.

Referring to the Author's remarks on core sands, Mr. Marais said green-sand cores had been used in South Africa. At that time, however, the experimenters had not known enough about the subject and they could not control the moisture content. Since then their knowledge had increased, and Mr. Marais was confident that they could now use green sand cores successfully.

Research Association

Mr. McGowan said the foundry industry in Britain was to be congratulated on the part it had played in the increased production of high-duty irons, but of course British foundries were in a very advantageous position to help in the improvement of metal practice since they had at their disposal a very useful tool in the form of the British Cast Iron Research Association. He understood that a levy was imposed by the Association on every ton of iron bought, so that every firm was automatically a member of the Association. All foundries could get first-hand information and advice by writing to the Association, and Mr. McGowan felt that the South African foundry industry would benefit considerably if a similar association were formed in the Union.

Mr. Ward pointed out that, pending the idealistic formation of such an association in South Africa, there was nothing to prevent South African firms joining the British Cast Iron Research Association. The annual subscription paid by each member firm to the Association was based on the number of workers employed by the firm.

A visitor who had recently arrived in the Union from Britain said that in a few months he had seen some very good production in South African foundries. On the whole it seemed that employees in the British foundry industry were given better equipment to work with than were South African employees, but the Union's foundry industry produced some outstanding work and there would be nothing to choose between British and South African workmanship if identical equipment were used. It was true that in South Africa the industry did not have the range of pig-irons or the cheap sands which were available to the British foundry industry.

Referring to the British Cast Iron Research Association, the visitor informed the meeting that the British Government every year paid in to the Association as much as had been collected by the Association from member firms. Thus every £50 paid in by members was an investment from which they could expect to derive £100 worth of benefit. The production of 90 boxes per hour from one pair of pin-lift machines—mentioned in the Paper

—was an exceptionally high output, but he had seen girls on pin-lift machines making 50 to 60 boxes per hour. With all the mechanical aids given to them they did their work so rapidly that it was difficult to keep one's eye on the process from stage to stage. In conclusion, the visitor stated that he had seen castings made in the Union which could not have been produced any better in England, apart from the finish. Any tendency towards inferior finish, however, was due to the pig-iron and sand used.

MR. PIENAAR pointed out that the Author had expressed surprise at the fact that steel moulding boxes were not common in South Africa, yet seemed himself to prefer the cast-iron box. What was the most common box in England?

MR. GODWIN said he had not visited a foundry in Britain producing as many as 90 moulds per hour but had come across several in which the regular output was about 60 per hour. He had been round several mechanised foundries and it seemed that a large proportion of the boxes used were of steel. He had visited a number of foundries using only aluminium alloy boxes, which were beautifully made, precision-cast jobs.

THE VISITOR who had previously spoken stated that if a complete survey were made it would probably be found that the number of steel boxes used in England would be balanced by the number of aluminium boxes. Many foundrymen who had gone over to steel had given them up because they became badly distorted when used with hydraulic down-sand-frame machines—and they now used cast-aluminium boxes. In his opinion, the cast box that breaks was preferable to the steel box.

MR. BILL considered that the choice of the aluminium-alloy box would be dictated largely by the factor of economics. If one were handling small batch work the initial cost of aluminium boxes would prove prohibitive; but if one had really big runs to handle the aluminium box was very attractive. Mr. Bill expressed the opinion that the steel box was being ousted by the tapered aluminium snap flask. Conservative foundrymen still had a lot to say against aluminium boxes, but he felt that the advantages of aluminium were such that the wooden snap flask would ultimately disappear completely.

A MEMBER said he had been associated for a number of years with apprenticeship training both in England and in South Africa, and what had struck him more than anything else was the difference in enthusiasm shown by English and South African apprentices. It was apparent that apprentices in England were distinctly more interested in their jobs than their South African counterparts. In England some time ago the principal of a technical college supported a proposal that a small foundry should be established at the college, and sent out a questionnaire to all foundries in the district asking for comments and suggestions. The proposal met with immediate response and a number of firms donated equipment for the foundry. In a matter of weeks the foundry was " in production," and the enthusiasm shown by the apprentices was astounding. Many firms allowed their apprentices time off to attend special periods in the foundry. There were 12 students split into two or three groups, each group handling a different job.

Most South African students resented the fact that they had to attend classes. They felt that the curriculum did not apply to their jobs, and there was a general lack of interest in the technical college side of their training. The member considered that the establishment of a small foundry attached to a college would soon arouse the enthusiasm of South African apprentices, with beneficial results for the foundry industry as a whole. The scheme would not be a success, however, unless firms were prepared to co-operate with the college and give the scheme their full support.

Royal Society Elects New Fellows

The Royal Society met in London on March 15 and elected 25 new Fellows. Among them were the following:—

H. FROHLICH, Professor of Theoretical Physics, Liverpool; G. GEE, director of the British Rubber Producers' Research Association; G. HERZBERG, director of the division of physics of the National Research Council at Ottawa; L. B. PFEIL, director of research of the Mond Nickel Company, Limited; M. H. L. PRYCE, Wykeham Professor of Physics at Oxford; W. J. PUGH, director of the Geological Survey and Museum, London; J. A. RATCLIFFE, Reader in Physics at Cambridge; P. J. DU TOIT, president of the Council of Scientific and Industrial Research, South Africa; A. M. TURING, assistant director of the computing machine laboratory at Manchester University; A. R. J. P. UBBELOHDE, Professor of Chemistry at Queen's University, Belfast.

G. & J. Weir's Foundry and Facilities

(*Concluded from page* 334.)

Treatment of Shafts

Heat-treatment of shafts is an important feature in this department, as G. & J. Weir, Limited, make large numbers for their turbines, centrifugal pumps, compressors, etc., and two vertical pit type furnaces, electrically heated, are used. These furnaces are 22 in. dia. by 108 in. deep, and operate at a maximum temperature of 1,000 deg. C. A feature of these furnaces is that the depth is divided into three zones, each controlled by a regulator, a step transformer allowing a variation of current in each zone so that shafts varying in diameter can be heated equally in spite of the difference in the section of the metal. An overhead runway above the pits allows shafts to be immersed in oil or water quenching tanks and returned to the furnace without dismantling the hanging tackle.

Among other equipment in this department are two sizes of cyanide salt baths for case hardening, with circulating water quench. These baths are only used for very delicate parts and for tools for shops use. Gudgeon pins, etc., are all carburised in a pot and refined and tempered in either gas or electric furnaces as usual.

Statistics of the National Insurance Schemes

By F. J. Tebbutt

Practically everyone is now insured under the National Insurance Schemes, employers and employees alike paying towards same by contributions and also *via* tax paying, so interest is doubtless present concerning certain aspects of the schemes. Therefore we give a few statistics arising from the first Report of the Ministry of National Insurance, which covers the period from November 17, 1944 (when the Ministry was formed) to July 4, 1949, but mostly this article refers to the first year, the schemes fully starting July 5, 1948, the first year's working ending July 4, 1949. Before the actual start of the schemes, the Ministry were occupied in arranging for the taking over of the Health Insurance scheme from the Approved Societies and the Contributory Pensions Schemes from the Ministry of Health, and the functions of the Ministry of Labour so far as Unemployment Insurance and Assistance. Furthermore the Family Allowances scheme (passed by the war-time Coalition Government) came under the new Ministry.

Family Allowances.—By July 4, 1949, 2,970,000 families were taking family allowances being in respect of 4,700,000 children, costing roughly £60 millions a year. Incidentally this is receivable irrespective of parents' income, but not for the eldest or only child. Over 63 per cent. of the families receiving had only two children under the age limit, that is receiving one allowance; families of six or more children totalled two per cent.

Main Scheme

There were 6,000 approved societies of moderate size in the old scheme taken over, covering an individual membership of six millions, with an average of fewer than 50,000 membership for each society. There were in addition 43 large societies, with a membership of 13 millions. The principal office of the Ministry is at Newcastle-upon-Tyne, and the site covers an area of 64 acres, with a staff of 7,700. The records of each insured person are kept there, and kept under the National Insurance number of the particular person (to be found on front of the person's contribution card) so it is important always to quote this number when communicating with the authorities, as otherwise when benefit is required there may be delay in authorising this. It will be understood that there may be many a person named John Smith, but only one number for each person. There are, of course, local offices spread over Great Britain, 983 full-time, 321 part-time or sub-offices, these being grouped into ten regions for England, each with a controller, Scotland and Wales having controllers in Edinburgh and Cardiff respectively.

An illuminating remark in the Report is that immediately after the start of the scheme (July 5, 1948) being holiday months, inquiries at seaside resorts were surprisingly high, it being stated that evidently holiday-makers used their spare time during wet weather in seeking shelter and information at the same time.

Items of Interest

The married women working for an employer can elect not to be insured and nearly one million elected not to pay. The new scheme brought four and three-quarter million more persons into Unemployment Insurance. During the first year, there were thirteen million benefit payments, totalling £20 millions. For sickness benefit the first year brought 39 million new claims averaging 140,000 a week. At one time the number of persons receiving benefit was as high as 1,100,000 but as the summer months arrived, the number dropped to 800,000.

On June 30, 1949, there were 4,100,000 men and women receiving retirement and old age pensions. Roughly 8,000 men and women reach pension age each week (*i.e.*, men 65, women 60) and about two-thirds of the men and rather less than half of the women go on working, and so defer pensions, which means that when they do take pensions, the rate will be higher than the ordinary 26s. (being 1s. weekly for every 25 contributions paid after the age of 65 (women 60). Pensions at 65 (women 60) however are not payable unless there is retirement. At 70 (women 65) the pension is payable irrespective of whether working or not and any amount of earnings can be drawn. At the end of the first year, there were 452,000 widow pensioners; 10,000 allowances for orphans were being paid.

Industrial Injuries Insurance.—This scheme applies to injuries at work (taking the place of the old Workmen's Compensation Scheme) and claims for injury benefit remained fairly constant at 15,000 during the year. Disablement benefit claims totalled just under 44,000 in the year under review, but these are now running at the rate of 80,000 a year. Death benefit claims nearly reached 200 a month. All these benefits are weekly benefits, the death benefit, of course, going to the widow and other dependents. Injury benefit is payable for six months when it becomes disablement benefit, pending an assessment being made of the injury when a disablement pension (permanent) may be awarded.

Reservists and National Insurance

The Ministry of National Insurance announces that the employer's contributions under the national insurance scheme will be paid by the Service authorities for reservists and members of the auxiliary forces called up for training.

The employee's contribution will be deducted from his Service pay.

Army and Air Force reservists and auxiliaries called up for 15 days or three months should not take their national insurance cards with them, but should take a note of their national insurance number which they can get from their employers. The cards should be kept by employers and exchanged at the usual times. Officers and men recalled to the Navy or R.A.F. for 18 months' service must take their national insurance cards with them.

B.S.A. Expansion

The Birmingham Small Arms Company, Limited, has acquired the share capital of Triumph Engineering Company, Limited. Mr. James Leek, managing director of B.S.A. Cycles, Limited, and B.S.A. Guns, Limited, Mr. James MacLaren, managing director of B.S.A. Tools, Limited, and Mr. J. Sangster, chairman of Triumph Engineering, have been elected directors of the Birmingham Small Arms Company.

It was officially stated that there would be no change in the management of the company, which would be conducted by the same board.

The British Standards Institution Monthly Information Sheet for February, 1951, lists amongst new standards issued, B.S. 1121, Part 17: 1951 Methods for the analysis of iron and steel. Part 17: Titanium in permanent magnet alloys (2s.). Part 18: Chromium in ferro-chromium (1s.).

Women in the Foundry

By Christina Hyde, B.A.Oxon.*

With the accelerating defence programme, the demand for more and more female labour becomes more insistent. As during the war years, it is the foundry industry, for so long a masculine stronghold, where additional dilution must follow swiftly in response to the changed requirements. The operation of the dilution is to a large extent, however, based on the experience gained since 1940. Even so, women in the foundry will always present a somewhat specialised problem in industrial welfare. Looking back over the history of female labour in the foundry, one finds nothing comparable with other industries, to which women seeking work have always gravitated. In some of the old Black Country foundries, there has always been a small nucleus of women, almost all being coremakers. Their predecessors flocked with their men-folk into foundries which thrust up so rapidly during the early years of the industrial revolution, so that for certain families and for some districts there was a tradition of belonging in the foundry.

Such women in foundries, however, were an outgrowth to the dominating male set-up, were uncatered for as women, and themselves contributed little save service to a production unit. Not until 1941 was a permanent place made for them, partly through strong female dilution, but largely through impetus of the great new cult of industrial welfare. Since those years of the past war when women emerged not only as coremakers but also as moulders and die-casters, they have had a recognised place in the foundry industry. Women are in foundries to stay and the industry has to adjust itself accordingly.

Suitable Activities

For some time, it was thought that only the "rougher" type of women would be attracted to the so-called "dirty" industries. It soon became clear, however, that foundries could and should, offer a satisfactory job to the capable, superior girl, whose work was more than a meal ticket to her. Job classification is now fairly well established. Although women under press of circumstances turned an efficient hand to such work as moulding and casting, their essentially permanent sphere lies in small core making, light dressing, filing (where no man can equal their deft fingers), machining, pressing, stamping, packing and viewing. Here, indeed, is a vast field for productive contributions. The rapid development of die-casting in this country—a process accelerated by war demands—has opened up a wide sphere for women in the foundry, the smallness of the castings offering much scope for the manual dexterity of a female worker.

Given the job allocations, what remains for the foundryman is to establish a background congenial to the foundrywoman. It must be a deliberately-created environment, a purposeful, selective, domestic setting and atmosphere. The female is never going to accept a job just as a "job," as a man does. She will always be alert and responsive to the trappings. She will make good cores if she is comfortable at a bench, satisfied with the shop, and happy with the people around. She is not always articulate (in spite of the fact that she can raise a storm when she is "upset" by anybody or anything), and does not always know that, compared with men, she is more resistant to discomfort; that she works better if the bench is adjusted to her height; if she does not have to bend and stoop in blacking up; if the conveyor is at hand to take her core-trays; if she does not have to shovel up too much sand; carry too-heavy patterns, boxes, and so on. With good environment, warmth, good lighting, adequate cupboards, cheerful cloakroom, and a shop where the "feminine" element is deliberate and exclusive, she will imperceptibly do better work. It is imperative that this environment be deliberately created and not casual. It is also imperative that somebody must turn regularly an official eye to weight lifting; splintered patterns and coreboxes; unsafe hammerheads; provision of seats and so on. It is essential that management listens sympathetically to complaints about draughts and poor lighting, for these things matter to women. Obviously one must keep a tight grip on anything that ranks as "feminine privilege," but certain privileges are sheer horse sense that reap a dividend in managerial as well as individual interest. Releasing the women through the clocking station five minutes before the men, for instance, so that they can avoid the masculine rush for canteen or transport, such a small concession establishes in the women a feeling of being cared for.

Special Welfare

There is little doubt that women need this individual care, and it is that attitude which the foundry must accept and translate into daily practice. The fact raises some difficulties. Solutions must be sought to the following questions:—Women like novelty—how to satisfy them, for it is impossible for economic and production reasons to have excessive internal transfer; how is one to check the outset of boredom which results in so high a labour turnover among female staff; how to counteract the volatility and lack of application that so many modern youngsters show? The answers seem to be to exercise patience and adroitness in giving them in managerial terms what they want; to initiate the women into the established social and sports clubs; to open up channels where they specifically shine (such as a hobbies exhibition); fuss endlessly over the canteen on their behalf (for they are ruthless

(*Continued on page 346 at foot of column two*)

* Women's Personnel Officer, Birmid Industries.

Notes from the Branches

Scottish

The annual meeting of the Scottish branch of the Institute of British Foundrymen was held on March 10, Mr. J. G. Arnott presiding. The president of the Institute (Mr. J. J. Sheehan, B.SC.) and the national secretary (Mr. T. Makemson, M.B.E.) were present. In his Report, Mr. John Bell, the honorary secretary, gave his usual detailed analysis of the membership and financial position of the branch. The total at 495 shows a loss of 14 as against 1950. In the course of his Report, Mr. Bell stated that the meeting with the Dundee Institute of Engineers was again a very successful gathering. On this occasion the speaker was the president, Mr. James G. Arnott. He was well supported by a contingent of members from the west, while the local members, resident north of the Tay, were there in full force. The effect of all these Dundee meetings was now beginning to show itself. Dundee is 80 miles and Arbroath 100 miles from Glasgow, and while there are visits to the meetings in Glasgow from members living in Dundee and Arbroath—and even from as far away as Aberdeen and Fraserburgh—one can hardly expect them to come very often. To meet the needs of these members, the formation of a Discussion Group is being considered. This will certainly be a worth-while effort because, whereas the branch formerly had only one or two members in the north, it now has quite a number.

On the morning after the meeting in Dundee those of the members present at it paid a most interesting and instructive visit to the works of the National Cash Register Company, Limited. Again the branch were greatly indebted to Mr. David Whyte, hon. secretary of the Dundee Institute—and now a member of the branch—for the great help given on this as on previous occasions.

The meetings of the Falkirk section were again under the guidance of Mr. John Leith, president, and with the help of the local council and Mr. David Fleming as hon. secretary, a very successful session had been held.

Oliver Stubbs Award

The branch shared in the honour conferred upon Mr. John Arnott for the outstanding work he had done during the many years of his membership. The list of his services was both long and impressive. The General Council, like their own branch council, were convinced of the value of his work and in recognition of it had conferred upon him the "Oliver Stubbs" medal for 1950. He congratulated Mr. Arnott on this well-deserved honour.

There being no "John Surtees" competitions in Scotland this year, the opportunity was taken to hold a short-paper competition. Quite a few years ago one of the Scottish members who desired to remain anonymous gave a sum of £10 10s. to be used as prize money for such a competition. Two similar competitions had been held not much earlier, and it was felt desirable to defer the new competition for a period. The entries were in the hands of the examiners, but it was doubtful if the name of the winner would be known in time for publication in this Report. The prizes would be presented at the business meeting on March 10. The thanks of the branch had been given, and were again offered, to the member through whose generosity this competition had been made possible.

A notable event in the year under review was the visit paid to the works of Glenfield & Kennedy, Limited, Kilmarnock. It was perhaps the most successful visit ever organised by the branch. No fewer than 183 members accepted the invitation and were present. Members were greatly indebted by Mr. H. Gardner and his co-directors for the kind invitation and for the excellent arrangements made by them for the inspection of their works and also for their generous hospitality.

It was interesting to record that both the "McInnes Shaw" prize-winners were present at the opening meeting in October. They were:—Mr. James Gurney, Glasgow, "Patternmarking"; and Mr. A. M. Stoddart, Wishaw, "Foundry Practice." At the meeting both lads were congratulated by Mr. Arnott, who presented each of them with a copy of the Productivity Team Report on Grey Iron Founding. He reminded members how 25 years ago the president received the second John Surtees Gold Medal.

The following were elected as office-bearers:—*As president*, Mr. R. R. Taylor; *as vice-presidents;* Mr. A. J. D. Black and Mr. J. Cameron, junr.; *as members of council*, Mr. H. J. M. Connacher, Mr. J. M. Douglas and Mr. C. Marsh; *as representatives to general council*, Mr. John Cameron, junr., Mr. J. Cormack, Mr. Alex. Marshall and Mr. Tom Shanks; *as representative to technical committee*, Mr. James McPheat; as *hon. secretary*, Mr. John Bell.

New Steel Plant in Sweden

A new Thomas steel plant, with a capacity of over 500,000 tons per annum, was started up recently at the iron and steel works of the Domnartvets Jernverks, Sweden. The layout and designs were made by John Miles & Partners (London), Limited, consulting engineers.

The plant is located adjacent to the blast furnaces, and consists of three 25-ton converters of new design, each converter being operated by electric blowers and hydraulic tilting mechanism. A 1,000-ton gas-fired hot metal mixer, electrically operated, feeds the three converters. The new methods of operating the converters, with the necessary additions, have been incorporated in the layout, and the plant is so designed that future extensions can be readily made.

The Thomas converter bottoms are prepared by a vibrator ramming machine, the dolomite bricks by a brick press.

Women in the Foundry

(*Continued from page* 345)

and exacting critics of canteen services and it is folly to pooh-pooh their verdicts); provide cloakrooms with towels and a proper supply of hot water, soap, etc., of a type superior to that arranged for the male element. Above all, workshops and supervision where there are female employees must be permeated with a feminine slant and influence. None of this will be wasted; nor is it benevolent and sentimental. It is soberly practical and utilitarian. A special stool, with a back rest; a neat personal cupboard; well-cut sandwiches for the mid-morning snack—all these details of "welfare" will have a direct ratio of response on production efficiency in the women. Foundries in recent years have entered the vanguard of development in intelligent welfare. Centres of superb craftsmanship, of technical skills and initiative second to no other trades, they have, however, in their essential masculinity, lacked good domesticity from the feminine standpoint. Now that the women are there in increasing numbers as a permanent element (about 10 per cent.) the foundry itself will rapidly change. The distaff side has never permitted itself to be ignored.

European Steel and Coal

Schuman Plan Agreements Initialled

THE DRAFT of a treaty setting up a "European steel and coal community" under a supra-national authority was initialled in Paris on March 19 by representatives of France, Western Germany, Belgium, Italy, Luxemburg, and the Netherlands. The treaty implements the Schuman plan, which was first put forward by the French Government under the name of its Foreign Minister in May of last year. M. Schuman and M. Monnet, who shared with him the conception of the idea, was present at the signing of the treaty.

M. Monnet, who is head of the French planning department, in a speech after the signing, stressed three points which he said characterised the scheme. They were:—(1) The supra-national character of the proposed community; (2) the creation of a single market of 150,000,000 consumers and the pooling of coal and steel resources; and (3) the elimination of restrictive cartel practices and of excessive concentrations of economic power.

For the first time, he said, six countries had come together not to seek a provisional compromise among national interests, but to take a concerted view of their common interests. This represented a fundamental change in the nature of the relations among the countries of Europe, from the national form which opposed and divided them, to the supra-national form, which reconciled and united them. Customs duties or quantitative restrictions would no longer hamper the movement of coal and steel within the territories formed by the six countries. Discrimination would be abolished, in particular during periods of shortage; the total resources of these basic raw materials, regardless of origin, would be allocated among all the countries according to their needs. Never before had this principle of distribution of resources according to needs been applied, except during war. M. Monnet emphasised that undertakings would retain complete responsibility for their own management.

Transitional Period

An agreement covering the transitional period, fixed at five years, between the signing of the treaty and its integral application was also initialled. The agreement provides measures to cushion the impact on the economies of member countries of the adjustment which the provisions of the treaty will involve. In practice, the common coal and steel market will not exist during the five-year transitional period. The Italian steel market will remain outside and Belgian participation in the pool during the first five years will be confined to steel. During that period, the steel industry will use Belgian coal and avert the closure of pits.

The text of the draft treaty, released on March 20, is a document of 90 pages, consisting of 95 articles, with three supplements and two additional protocols. The preamble states that the aims of the community are to create a single market, help economic expansion, maintain a high level of employment, and raise living standards among its members. It must gradually establish conditions which will automatically lead to a more rational distribution of production at the highest level of productivity. The High Authority provides the executive.

Working Arrangements

The number of its members, the method of their appointment, and certain other matters are to be determined by the conference of Foreign Ministers, which will put the finishing touches to the treaty. The authority is the agent of the six Governments jointly in regard to their present powers over prices, production, and investment concerning coal and steel. t is advised by a consultative committee of 30 to 51 members, drawn in equal numbers from producers, workers, and consumers and traders. A council, composed of delegates of the Governments of member countries, will keep in constant touch with the authority. In certain cases its approval should be secured before decisions may be taken, but the authority may proceed on its own initiative if the council fails to reach agreement. The council appoints the members of the consultative committee.

An assembly of delegates from national Parliaments is to hold a yearly session to vote upon the authority's annual report. If the assembly passes a vote of censure by a two-thirds majority, provided that those voting number at least half the total membership, the authority must resign. A special court of seven will arbitrate between the authority and all whom its decisions may concern. The court may annul decisions and order damages to be paid; it may also impose fines. All differences between members must be submitted to the court. Price manipulation, dumping, and restrictive practices are forbidden. The authority is allowed in certain cases to fix maximum or minimum prices. If demand falls dangerously, the executive may institute production quotas after reference to the council. In the event of scarity the authority allocates production and raw materials within the community.

The treaty has a duration of 50 years. It prohibits associations or amalgamations intended to limit or avoid the effects of free competition, except in so far as amalgamations may be allowed by the authority. These provisions are linked with the decartelisation and deconcentration of Ruhr industry under the occupation statute for Germany. Although wage levels are to be fixed according to national practives, the authority may intervene if it finds that wages in any firms are abnormally low.

Speaking in Paris recently, M. Monnet expressed the hope that some form of association between the West European coal and steel pool and British industry would be found.

Pig-iron and Steel Production

Statistical Summary

The following particulars of pig-iron and steel produced in Great Britain have been extracted from the Statistical Bulletin for February, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in January, 1951, and number of furnaces in blast; Table II, production of steel ingots and castings in January, and Table III, deliveries of finished steel. Table IV summarises activities during the previous six months.

TABLE I.—*Weekly Average Production of Pig-iron and Ferro-alloys during January, 1951. (Thousands of Tons.)*

District.	Furnaces in blast 31.1.51	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, & Essex	25	—	19.0	22.0	1.4	—	42.4
Lancs. (excl. N.W. Coast), Denbigh, Flints and Cheshire .. Yorkshire (incl. Sheffield, excl. N.E. Coast ..	7	—	7.6	—	—	1.2	8.8
Lincolnshire ..	14	—	23.3	—	—	—	23.3
North-East Coast	23	8.5	35.1	0.3	—	1.4	45.3
Scotland	9	0.8	10.7	2.8	—	—	14.3
Staffs., Shrops., Worcs., and Warwick ...	9	—	9.2	1.4	—	—	10.6
S. Wales and Monmouthshire	7	3.4	21.7	—	—	—	25.1
North-West Coast	7	13.0	—	0.2	—	0.1	13.3
Total ..	101	25.7	126.6	26.7	1.4	2.7	183.1*
December, 1950 ..	102	28.5	126.6	29.4	0.9	3.0	188.4
January, 1950 ..	100	29.0	124.5	29.3	1.7	2.9	187.4

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steel. (Thousands of Tons.)*

Product.	1949.	1950.	1950. Jan.	1950. Dec.	1951. Jan.*
Non-alloy Steel:					
Ingots, blooms, billets and slabs† ..	4.5	3.6	3.8	3.5	3.7
Heavy rails, sleepers, etc.	9.8	11.3	9.7	10.0	8.9
Plates ⅛ in. thick and over	39.2	40.0	39.0	40.1	39.0
Other heavy prod...	36.1	38.7	35.2	38.6	39.7
Light rolled prod.†	46.4	47.6	46.7	44.4	48.9
Hot rolled strip ..	17.1	19.4	17.5	19.3	18.8
Wire rods	15.1	16.0	16.3	15.9	17.4
Cold rolled strip ..	4.9	5.5	5.2	5.4	6.4
Bright steel bars ..	5.8	6.5	5.9	7.0	7.4
Sheets, coated and uncoated	27.6	30.5	31.0	29.0	31.4
Tin, terne and blackplate	13.7	14.3	14.9	16.0	14.1
Tubes, pipes and fittings	18.5	20.0	19.4	22.3	19.6
Mild wire	11.8	12.3	11.7	11.6	11.9
Hard wire	3.2	3.5	3.6	3.6	3.7
Tyres, wheels and axles	4.1	3.5	3.5	3.0	3.5
Steel forgings** ..	2.4	2.2	2.3	2.3	2.1
Steel castings ..	3.6	3.5	3.5	3.3	3.6
Total	263.8	278.4	269.2	275.3	280.1
Alloy steel	10.4	10.6	9.7	11.1	10.6
Total deliveries from U.K. prod.‡‡ ..	274.2	289.0	278.9	286.4	290.7
Add imported finished steel	9.5	3.8	4.1	2.4	3.2
	283.7	292.8	283.0	288.8	293.9
Deduct intra-industry conversion‖ ..	51.0	53.4	51.2	54.7	57.7
Total deliveries ..	232.7	239.4	231.8	234.1	236.2

** Excl. drop forgings.

† Other than for conversion into any form of finished steel listed above.

‡‡ Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.

‖ Material for conversion into other products also listed above.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in January, 1951. (Thousands of Tons.)*

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derby., Leics., Notts., Northants and Essex ..	—	3.0	10.7 (basic)	1.1	0.2	14.4	0.6	15.0
Lancs. (excl. N.W. Coast), Denbigh, Flints., and Cheshire .. Yorkshire (excl. N.E. Coast and Sheffield) ..	1.4	21.0	—	1.6	0.5	23.6	0.9	24.5
Lincolnshire ..	—	29.8	—	—	0.1	29.7	0.2	29.9
North-East Coast ..	1.5	59.5	—	0.8	0.5	60.8	1.5	62.3
Scotland ..	3.3	30.0	—	1.4	0.6	33.8	1.5	35.3
Staffs., Shrops., Worcs. and Warwick ..	—	16.7	—	0.8	0.6	16.8	1.3	18.1
South Wales and Monmouthshire ..	10.0	50.9	5.8 (basic)	0.9	0.1	67.3	0.4	67.7
Sheffield (inc. small quantity in Manchester) ..	8.8	27.6	—	8.4	0.6	43.4	2.0	45.4
North-West Coast ..	0.6	2.5	4.3 (acid)	0.2	0.1	7.6	0.1	7.7
Total ..	25.6	241.0	20.8	15.2	3.3	297.4	8.5	305.9*
December, 1950 ..	23.0	235.2	21.5	13.5	3.1	288.3	8.0	296.3
January, 1950 ..	25.2	240.8	22.7	13.3	3.3	296.9	8.4	305.3

TABLE IV.—*General Summary of Pig-iron and Steel Production. (Weekly Average in Thousands of Tons.)*

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy). Imports.§	Steel (incl. alloy). Output of ingots and castings.	Steel (incl. alloy). Deliveries of finished steel.	Steel (incl. alloy). Stocks.†
1949	258	169	199	183	188	17	299	233	1,275
1950	249	174	197	185	197	9	313	239	997‖
1950—August*	239	175	194	177	181	5	279	199	1,187
September ..	229	179	198	187	207	8	326	256	1,160
October	266	183	201	194	202	5	328	251	1,097
November* ..	260	179	200	193	206	6	336	261	1,060
December	249	171	198	188	175	5	296	234	997
1951—January* ..	258	163	200	193	183	7	306	236	919

* Five weeks (all tables). † Stocks at the end of the years and months shown. § Weekly average of calendar month.
‖ From July, 1950, the stocks of wire for reinforcement, material for drop forgings and bolt, nut and washer material, are excluded.

Imports and Exports of Iron and Steel in February

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in February. Figures for the same month in 1950 are given for purposes of comparison and totals for the first two months of this year and of 1950 are also included.

Total Exports of Iron and Steel

Destination.	Month ended February 28.		Two months ended February 28.	
	1950.	1951.	1950.	1951.
	Tons.	Tons.	Tons.	Tons.
Channel Islands	761	699	1,537	1,308
Gibraltar	136	52	285	99
Malta and Gozo	490	202	986	519
Cyprus	1,172	353	1,361	1,054
Sierra Leone	352	202	755	455
Gold Coast	4,050	1,545	7,226	3,449
Nigeria	4,747	5,880	10,518	11,523
Union of South Africa	10,916	7,995	20,300	20,710
Northern Rhodesia	1,952	910	4,111	2,840
Southern Rhodesia	6,433	1,799	12,355	4,799
British East Africa	7,453	8,882	15,502	17,960
Mauritius	622	390	1,726	971
Bahrein, Kuwait, Qatar & Trucial Oman	718	1,182	1,224	1,508
India	6,230	7,788	13,050	18,963
Pakistan	5,006	6,547	8,420	11,712
Malaya	4,555	6,419	13,773	13,032
Ceylon	3,072	1,908	5,886	4,968
North Borneo	1,043	176	1,916	334
Hongkong	4,184	7,895	8,327	15,406
Australia	32,231	34,509	55,845	77,150
New Zealand	13,365	9,796	30,888	25,467
Canada	3,550	14,375	11,225	28,264
British West Indies	7,535	3,310	12,372	8,338
British Guiana	409	404	1,064	963
Anglo-Egyptian Sudan	1,131	671	2,753	1,601
Other Commonwealth	1,407	874	2,539	1,850
Irish Republic	6,293	6,497	12,075	13,960
Soviet Union	152	928	205	999
Finland	4,646	4,145	10,835	7,281
Sweden	6,339	9,722	13,257	16,316
Norway	4,227	3,180	10,547	11,000
Iceland	167	221	1,137	486
Denmark	11,123	9,247	24,408	17,932
Poland	180	71	243	220
Germany	42	103	100	228
Netherlands	5,835	5,533	11,080	13,573
Belgium	1,486	1,120	2,527	2,404
France	1,462	1,284	2,534	2,401
Switzerland	2,039	977	2,675	2,158
Portugal	1,534	877	2,616	2,360
Spain	887	152	1,616	464
Italy	666	526	1,375	1,681
Austria	76	31	138	106
Hungary	55	—	136	23
Yugoslavia	112	886	1,971	2,044
Greece	481	128	1,059	666
Turkey	1,621	452	2,492	569
Indonesia	519	392	3,197	1,215
Netherlands Antilles	886	198	2,487	545
Belgian Congo	147	64	250	291
Angola	270	171	756	571
Portuguese E. Africa	389	297	819	595
Canary Islands	241	32	397	127
Syria	55	39	73	397
Lebanon	669	96	1,582	1,166
Israel	1,383	2,256	3,239	4,237
Egypt	5,654	3,222	11,026	7,146
Morocco	172	98	198	1,222
Saudi Arabia	186	31	388	70
Iraq	2,820	2,254	6,100	4,667
Iran	12,432	6,071	24,027	11,300
Burma	1,055	1,202	1,744	2,338
Thailand	1,097	1,896	1,774	2,415
China	151	528	421	2,051
Philippine Islands	667	4	2,338	915
USA	1,002	15,324	1,453	33,239
Cuba	73	44	258	721
Colombia	186	379	608	1,433
Venezuela	3,397	2,318	8,221	5,180
Ecuador	149	70	513	131
Peru	293	540	1,213	1,805
Chile	316	126	2,421	1,649
Brazil	1,598	1,146	5,455	3,748
Uruguay	681	1,001	1,646	4,839
Argentina	6,396	3,465	13,996	9,702
Other foreign	1,705	1,620	4,313	3,874
TOTAL	217,592	215,787	449,883	479,703

Total Imports of Iron and Steel

From	Month ended February 28.		Two months ended February 28.	
	1950.	1951.	1950.	1951.
	Tons.	Tons.	Tons.	Tons.
India	3,457	1	13,955	1
Canada	2,847	3,747	6,258	8,261
Other Commonwealth and Irish Republic	34	140	480	205
Sweden	1,183	1,055	2,126	2,945
Norway	4,614	2,908	7,084	7,087
Germany	4,379	985	12,058	2,207
Netherlands	5,830	424	9,104	6,593
Belgium	5,837	9,742	10,479	19,984
Luxemburg	3,183	7,354	3,528	15,506
France	9,938	22,557	38,923	45,814
Austria	—	24	—	38
USA	6,737	2,499	11,472	6,589
Other foreign	246	254	1,387	419
TOTAL	48,285	51,690	116,860	115,709
Iron ore and concentrates—				
Manganiferous	—	—	—	—
Other sorts	685,878	563,005	1,361,557	1,154,097
Iron and steel scrap and waste, fit only for the recovery of metal	187,307	55,979	354,895	141,539

Exports of Iron and Steel by Products

Product.	Month ended February 28.		Two months ended February 28.	
	1950.	1951.	1950.	1951.
	Tons.	Tons.	Tons.	Tons.
Pig-iron	1,799	2,778	4,065	6,313
Ferro-alloys, etc.—				
Ferro-tungsten	107	57	188	157
Spiegeleisen, ferro-manganese	198	116	504	321
All other descriptions	117	66	441	231
Ingots, blooms, billets, and slabs	164	186	422	1,624
Iron bars and rods	346	379	802	1,392
Sheet and tinplate bars, wire rods	140	457	442	2,550
Bright steel bars	2,690	3,720	6,848	9,376
Alloy steel bars and rods	1,054	1,113	2,422	2,799
Other steel bars and rods	20,632	20,765	45,765	44,932
Angles, shapes, and sections	13,063	19,890	23,014	37,462
Castings and forgings	467	748	1,556	1,723
Girders, beams, joists, and pillars	5,006	3,803	8,513	7,602
Hoop and strip	6,820	3,725	11,556	11,274
Iron plate	209	160	637	248
Tinplate	18,669	19,672	36,661	45,178
Tinned sheets	167	199	372	476
Terneplates, decor. tinplates	33	98	60	201
Other steel plate (min. ⅛ in. thick)	19,719	26,562	42,700	47,459
Galvanised sheets	7,058	4,767	18,401	13,804
Black sheets	8,624	11,472	19,648	24,364
Other coated plate	1,012	670	1,952	1,556
Cast-iron pipes up to 6 in. dia.	4,650	5,005	12,066	10,641
Do., over 6 in. dia.	5,798	3,896	13,311	9,283
Wrought-iron tubes	26,778	25,374	56,440	56,366
Railway material	25,607	17,289	42,556	39,685
Wire	4,764	4,893	10,377	12,327
Cable and rope	2,374	2,480	5,566	4,930
Wire nails, etc.	1,142	1,654	2,712	4,459
Other nails, tacks, etc.	390	738	781	1,776
Rivets and washers	594	582	1,315	1,217
Wood screws	222	380	560	721
Bolts, nuts, and metal screws	2,218	2,284	5,116	4,647
Baths	1,179	1,239	2,418	2,237
Anchors, etc.	986	652	1,597	1,304
Chains, etc.	731	669	1,605	1,612
Springs	596	521	1,460	1,096
Hollow-ware	9,549	3,157	17,128	6,906
TOTAL, including other manufactures not listed above	217,592	215,787	449,883	479,703

World Steel Production

Increase last year of 17 per cent

World steel production in 1950, according to the British Iron and Steel Federation, rose by 17 per cent. to 184,000,000 tons. The main increase, of 17,000,000 tons, occurred in the U.S.A., where production was unusually low in 1949 as a result of the autumn steel strike. According to Russian statistics, output in the U.S.S.R. rose by 4,000,000 tons. Substantial increases occurred in the United Kingdom, West Germany, and Japan.

In many countries, however, production advanced little, or even fell slightly, in 1950. In some West European countries the stagnation of production can be attributed to the decline in the demand for steel in the early months of 1950, when international markets were showing signs of saturation. After Korea, however, increased demand raised operating rates and production revived.

In overseas countries, lack of capacity hampered an extension of output, but this should be remedied in the coming year, when new plant will be in operation in India, South Africa, Canada, and many smaller producing countries. In Australia the continuing coal shortage affected production adversely. The accompanying table compares world production of steel ingots and steel for castings in 1937, 1949, and 1950. Estimates have been made for those countries where the final figures for 1950 are not yet available, and the total for the year is therefore provisional.

Rise in U.S. Production

Since 1937, the peak pre-war year, world production has advanced by 50,000,000 tons, and the relative importance of many steel producers has altered. The U.S.A. and U.S.S.R. retain their position as first and second largest producers, but the U.K. has replaced West Germany in the third place. The big rise in American production has been possible because of the large reserve of idle capacity in existence before the war and the Government-aided expansion of steel plants during the war years, which was carried out unhampered by enemy action. Although quantitatively unimportant compared with the U.S.A., many of the smaller producers oversea have, in relative terms, surpassed the American achievement by raising their output to more than twice the 1937 level, among them Canada, South Africa, Brazil, Mexico, and the Netherlands.

World production of pig-iron has increased, but whereas in 1937 the output of pig-iron was 76 per cent. of steel output, it fell to 72 per cent. and 70 per cent. in 1949 and 1950 respectively, reflecting the increased use of scrap in the post-war years.

The balance of steel output between Western and Eastern Europe is of interest at the present time. In 1950, the U.S.S.R. and her European satellites produced 34,000,000 tons of steel, compared with 50,000,000 tons in the O.E.E.C. countries alone, and 125,000,000 tons in the North Atlantic Treaty countries, including the U.S.A. and Canada.

World Steel Production.
(Million long tons.)

—	1937.	1949.	1950.
U.S.A.	50.57	69.62	86.36‡
US.S.R.	17.54	23.22	27.15
U.K.	12.98	15.55	16.29‡
Western Germany	15.37	9.01	11.93‡
France	7.79	8.97	8.52‡
Eastern Europe*	6.45	6.95	7.07
Japan	5.71	3.07	4.35‡
Belgium	3.80	3.79	3.71‡
Canada	1.40	2.84	3.02‡
Luxemburg	2.47	2.24	2.41‡
Italy	2.05	2.01	2.26‡
Saar	2.30	1.73	1.87‡
India	0.90	1.35	1.43
Sweden	1.09	1.34	1.42
Finland, Yugoslavia, Spain ..	0.39	1.21	1.26
Australia†	1.10	1.20	1.08‡
Austria	0.64	0.83	0.94‡
South Africa	0.33	0.72	0.74
Brazil	0.08	0.61	0.70
Netherlands	0.06	0.43	0.45
Mexico	0.02	0.35	0.35
Turkey	—	0.10	0.10
Norway	0.06	0.06	0.08
Other countries	0.55	0.56	0.74
TOTAL	133.65	157.76	184.23

* Including Poland, Czechoslovakia, Rumania, Bulgaria.
† Years ended June 30.
‡ Final figure.

Training Fan Engineers

Mr. F. D. Moul, of Air Control Installations, Limited, has succeeded Mr. H. D. Mains, of Musgrave & Company, Limited, as president of the Fan Manufacturers' Association. At the association's annual meeting, Mr. Mains said that it had maintained in the past year its policy of concentrating on technical development and close contact with Government departments. It adhered to its original resistance against any form of price ring or cartel, believing that the competitive element was the sure road to industrial progress.

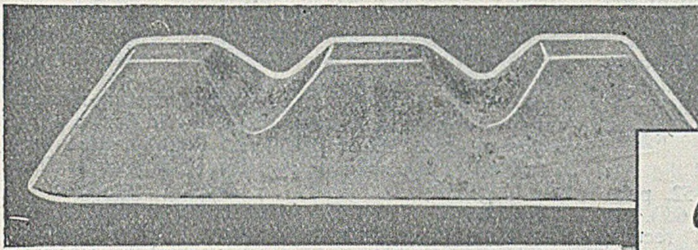
In a reference to the National College for Heating, Ventilating, Refrigeration, and Fan Engineering, Mr. Mains said that their industry was in great need of young engineers with a sound technical knowledge of fan making, and they expected to benefit considerably in the future from the facilities offered by the National College.

THE AMERICAN IRON AND STEEL INSTITUTE estimated that production of steel by U.S. mills during last week would be at 2,021,000 tons, which is only 4,000 tons below the all-time record set up a few weeks ago.

NEWMAN INDUSTRIES, LIMITED, of Yate, Bristol, announce that they have now been appointed sole selling agents for the United Kingdom for Franco Tosi and Sisma Diesel engines, and are able to offer early deliveries.

ACKNOWLEDGING A PRESENTATION on his retirement from the post of North-East Divisional Officer of the Iron and Steel Trades Confederation, after nearly 50 years in the industry, Mr. Thomas Meehan said: "I have now seen the men of this industry get the power they have sought so long. I say to them don't lose it, but don't abuse it."

AT A MEETING of the joint works committee of Baker Perkins, Limited, manufacturing engineers, of Hebburn-on-Tyne, it was reported that there was about £140,000—about 20 per cent. on gross annual wages or salaries for those with more than 11 years' service with the company—to be shared among the firm's 2,370 employees under the profit-sharing scheme started in 1947.

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FOR BETTER
HANDLING
AND
STACKING

News in Brief

A FURTHER DECLINE of 10s. per unit in the price of wolfram in London last Tuesday brought the range to 510s.-540s. nominal.

LONG-SERVICE AWARDS have been presented to 100 employees of Imperial Chemical Industries, Limited, Billingham-on-Tees.

DIAMOND JUBILEE CELEBRATIONS of John Wilkinson (Machinery & Tools), Limited, Edinburgh, include a machine-tool exhibition comprising 40 to 50 exhibits of the firm's latest products of the lighter type of machinery.

GRANTS totalling £4,300,837 for science and the arts are proposed in the Civil Estimates for 1951-52, published on March 16 (Stationery Office, 2s. 6d.). It is proposed that the Royal Society should receive £55,000.

SAID TO BE THE BIGGEST in this country, the South Durham Steel & Iron Company, Limited, has completed and despatched from its Stockton-on-Tees works a 25-ton excavator bucket which has a capacity of 25 cub. yds.

A TOUR of the Abbey Works, Margam, of the Steel Company of Wales, Limited, and films showing the development scheme for Welsh steel, formed part of the quarterly meeting of the Wales and Monmouthshire branch of the Society of Town Clerks.

ONE HUNDRED AND FIFTY-ONE long-service awards were made to employees of Joseph Sankey & Sons, Limited, manufacturers of pressings and stampings, etc., of Bilston (Staffs), recently. Since the inception of the scheme, 2,289 awards have been made.

AMALGAMATED METAL CORPORATION, LIMITED, announces that in order to meet the requirements of the Stock Exchange regarding preliminary announcements, the dividend announcement for 1950 will have to be deferred until a date later than in previous years.

MORGAN FAIREST, LIMITED, machinery manufacturers, of Sheffield, will, it is understood, be the only British company represented at next month's big American packaging display at Atlantic City, New Jersey. The firm will exhibit its automatic bottle-labelling machine.

THE "MEN ONLY" DINNER of the London branch of the Institute of British Foundrymen was held on March 16 at the Horse Shoe Hotel and Restaurant, London, W.1. Members and guests totalled 116 and the informal atmosphere and first-class entertainment contributed much to a very enjoyable evening.

THE ENGINEERING INDUSTRIES ASSOCIATION, in a memorandum to the Chancellor of the Exchequer, declares that taxation of profits retained in a business should be "reduced rather than increased." The association also urges that rearmament be financed "to a considerable extent" by reductions in other forms of Government expenditure.

MR. D. D. FRAME, chairman of the Hammond Lane Foundry Company, Limited, Dublin, has been elected president of the Federation of Irish Manufacturers for the year 1951. It is interesting to recall that his father, the late Mr. David Frame, was a founder member of the Federation and served on the Council until the date of his death.

SIR THOMAS KENNEDY, a director of Glenfield & Kennedy, Limited, hydraulic engineers, foundrymen, etc., of Kilmarnock, died in a Glasgow hospital on March 20. He was 67. A native of Kilmarnock, Sir Thomas served his apprenticeship at the works of Glenfield & Kennedy from 1901 to 1907. He was the firm's general manager in India and was stationed for 38 years at Bombay, where he was an honorary sheriff. He became a director of the company in 1944.

Personal

MR. WINSTON CHURCHILL has accepted an invitation to become an honorary member of Glasgow Chamber of Commerce—the first since 1865.

DR. D. J. CRISP, who is at present in charge of the marine research station of Imperial Chemical Industries, Limited, has been appointed director of the Marine Biological Institute at the University College of North Wales, Bangor.

DR. W. A. TUPLIN, head of the engineering-research and development department of the David Brown group of companies of Huddersfield and Penistone, has been appointed to the chair of Applied Mechanics at Sheffield University.

MR. W. H. COWLEY, foreman patternmaker, employed by Edgar Allen & Company, Limited, Sheffield, was presented with a gold watch to mark his 50 years' service with the company at the recently held annual dinner of the Foremen's Association.

MR. E. W. MARVILL, works superintendent of F. Perkins, Limited, engineers, of Peterborough, and MR. GORDON SMITH, the company's plant layout engineer, are now studying methods of production in the United States where they will visit a number of plants, including those of the Ford and Chrysler concerns.

MR. W. R. HEROD, president of the International General Electric Company of America and Co-ordinator of North Atlantic Defence Production, will open the Gauge and Tool Exhibition at the New Hall of the Royal Horticultural Society, Elverton Street, Vincent Square, London, S.W.1, at 11 a.m. on May 15. The exhibition will continue until May 25.

MR. ALFRED LEMUEL WOOD, a director of Hedley Moorwood & Company, Limited, iron and steel merchants, etc., of Sheffield, from 1946 to 1948, and now assistant to the managing director of S. Rhodes & Company, Limited, iron and steel and scrap metal merchants, etc., of Sheffield, has been adopted as prospective Conservative-Liberal candidate for the Brightside Division of Sheffield.

Obituary

MR. DAVID AITKEN, late of Archibald Low & Sons, Limited, brassfounders, etc., of Glasgow, died on March 14, aged 80.

MR. ALFRED DIXON, who was for many years chief engineer of Brightside Foundry & Engineering Company, Limited, Sheffield, until his retirement in 1948, has died.

MR. JOHN STIRLING, who died at Farnworth (Lancs) on March 13, was formerly with the North British Locomotive Company, Limited, Glasgow. He was in his 84th year.

WITH VERY DEEP REGRET we report that MR. ROY STUBBS, president of the Institute of British Foundrymen in 1934, died during the Easter holiday. The Institute was represented at the funeral on Wednesday by members of the Lancashire branch council and Mr. T. Makemson, M.B.E.

MR. JOHN BIRD, who has died suddenly at Blairmore (Argyleshire), is well remembered in steel circles on Tees-side. He was formerly works manager at Dorman, Long & Company's Britannia Works, Middlesbrough, and subsequently general works manager at the company's Cleveland steelworks, retiring in 1936.

MR. JOHN JULES SAUTTER, who resigned from the position of managing director of Philip & Son, Limited, engineers and shipbuilders, of Dartmouth, in 1947, died on March 13. He had been with the company for nearly 50 years. Mr. Sautter was a member of the Institution of Mechanical Engineers for 37 years.

Raw Material Markets

Iron and Steel

Most of the foundries were closed from Friday evening until Wednesday morning, for the Easter holidays, opportunity being taken to carry out general repair work. Nearly all of them were open to receive raw materials, as at the moment every ton of pig-iron and coke is welcome. Stocks are low—in some cases non-existent—so that the level of production depends almost entirely on the tonnages which come forward. There is little change in the supply position, and the outlook does not give rise to hope of an early improvement. All grades of foundry iron and hematite are in short supply, and the producers have from necessity to ration supplies in order to obtain an equitable distribution of available tonnages. The engineering foundries, which continue to be busily employed, are most seriously affected by the shortages. For a long time, outputs of the low- and medium-phosphorus irons have not provided the tonnages required, and from some furnaces the quantity has depreciated recently, owing to insufficient supplies of coke and delay in the receipt of ore. The hematite makers are seriously incommoded by the lack of ore, and the resulting increased demands for refined iron have swallowed up outputs of this grade. Until such time as raw materials flow more freely to the hematite makers, an improvement in the overall supplies of pig-iron for the engineering foundries appears unlikely. They are not receiving sufficient supplies for current usage, and few of them are able to cover current licensed tonnages. Unless there is an early improvement, outputs will undoubtedly suffer.

High-phosphorus pig-iron is also scarce and the jobbing and light foundries, as well as some of the engineering foundries which utilise this grade, are finding it extremely difficult to obtain the required tonnages. Deliveries of previous allocations are badly behind, and fresh orders are difficult to place. The switching of some of the producing furnaces to steelmaking pig-iron has reduced supplies considerably, and only the blowing-in of additional furnaces for foundry grades will relieve the position. The new furnace expected to be blown in shortly in the Derbyshire area will bring welcome relief, but alone will not compensate for present shortages.

Scrap supplies are difficult, and the shortage is more pronounced because of the pig-iron position.

Foundry coke is coming forward regularly, but stocks at the foundries are low and delays in transit are causing concern. Furnace coke for heating and core-oven purposes is being delivered in fairly satisfactory quantities, although difficulty is experienced in obtaining the larger sizes. Ganister, limestone, and ferro-alloys are being received to requirements.

Pressure on home steelworks for supplies of steel semis continues to be very strong. Sections, bars, and strip are in heavy demand, and there is no shortage of new business. Any tonnage which can be spared would be easily disposed of to oversea buyers, but the present reduced outputs and the demands of the home market restrict the quantities which can be shipped oversea.

Non-ferrous Metals

Business was quiet before the Easter holiday, and this week many works did not reopen before Wednesday. Such deals as have taken place have been confined principally to virgin metals, for the situation in scrap is far from happy, even after the appearance of the new maximum price Order on March 17. Apparently many merchant houses feel that the increase to 3 per cent. commission is inadequate and that even the new rates is insufficient to cover present-day costs. On the other hand, the consumers, calculating this commission rate on current scrap metal prices, adding carriage and perhaps a charge of 25s. for briquetting, will come to the conclusion that old metals are a fairly expensive commodity.

The position in brass ingots is not at all satisfactory, for it would appear that very high prices are being asked for this type of secondary metal. So far, no ceiling has been imposed and there has been talk of as much as £220, or even £230, being asked for 60/40 quality. There is, in fact, no bar to as much as £250 being insisted upon, and in the present state of near famine consumers might be inclined to accept this charge in order to secure supplies of much needed metal. It is to be regretted that the authorities could not see their way to agreeing maximum values for ingots, but, so far, this has not been found possible.

A steadier tone was apparent in tin last week, price movements being within a narrower range than of late. No further news has come through regarding stockpiling of tin, but it was reported before the holiday that a definite decision had been reached to reduce the rate of accumulating copper and zinc. Moreover, it would seem that there have been second thoughts about the ultimate target figure of stocks in these two metals. It certainly appears that the U.S. authorities have rather changed their stockpiling policy in the light of recent developments.

Metal Exchange official tin quotations were as follow:

Cash—Wednesday, £1,305 to £1,310; Thursday, £1,315 to £1,320; Tuesday, £1,250 to £1,260; Wednesday, £1,235 to £1,240.

Three Months—Wednesday, £1,190 to £1,195; Thursday, £1,185 to £1,190; Tuesday, £1,135 to £1,140; Wednesday, £1,140 to £1,145.

Increases of Capital

The following companies are among those which have recently announced details of capital increases:—

BROWN, BAYLEY STEELS, LIMITED, Sheffield, increased by £322,400, in £1 shares, beyond the registered capital of £100.

METAL CASTINGS, LIMITED, Worcester, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £70,000.

METAL MOULDINGS, LIMITED, London, S.W.1, increased by £45,000, in £1 ordinary shares, beyond the registered capital of £5,000.

WOLSINGHAM STEEL COMPANY, LIMITED, Wolsingham (Co. Durham), increased by £100,000, in £1 shares, beyond the registered capital of £50,000.

W. G. BAGNALL, LIMITED, engineers, boilermakers, etc., of Worcester, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £100,000.

STEDALL & COMPANY, LIMITED, iron merchants, etc., of London, E.C.2, increased by £133,016 in 5s. ordinary shares, beyond the registered capital of £116,984.

PLATT METALS, LIMITED (formerly John Walton & Company (Castleside), Limited), Enfield, increased by £122,000, in £1 ordinary shares, beyond the registered capital of £3,000.

JOSEPH HIBBERT & COMPANY, LIMITED, iron and brass founders, engineers, etc., of Darwen, increased by £40,000, in £1 ordinary shares, beyond the registered capital of £10,000.

STOTHERT & PITT, LIMITED, engineers, ironfounders, etc., of Bath, increased by £250,000, in 100,000 ordinary and 150,000 unspecified shares of £1, beyond the registered capital of £500,000.

SMITH PATTERSON & COMPANY, LIMITED, Pioneer Foundry, Blaydon-on-Tyne, increased by £50,000, in £1 5 per cent. cumulative preference shares, beyond the registered capital of £200,000.

W. H. A. ROBERTSON & COMPANY, LIMITED, general, mechanical, and electrical engineers, etc., of Bedford, increased by £144,000, in 5s. ordinary shares, beyond the registered capital of £106,000.

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

(Delivered, unless otherwise stated)

March 28, 1951

PIG-IRON

Foundry Iron.—No. 3 Iron, Class 2:—Middlesbrough, £10 17s. 9d.; Birmingham, £10 13s.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent P, £12 9s., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si)—North Zone, £12 16s. 6d.; South Zone, £12 19s.

Scotch Iron.—No. 3 foundry, £12 7s. 9d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £13 7s. 6d.; South Zone, £13 10s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £13 17s. 6d.; South Zone, £14.

Cold Blast.—South Staffs, £16 10s. 6d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £12 7s. 6d.; Scotland, £12 14s.; Sheffield, £13 2s. 6d.; Birmingham, £13 9s.; Wales (Welsh iron), £12 7s. 6d.

Spiegeleisen.—20 per cent. Mn, £18 3s.

Basic Pig-iron.—£10 19s. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered.)

Ferro-silicon (6-ton lots).—40/55 per cent., £37 15s., basis 45% Si, scale 14s. per unit; 70/84 per cent., £52, basis 75% Si, scale 14s. 6d. per unit.

Ferro-vanadium.—50/60 per cent., 15s. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 8s. 9d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon free, £167; ditto, copper free, £183.

Ferro-tungsten.—80/85 per cent., 37s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 39s. 6d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £66, basis 60% Cr, scale 22s. per unit; 6/8 per cent. C, £61, basis 60% Cr, scale 21s. per unit; max. 2 per cent. C, 1s. 6¾d. per lb. Cr; max. 1 per cent. C, 1s. 7½d. per lb. Cr; max. 0.15 per cent. C 1s. 8d. per lb. Cr; max. 0.10 per cent. C, 1s. 8½d. per lb. Cr.

Cobalt.—98/99 per cent., 17s. 6d. per lb.

Metallic Chromium.—98/99 per cent., 5s. 9d. per lb.

Ferro-manganese (blast-furnace). — 78 per cent., £32 3s. 7d.

Metallic Manganese.—96/98 per cent., carbon-free, £215 per ton.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—Basic: Soft, u.t., £17 4s.; tested, up to 0.25 per cent. C (100-ton lots), £17 9s.; hard (0.42 to 0.60 per cent. C), £19 4s.; silico-manganese, £24 6s. 6d.; free-cutting, £20 9s. Siemens Martin Acid: Up to 0.25 per cent. C, £22 11s. 6d.; case-hardening, £23 9s.; silico-manganese, £26 14s.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £20 4s.; basic, hard, over 0.41 up to 0.60 per cent. C, £21 9s.; acid, up to 0.25 per cent. C, £23 9s.

Sheet and Tinplate Bars.—£17 6s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £21 3s.; boiler plates (N.-E. Coast), £22 10s. 6d.; chequer plates (N.-E. Coast), £23 8s.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £20 1s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £22 15s.; flats, 5 in. wide and under, £22 15s.; hoop and strip, £23 10s.; black sheets, 17/20 g., £29 13s.; galvanised corrugated sheets, 17/20 g., £43 6s.

Alloy Steel Bars.—1-in. dia. and up: Nickel, £37 19s. 3d.; nickel-chrome, £56 6s.; nickel-chrome-molybdenum, £63 1s.

Tinplates.—I.C. cokes, 20 × 14, per box, 42s. 7½d.; 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, £1,235 to £1,240; three months, £1,140 to £1,145; settlement, £1,240.

Zinc.—G.O.B. (foreign) (duty paid), £151; ditto (domestic), £151; "Prime 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 17s. 6d.; rolled zinc (boiler plates), all English destinations, £168 17s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £170.

Other Metals.—Aluminium, ingots, £124; antimony, English, 99 per cent., £360; quicksilver, ex warehouse, £73 10s. to £74; nickel, £406.

Brass.—Solid-drawn tubes, 21¾d. per lb.; rods, drawn, 29¼d.; sheets to 10 w.g., 26⅜d.; wire, 27½d.; rolled metal, 25⅛d.

Copper Tubes, etc.—Solid-drawn tubes, 23½d. 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), —; BS. 1400—LG3—1 (86/7/5/2), —; BS. 1400—G1—1 (88/10/2), —; Admiralty GM (88/10/2), virgin quality, —, per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, —; L.P.Bl, — per ton.

Phosphor Bronze.—Strip, 37d. per lb.; sheets to 10 w.g., 39⅛d.; wire, 40½d.; rods, 36¾d.; tubes, 42d.; chill cast bars: solids, —, cored, —. (C. Clifford & Son, Limited.)

Nickel Silver, etc.—Ingots for raising, 2s. 3½d. per lb. (7%) to 3s. 2½d. (30%); rolled metal, 3 in. to 9 in. wide × .056, 2s. 9¼d. (7%) to 3s. 8¼d. (30%); to 12 in. wide × .056, 2s. 9½d. to 3s. 8¾d.; to 25 in. wide × .056, 2s. 11½d. to 3s. 10¾d. Spoon and fork metal, unsheared, 2s. 6½d. to 3s. 5¼d. Wire, 10g., in coils, 3s. 3d. (10%) to 4s. 2½d. (30%). Special quality turning rod, 10%, 3s. 2d.; 15%, 3s. 6¾d.; 18%, 3s. 11d. All prices are net.

Forthcoming Events

APRIL 2

Institute of British Foundrymen

Sheffield Branch:—"Repair and Reclamation of Iron Castings by Welding and Allied Methods," presented by the Chairman of Sub-committee T.S.23, 7.30 p.m., at the Royal Victoria Station Hotel, Sheffield.

APRIL 5

Liverpool Metallurgical Society

Annual General Meeting at the Electricity Service Centre, Liverpool, at 7 p.m.

Institute of Metals

Birmingham Local Section:—Annual General Meeting at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 6.30 p.m. Chairman's address.

London Local Section:—Annual General Meeting at 4, Grosvenor Gardens, London, S.W.1, at 6.30 p.m. Discussion on "Sintering" to be opened by J. C. Chaston, Ph.D., and J. P. Roberts, B.A.

Institution of Mechanical Engineers

Meeting at Institution Building, Storey's Gate, London, S.W.1, at 6.30 p.m. Paper, "How Fluid Friction Affects the Engineer," by N. Bradley.

APRIL 7

Institute of British Foundrymen

Lancashire Branch:—Annual General Meeting and Election of Officers; Report on the Work of the Technical Council, by C. R. van der Ben; Winning Paper in the Short-Paper Competition open to foundry and patternshop apprentices and display of foundry films; 2.45 p.m., at the Engineers' Club, Albert Square, Manchester.

East Midlands Branch:—Annual General Meeting, followed by Short-Paper Competition, 6 p.m., at the Derby School of Art and Crafts, Green Lane, Derby.

APRIL 7-11

Physical Society.

35th Annual Exhibition at Imperial College, South Kensington, London, S.W.7.

Fuel Efficiency Advisory Committee

The Ministry of Fuel and Power's Fuel Efficiency Committee has been replaced by a Fuel Efficiency Advisory Committee, the present membership of which is:—Capt. W. Gregson (chairman), a past-president of the Institute of Mechanical Engineers and a director of Babcock & Wilcox, Limited.; Mr. W. L. Boon, managing director of Powell Duffryn Technical Services, Limited, and formerly general manager of the London and Counties Coke Association; Mr. Oliver Lyle, author of "The Efficient Use of Steam" and a director of Tate & Lyle, Limited; Dr. R. J. Sarjant, Professor of Fuel Technology at the University of Sheffield.

The Fuel Efficiency Committee was set up in 1941 and reconstituted in 1948. In its report for the year ended October, 1950, the committee suggested that it had mainly completed the terms of reference and that it could be replaced by a smaller advisory committee.

I.B.F. Golfing Society

The committee of the Institute of British Foundrymen Golfing Society have pleasure in announcing that the 1951 Golf Meeting will be held at Woodhall Spa on Saturday and Sunday, September 29 and 30. Reservations have already been made at the Golf Hotel for the Friday and Saturday nights. Entry forms will be available from May 1 onwards and meantime all members of the I.B.F. Golfing Society are notified that their annual 5s. subscriptions for 1951 are now due and should be sent to the honorary secretary, Mr. F. Arnold Wilson, c/o William Jacks & Company, Limited, Winchester House, Old Broad Street, London, E.C.2.

NOTICE

Replies to Box Numbers to be addressed to "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATION WANTED

FOUNDRY METALLURGIST (Practical) available in one month. Experienced chill roll manufacture, machine tool, automobile, high duty iron and non-ferrous castings. Wide experience synthetic resins, core-binders, mechanised plants. Accustomed full control and acting on own initiative. Age 31.—Box 806, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

YOUNG METALLURGICAL CHEMISTS required for routine laboratory work, on shift basis, in large modern steelworks in Midlands. Applicants should be 22/25 years of age, with a good education and chemical training.—Reply, stating full details of education, experience, and salary required, to: THE GENERAL MANAGER (Iron and Steel Works), Stewarts and Lloyds, Limited, Corby, Northants.

YOUNG Man required, with administrative ability; able to read engineering drawings and knowledge of foundry technique. The vacancy is to train young man for future high executive post in a well established foundry, and offers great scope. State full particulars of education and experience in the foundry or engineering industry.—Box 804, FOUNDRY TRADE JOURNAL.

WANTED.—FOUNDRY FOREMAN, for old-established Steel Foundry. Must have good experience and be capable of taking charge of men. Please give full particulars of service, age, etc., when applying.—Box 784, FOUNDRY TRADE JOURNAL.

KENT EDUCATION COMMITTEE.

MEDWAY TECHNICAL COLLEGE.

CHATHAM, ROCHESTER AND GILLINGHAM.

A FULL-TIME TEACHER of Pattern Making and Woodcutting Machinists' work is required to take up his duties as soon as possible. Candidates should hold the Final Certificate of the City and Guilds of London Institute or other suitable qualifications either in Pattern Making or in Woodcutting Machinists' work, and be prepared to teach the subject to the Final Stage City and Guilds.

Salary in accordance with Burnham Scale for teachers in technical institutions, including increments for industrial experience.

Applications, giving age and very full particulars of qualifications and industrial experience, should be sent as soon as possible to the PRINCIPAL, Medway Technical College, Gardiner Street, Gillingham.

SITUATIONS VACANT—*Contd.*

CORE MAKER.—Experienced man required to take charge of small core department in new mechanised grey iron foundry in Yorkshire, near Leeds. Assistance with housing if required.—Apply, giving age, experience, and salary required, to Box 794, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, to take charge of small light grey iron mechanised Foundry, S.W. Lancashire. Must be experienced in this type of work. State previous positions held and salary required. —Box 774, FOUNDRY TRADE JOURNAL.

ASSISTANT WORKS MANAGER required for Precast Concrete Works, Leicester area, approximately 200 employees. Must have sound knowledge of Concrete practice and Building Construction.—Write, stating age, experience, qualifications, and salary required, to Box 782, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS (Wood and Metal). Excellent opportunities for younger men on all classes of work, under ideal conditions in the largest modern pattern shop.—G. PERRY & SONS, LTD., Hall Lane, Leicester.

SKILLED MOULDERS, PATTERN MAKERS, PLATERS, TURNERS, BORERS, etc., required by DISTINGTON ENGINEERING CO., LTD., Workington, Cumberland. For further details apply to the Labour Manager.

FOUNDRY SUPERINTENDENT required for Grey Iron Foundry. Loose pattern, plate and mechanised production. Good opportunity for ambitious, experienced man, accustomed to handling labour. Salary commensurate with experience and ability. Suggested age between 30 and 40.—Write, stating full details of experience, etc., in confidence, to PLATT BROTHERS & CO., LTD., Hartford Works, Oldham.

EXPERIENCED FOUNDRY MANAGER required by old-established Engineering Company in Liverpool area for ferrous and non-ferrous foundry.—Applications, stating age, qualifications, experience, and present salary, to Box 786, FOUNDRY TRADE JOURNAL.

DESIGN ENGINEERS required for heavy steelworks plant development in the Midlands. Knowledge of Structural, Mechanical or Civil Engineering required. —Write, stating age, experience, and salary expected, to Box 788, FOUNDRY TRADE JOURNAL.

DRAUGHTSMEN required for heavy engineering developments in steelworks situate in the Midlands. Mechanical, Structural and Civil Engineering work involved.—Write, stating age, experience, and salary expected, to Box 790, FOUNDRY TRADE JOURNAL.

SAND FOUNDRY MANAGER required by a large Industrial undertaking in the North Midlands area, to take complete control of modern foundry, including floor, mechanical, and batch output. Applicants must have held positions of a similar capacity and must possess ability for leadership. Assistance with housing given to the successful applicant.—State age, experience, and qualifications to PERSONNEL MANAGER, Box 742, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

LARGE Manufacturing Organisation in Yorkshire requires the services of a MOULDER highly skilled in making aluminium castings for patterns, core boxes, core carriers and match plates. Must be able to prepare own sand and metals, produce sound castings to accurate dimensions, good surface finish. Permanent position with prospects.—Reply, stating age, experience, and salary required, to Box 768, FOUNDRY TRADE JOURNAL.

MANAGER for large mechanised Iron Foundry in South Midlands. Proved administrator, with practical foundry and pattern making experience essential. Successful applicant must warrant four figure salary. Status will be that of Senior Executive, and the company has a first-class Superannuation Scheme in operation.—Full details of past experience, which will be treated in strictest confidence, to Box 738, FOUNDRY TRADE JOURNAL.

ASSISTANT FOUNDRY MANAGER required for large Foundry in South Wales, comprising mechanised, plate moulding and jobbing sections. Practical and technical experience in post of similar nature is essential.—Applications in confidence, giving age, qualifications, experience and salary required, to Box 732, FOUNDRY TRADE JOURNAL.

ENGINEER required for large Mechanised Foundry in South Wales. Must have had practical foundry experience in similar position and be capable of taking complete control of maintenance section employing 20-40 maintenance fitters.—Applications in confidence, giving age, qualifications, experience and salary required, to Box 734, FOUNDRY TRADE JOURNAL.

FOUNDRY SUPERINTENDENT required for Engineering Works, near Manchester, to take control of Pattern Shops, Ferrous and Non-ferrous Foundries, producing 80 tons per week of heavy, medium and light castings. Must be thoroughly experienced practical man, with good theoretical knowledge, and accustomed to loam and general flow moulding practice.—Apply in writing, stating age, qualifications, experience, and salary required, Box 766, FOUNDRY TRADE JOURNAL.

LOUGHBOROUGH COLLEGE, LOUGHBOROUGH, LEICESTERSHIRE.

MAJOR-GENERAL W. F. HASTED, C.B., C.I.E., C.B.E., D.S.O., M.C., late R.E. President.

A FULLY qualified FOUNDRYMAN is required to take charge of the College Foundry, making ferrous and non-ferrous castings. Applicants should have served an apprenticeship with a reputable firm, and preference would be given to one who has had industrial experience in high class jobbing work in green sand, dry sand and loam moulding.

The Foundry is equipped with 1-ton and 5-ton Whiting cupolas, a 200-lb. Morgan oil fired tilting crucible furnace, etc., and the person appointed will be responsible for the handling and running of same.

Candidates should be capable of instructing and controlling Students and Apprentices, and it is desirable (but not essential) that applicants should be Corporate Members of the Institute of British Foundrymen.

The salary will be in accordance with the scales for Teachers in Technical Colleges and Institutions, and is subject to deductions for superannuation.

Further details and forms of application may be obtained from the Registrar.

Consideration will be given to applications from suitably qualified registered disabled persons.

SITUATIONS VACANT—*Contd.*

VACANCY for working ASSISTANT FOREMAN in Brass Foundry. High-class hydraulic castings up to 10 cwt. Midlands.—Box 764, FOUNDRY TRADE JOURNAL.

FINANCIAL

REQUIRED TO PURCHASE part or whole interest in an established Engineering concern or Ironfounders. Amount of capital involved secondary consideration, provided justified by profit-earning record. Continuity of management and personnel desirable.—Write Box 748, FOUNDRY TRADE JOURNAL.

WORK WANTED

WORK wanted. Low phos. iron suitable Diesel and other pressure work. Pieces not over 1 ton. Patts. required suitable machine moulding. Location Clyde area.—Box 534, FOUNDRY TRADE JOURNAL.

MATERIALS FOR SALE

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. BREALEY (MACHINERY), LTD., Station Works, Ecclesfield, Sheffield.

MACHINERY WANTED

OFFER YOUR SURPLUS PLANT TO

FRANK SALT & CO., LTD.,
Station Road, Blackheath, Birmingham.
BLA. 1635.

WANTED, urgently, broken or crushed Plumbago Crucibles.—Please state quantity available and price to buyer, DAVID BROWN-JACKSON, LTD., Salford Works, Hampson Street, Manchester, 5.

WANTED

10 IN. (minimum) S.S. & S.C. LATHE, GAP BED. Minimum 4 ft. between centres. Preferably A.G.H., in good condition.

FRANK SALT & CO., LTD.,
Station Road, Blackheath, Birmingham.
BLA. 1635.

EDGAR ALLAN Mill Separator, or Edgar Allan Stag Ball Mill, suitable for grinding reverberatory slags and residues.

Swarf Crusher, capable of crushing brass, curly turnings.

Hydraulic Baling Machine, capable of producing non-ferrous briquettes, approximately 12 in. by 10 in. by 8 in., or near.

Rotary Furnace, 4- to 10-ton capacity, complete with all auxiliary equipment and spare shell, if possible.

Rotary Mixer, automatic discharge type, suitable for mixing fluxes.

Billet Mould Turn Table, suitable for use with 1-ton electric furnace.

Cropping Machines, large and small, capacity up to ½ in. bar Jaw opening to 2 in. Capacity up to 2 in. Jaw, opening 3 to 4 inches.

Vibrating Sieves, either electrical or mechanical, suitable for sieving and grading slags and residues.—Box 798, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED—*Contd.*

SMALL capacity Blast Furnace, suitable for treating reverberatory slags and residues, complete, if possible, with blowers, hoists, etc.—Please send full particulars to Box 796, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

ONE Double Drum Magnetting Machine, recently overhauled by "Electro Magnets, Ltd.," 30 in. by 18 in. Drums, complete with Bucket Elevator.

Small belt type Magnet, by "Rapid Magnetting Co."—Offers to Box 800, FOUNDRY TRADE JOURNAL.

150 kVA, 11,000 to 400 volts, 3-phase, Brand new, complete with low tension Switch.

100 kVA, 11,000 to 400 volts, 3-phase. Secondhand.

Both the above are in excellent condition, and can be inspected at any time, Birmingham.—Box 802, FOUNDRY TRADE JOURNAL.

FOR SALE

NO. 16 ATRITOR CRUSHER by Alfred Herbert, complete with Feed Hopper, overhauled and with a quantity of spares. Also a No. 12 Atritor by Alfred Herbert, for which we have available about 6 tons of spares. Both these machines are offered at extremely low prices for quick clearance.

SAVILLE-CALVERT (MACHINERY), LIMITED
BIRMINGHAM ROAD, STRATFORD-ON-AVON.
Tel.: Stratford-on-Avon 3681.

600

AIR COMPRESSORS.

1,000-C.F.M., TILGHMAN, low pressure set, type CE.3B, vert., twin cyl., single stage, water cooled, 12 lb. w.p., 320 r.p.m. Direct coupled 75-h.p. S/R Met.-Vick. motor 415/3/50.

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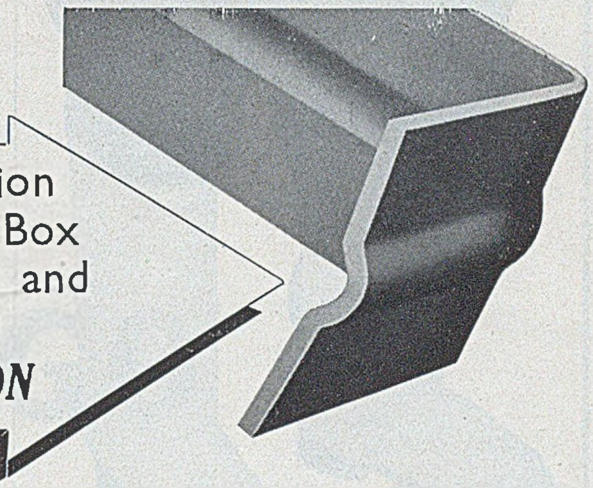

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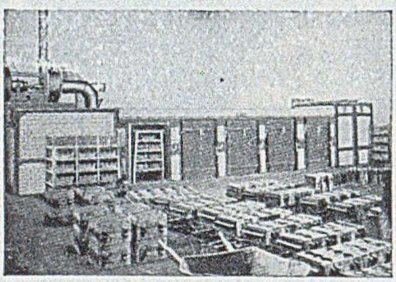

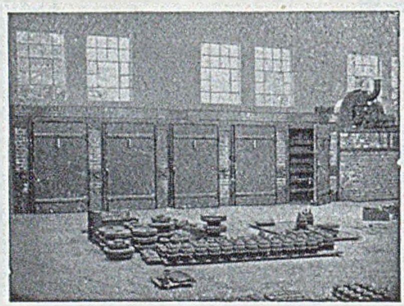

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