
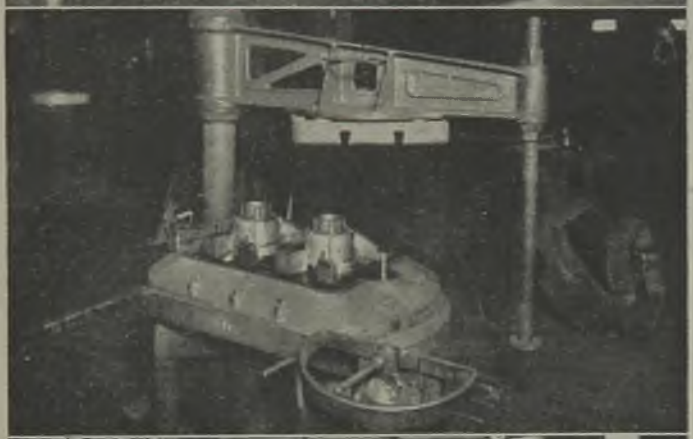

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FOUNDRY TRADE JOURNAL
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## Re-Enter the Buyer

Two events last week focussed our attention on the buyer. Of significance is the notable increase in politeness shown to his customers by the average retail salesman, for he realises that there is always an end to the seller's market. The first event which made us think about the importance of the buyer was a visit we paid to an architectural exhibition organised by the British Cast Iron Research Association at their laboratories at Alvechurch. The bulk of the visitors were members of the Press concerned specifically with architecture and kindred professions and trades. The object of the exhibition was to "sell" the idea of cast iron to an important group of potential buyers, who are by the very nature of things invariably on the look-out for new materials with which to express their art. Not too much could be accomplished because the war has restricted almost to vanishing point the activities of the foundries catering for the architectural profession and building trades. What was done, however, was to stress two main factors, the first of which was designed to show how the industry has for hundreds of years met the requirements of the civil engineer, the architect and the builder. Moreover, many of the exhibits shown, mainly, *force majeure* by photographs, were of such a character as to add lustre to the artistic records of a high ranking profession. The second object was more easy of attainment, and that was to convince the visitors that the cast-iron industry was in possession of scientific and industrial research facilities well capable of establishing confidence in the material they are being asked to utilise. The creation this year of Building Uses Department under the supervision of Mr. Derek Bridgwater, a consulting architect, ensures a permanent service for industrial designers, surveyors, builders and others who desire comprehensive and impartial information on the building applications of cast iron.

The second event was an informal luncheon party organised by the Council of the London Branch of the Institute of British Foundrymen, which had for its object the honouring of a Branch past-president, Mr. J. W. Gardom, now president of the Institute, and one of its most distinguished members, Dr. W. T. Griffiths, the president of the Institute of Metals. Mr. Gardom, being in reminiscent mood, recalled his London presidential address, in which he had expressed the view that buyers varied in their psychological make up and reacted in diverse ways towards their fellow man. Thus in many cases it was necessary to send not one but two commercial representatives in order to ensure service of highest order.

Now he goes a step further, and makes the revolutionary suggestion that shop stewards and the like should accompany the traveller on his rounds to acquire first-hand knowledge of the difficulties of maintaining the ship of business on an even keel. Above all, there must be a realisation that there is a third partner in this employer-employee set-up, and that is the man who buys the product. Here there are two widely divergent aspects of this all important question of selling the industry's products, with which must be associated the maintenance and improvement in the level of employment under conditions of continuous amelioration.

## PUBLICATION RECEIVED

**The Welding of Zinc Alloy Die Castings.** Published by the Zinc Alloy Die Casters' Association, Lincoln House, Turl Street, Oxford.

Apparently, but quite unusually, zinc base die castings get broken, and they should not be brazed. It is quite a tricky job to effect a good repair, and the object of this leaflet is to provide a description of the necessary technique. Oxy-acetylene welding is recommended, using B.S.I. 1,004 rods. The nature of the flame and all the germane instructions are given, together with some data as to the strength of the joints made.

## Contents

## BOOK REVIEWS

**Stores Control.** By W. Nelson Wright. Published by Richard Madley, Limited, 54, Grafton Way, London, W.1. Price 2s.

The author of this pamphlet is Stores Controller at the London works of Fredk. Braby & Company, Limited, and this is perhaps the reason why the matter is so well suited to the metallurgical industries. The reviewer having personally attempted to create a card to indicate a balance of stores record finds the one set out on page 19 the ideal he sought and failed to obtain. An unqualified recommendation is given to all foundry owners to provide themselves with a copy.

V.C.F.

**A Constructional Engineers' Compendium.** Published by the Appleby-Frodingham Steel Company, Limited, Scunthorpe, Lincs. Price £1 1s.

This book is typical of the kind in which the owner writes his name, and if a juvenile, embellishes it with a doggerel couplet having reference to straying and returning. Ever since engineering became a national industry there seems to have been a perpetual dearth of manuals which give the sizes and weights of a foot of a T-iron on a girder and similar data. Moreover, the very latest book seems to be an essential requirement. Thus this 905-page volume will demand padlocking to the desk to ensure it against borrowers, for not only is it a standard work of reference, but it has a very handsome appearance.

V.C.F.

**The Safe Installation and Use of Abrasive Wheels.**—Published by the International Labour Office (Montreal) and sold through P. S. King & Staples, Limited, 14, Great Smith Street, London, S.W.1. (Price 4s.)

This monograph had its origin in a report prepared by Mr. G. Stevenson Taylor, H.M. Deputy Chief Inspector of Factories. After much delay, dating from 1934, the original author has been able to supervise the final draft. This provides an excellent text-book on the subject of grinding and should certainly be read by every executive in charge of a fettling shop. The subjects covered embrace every aspect from the manufacture of abrasive wheels to their maintenance. Stress is laid on storage, guarding, eye injuries, dust, and those features which relate to accident prevention. This, happily for everybody, also connotes economic operation.

There are two appendices which deal with the mathematical side of rotating discs, and additionally the safety regulation in Germany, Great Britain and the United States. The reviewer sincerely hopes that the British civil servants responsible for drafting the law of the land will compare the legal jargon of our regulations with the simple English used by their American colleagues. Maybe the latter is not a legal document, but it is reasonably certain that those responsible for drafting it could without equivocation enunciate the necessary penal clauses.

V. C. F.

## ASSOCIATION TECHNIQUE DE FONDERIE

### LETTER OF GREETING TO OUR READERS

We have received a letter of greetings from the Association Technique de Fonderie. The letter is signed by Prof. P. Chevenard, the President, and the address of the Association is still 66, Rue Boissière, Paris (XVIe The letter is addressed to the Editor, and we print extracts below.

"On the occasion of the recent liberation of French territory and, in particular, our capital city, by the valiant troops of the Allied armies, we are happy to write to you once again in the name of French foundrymen and to send you our most cordial greetings. We hope that we shall be able, as soon as possible, to renew the friendly relationship between us which has been suspended for nearly five years because of the occupation of our country by German hordes.

"With confidence we express the hope of seeing, in the near future, a victorious peace which will permit our two associations to continue, as in the past, to work in close collaboration for the technical and scientific improvement of our industry. Through the re-creation of the work of the International Committee of Foundry Associations, which we hope will not be too long delayed, we sincerely desire that the necessary measures may be determined as soon as possible by a common agreement between different countries in order to establish a calendar for future international congresses."

## ALLOY CAST IRON FOR LOW-TEMPERATURE SERVICE

Ministry of Aircraft Production—"Alloy Cast Iron for Use at Low Temperatures," D.T.D. Specn. 649; July, 1944. The specification covers cast iron within the following limits of composition:—The specification requires that the castings shall be sound and free from blowholes and all surface and other defects, and provides for rejection for faults in manufacture, irrespective of previous proof of correct composition:—Carbon, 2.5 to 3.0 per cent.; silicon, 2.5 (max.); manganese, 0.5 to 1.2; sulphur, 0.12 (max.); phosphorus, 1.0 (max.); nickel,* 15.5 to 17; copper,† 7.5 to 8.5; and chromium, 1.5 to 2.5 per cent. (* Preferred nickel content, 16 per cent.; † preferred copper content, 8 per cent.)

## NOTES FROM THE BRANCHES

**Slough Section.**—The November meeting held in the lecture theatre of the Research Department of High Duty Alloys, Limited, attracted an audience of over 70. Mr. A. Logan presided. The lecturer was Mr. E. Raybould, who, under the title "Theory and Practice of the Aluminium Sand Foundry," dealt with just those points which a practical audience so much appreciates. He used a number of lantern slides to illustrate his general argument.

# ACHIEVEMENTS IN THE DEVELOPMENT AND APPLICATION OF UNIFORM COST SYSTEMS*

*There is ample evidence of foundrymen's interest in uniform accounting*

By G. C. STONE, F.C.W.A.

**Introduction**

The editorial in THE FOUNDRY TRADE JOURNAL, dated February 26, 1942, stated: "At no time in its history has the foundry industry been so interested in costing as at the present time, and it is a rare event at the moment that our mail does not include a demand for some information on this subject." The revelation made in this statement qualifies the submission of the subject of this Paper for consideration by an audience in which there are representatives of the foundry industry. If any further justification was required there is evidence that in slightly over two years since this editorial was published interest in costing amongst foundrymen has been sustained. This seeking after knowledge regarding costing can accurately be claimed as due to a keen awareness of the vital nature of this service in modern business management.

In wartime, industrial resources are dominated by the production of supplies for the war effort, and most industries are affected. For some of these materials, the Government contractor's selling price is based either on actual costs determined after work has been done or a tentative price subject to modification after actual costs have been subjected to Government investigation. These conditions associated with the fixing of selling prices cause the ascertainment of costs to be essential by many contractors. This compels an interest in costing, which initially, with some firms, may be artificial and exercised principally to meet their obligations to Government departments. But later, when this interest has been consummated in the application of a reliable costing system, there often follows such an appreciation of the advantages of modern accounting methods that the need for them becomes a conviction.

Enquiries for information on costing methods come from different sources. At one source there are those who have done little or no costing, but being suppliers of war materials they desire to anticipate and satisfy the requirements of Government cost investigators. Another group comprises those who have done some costing and are either conscious, or suspect, that their methods are not up to date. An even further group consists of keenly discerning and progressive people who are always on the alert for any methods in advance of those previously known to them. Efforts to promote uniform costing in an industry unite these different types of outlook. As the result of their collaboration new interest in costing is stimulated, in consequence, improved methods are developed and applied, and benefits of a mutual nature follow. Enlightenment has been progressive regarding the advantages to be derived by collaboration between competitors within the same trade. When this is made effective it is found that most commercial and technical matters have to be related to costs in order to appreciate fully the issues involved. Costs are most readily appreciated when the methods by which they are compiled are the same for each manufacturer in the same industry.

The need for an international language is obvious when natives of different countries meet to confer together, and each can speak only his or her native vernacular. Similarly, in the absence of uniform methods, the dissimilarity in costing systems reveals the need for costs to be uniformly prepared if they are to be used effectively for collaboration between the member firms of an industry. When action is initiated from within an industry the purpose of it may be confined to the development of methods for application only to that particular industry. There are, however, accountants who claim that sound accounting is expressive of certain fundamental principles which ought to be observed regardless of the industry affected.

Uniform accounting can, therefore, be given a wide perspective, and how general is the interest in it is expressed by many sources representative of different interests in the business life of the country from which urgent claims for the application of uniform methods have been made. These sources comprise Reports of Select Committees on National Expenditure, the publications of associations of professional people, the daily newspapers, and also the recommendations of politicians and economists. Much has been revealed of the need for uniform methods. Much has been done to satisfy this need, yet there is much more to be done.

There is an absence of collated evidence of achievements obtained. Therefore, for the benefit of any future efforts, there is a need for some record of the difficulties experienced in the past and how these have been overcome by positive accomplishments. It is not intended to undertake the satisfaction of this requirement now as in a Paper of this kind only an outline of the subject can be given. For the purpose of an outline the subject has been resolved into four

* A Paper read before a joint meeting of the London branches of the Institute of British Foundrymen and the Institute of Cost and Works Accountants at the Institution of Civil Engineers, Mr. H. W. Lockwood presiding. The Author is on the staff of J. A. Jordan & Sons, Ltd., Bilston; he is President Designate of the Institute o Cost and Works Accountants.

## Uniform Cost Systems

groupings, each of which will be treated separately:—(1) What uniform costs are; (2) why uniform costs are needed; (3) difficulties associated with uniform costing, and (4) applications made of uniform costs.

### What Uniform Costs Are

Uniform costs are prepared by using the same costing methods in the different factories in the same industry or combine. These costs for the different factories are comparable, and can be used to reveal either the merits or the demerits of conditions in each factory. It is usual for comparisons to be made at each level in an industrial organisation to determine the nature of each achievement. Workmen, when their work is constant, compare the quantities payable to them day by day. If their work varies, they make daily comparisons of their monetary earnings as a test of their own efficiency or to impute that of the rate-fixer. From this level upwards the subject for which comparisons can be made increase. These illustrations of the methods of workmen express a fundamental principle which ought to be observed at every level. The principle is, that only information should be used for comparison purposes which is directly comparable, in other words, like with like.

Costing provides a variety of services essential for modern business management. Quite naturally, a costing system will be expected to render possible the ascertainment of the cost of every job as a basis for fixing selling prices, and so that actual costs can be compared with estimates. The routine information indispensable for the purpose of ascertaining costs can be used for the operation of an information service to provide various data on a daily basis or for larger periods in such a form as to facilitate constructive managerial action. In this service, typical data would reveal the results achieved by various sections of the business, also inefficiencies, waste and potential economies. The nature and extent of the information provided varies according to the size and needs of each business. Thus in the planning of any kind of costing system it is desirable to anticipate the complete service it can render.

This will naturally provoke a query regarding the scope for the application of uniform methods. Where firms are associated in a combine there can be complete uniformity in methods of cost finding and in the statistical information supplied to the management of each firm. In these particular circumstances the same classifications for expenses and departments can be used and the same stationery and routine procedure be employed. This will result in the utmost uniformity in the internal methods employed by each firm and in the comparison of costs between firms. These conditions are amongst the most favourable for the application of uniform methods, yet because of variations in factory methods or in the size of the different firms, when their costs are compared, disparities will appear. Cases are known of firms in a combine making the same goods by broadly the same manufacturing methods, but one has a few hundred employees and another several thousand employees. Due to these disparities in the magnitude of these firms their organisations will differ, and although costs are uniformly prepared, they will express the differences in factory technique.

Uniform costing systems usually consolidate the best ideas from an entire industry and express advanced knowledge. The adoption of these methods will, however, be made cautiously by some firms, as for their internal purposes the statistical information supplied may be less useful than that of the system which would be superseded. Some firms are, therefore, uniform in the compilation of their costs for all external uses, such as for trade association purposes and for comparisons with other businesses, but for all internal purposes they have a system which is peculiarly their own. Such a system will need to be flexible, otherwise internal and external requirements will only be satisfied at great inconvenience.

### Why Uniform Costs are Needed

The needs for uniform costs are threefold:—

(1) Where the State, using public funds, is buying or subsidising the purchase of supplies from several sources. More particularly if it has the right to examine costs of production.

(2) For collaboration between the member firms of an industry and to facilitate joint action for the advancement of their common interests.

(3) For application to firms associated in a combine. Also to gas, water and electricity undertakings, local government and national services. The purposes are manifold, but principally to compare results for individual units so as to reveal the efficiency of each unit.

In consideration of the first need. Where public money is being utilised, it is essential that there be known the reasons for differences in the selling prices proposed by the proprietors of different businesses. Efforts made by Government accountants to supply these reasons are subject to frustration due to differences in costing methods. When the restoration is undertaken of damage to property done by enemy action it will be necessary for there to be uniformity in the routine for authorising work to be done and in ascertaining the cost. In the much more comprehensive task of national reconstruction there will have to be bold thinking and planning. Already the Institute of Municipal and County Engineers has had under intense consideration uniform costing for national, regional and local government services. The activities of the State are now highly varied in publicly owned undertakings, also in the control and regulations of businesses generally. Some of these activities are associated with subsidies, grants and reimbursements. When public funds are employed it is desirable that there be uniformity in the accounting methods employed.

The second need applies mainly to trade organisa-

tions. There is a saying attributed to John Stuart Mill: "There is not a more accurate test of the progress of civilisation than the progress of the power of co-operation." Co-operation between manufacturers is usually suspected as existing for the protection of profits. Enlightened distributors and consumers will, however, understand that companies making profits offer the best prospect of a continuing service. Goods sold at a loss ultimately involve the extinction of the supplier. But co-operative action can quite as likely result in the reduction of costs with benefits to consumers in reduced selling prices. Progress based on co-operation in one industry stimulates the development and supply of competitive material from another industry. Both industries may be actuated by a recognition of the consumer's desire to buy merchandise of an improving quality in a cheapening market. Thus the organisation of firms into industrial groupings subdues competition between the member firms of an industry and gives prominence to competition between industries producing rival materials.

An industry consists of producers, distributors and consumers whose interests are so interwoven that they are mutually interdependent. Collaboration within industries must embrace all of these elements with the object of improving methods of production and distribution so as to provide the best and cheapest service consistent with the requirements of the consumer. Wartime legislation has emphasised that industrial concerns are co-operative undertakings. This is stressed particularly in works councils on which employers and employees have to be represented. Organisations representative of whole industries must recognise that the entire field of business is co-operative, involving producer, distributor and consumer. Research affecting manufacturing technique must therefore coincide with research into potential markets, and all matters associated with the furtherance of the best interests of all participants.

As the margin between costs and selling prices either as a profit or loss is involved in every transaction costs will have to be freely used for this kind of co-operation. Costs will be wanted for collaboration between member firms and for joint action with State departments or organisations representing other industries. For these purposes uniform costs will be the most helpful. As most interests affecting an industry come within the purview of the trade association it is only natural that at this source consideration be given to costing methods. If for no other reasons uniform systems can be prepared and issued as a service to members of the association for the purpose of stimulating maximum efficiency in their cost accounting procedure. The third need affects firms in combines, and various public services. Where firms are associated by amalgamation it is advantageous to have a centralised research organisation to select the methods most suitable for standardisation throughout the combine. This should lead to the adoption of the one best method, and it is as desirable that there be the greatest efficiency in the accounting methods as well as in the technique of manufacture and distribution.

**Difficulties Associated with Uniform Costing**

The application of uniform costing is fraught with considerable practical difficulties. Since businesses differ in size and types of organisation it is not easy to evolve costing methods which can equitably be used in every business. In any one business the major features are constant and show little variation within short periods. For example, the organisation, methods of manufacture, and the nature of the products vary little in successive accounting periods. In consequence inter-period cost comparisons can reliably be made. Ideally one of the purposes of uniform costing is to make comparisons of costs between different businesses as easily as is possible between accounting periods within a business.

The causes of the difficulties encountered can be classified under four principal headings:—(1) Lack of uniformity in the size and organisation of businesses; (2) lack of uniformity in methods of manufacture; (3) lack of uniformity in products manufactured; and (4) lack of uniformity in the accounting methods employed.

*Lack of Uniformity in the Size and Organisation of Businesses.*—The functions or services within a business can, in varying degrees, either be separate or merged dependent on the size and nature of the undertaking. In the small business one person may perform several functions. For each stage in the growth of a firm the range of tasks per person gets less until ultimately several people may be required to cope with the demands of individual jobs. To quote an example, in a small foundry one man may:—(*a*) Store patterns and coreboxes; (*b*) repair patterns and coreboxes; (*c*) repair moulding boxes; (*d*) mix sand; (*e*) mould; (*f*) set cores; (*g*) pour metal; (*h*) knock castings out of moulding boxes. His time and consequently his wages would, perhaps with some justification, be charged direct to the order he was executing in doing this conglomeration of jobs. In a larger foundry each of these jobs would be done by a different person when some wages would be charged direct to the order, the others to indirect expenses and as such applied to the cost of orders as part of overhead expenses.

Variations in the organisation of services or functions cause great difficulty in comparing results for different firms. Some firms have general purpose departments, others have departments for a single or special method of production. Some have a combination of departments for the purpose of mass producing one article, others make the same article in their general purpose departments. These dissimilarities in types of organisation influence the forms in which costs of production have to be prepared.

*Lack of Uniformity in the Method of Manufacture.*—Opinions can differ as to the best method for producing a particular job. Some result in the use of general purpose plant, others require plant special for the one job. The use of general purpose plant may cause direct labour to be prominent in the cost of the job whereas in the other instances the costs of special plant may be high and direct labour low. In one place manual methods may be used; in another

(*Continued overleaf, column* 1.)

## ACHIEVEMENTS IN THE DEVELOPMENT AND APPLICATION OF UNIFORM COST SYSTEMS

(*Continued from previous page.*)

mechanical methods; in a third place, a combination of both manual and mechanical facilities. The position is strongly affected by secret processes and methods which basically can be simple in character yet affect either operations or processes fundamentally. This may cause the methods of the orthodox firm to be drastically different from those of the firm which are secret.

*Lack of Uniformity in the Product Manufactured.*—This affects the nature of the material entering into an article and the form in which it is provided. In a foundry there can be several grades of grey iron with different costs and a particular casting can be made with or without cored holes dependent on the requirements of the machining operation. Some jobs can be made out of alternative materials, such as tubing, a drop forging, a casting, solid bar material.

*Lack of Uniformity in the Accounting Methods Employed.*—There are alternative methods of allocating costs to jobs and each method can produce a different cost for the same job. It is good practice as far as it is practicable and equitable to charge costs direct to orders. This resolves expenses into two groupings:—(1) Direct costs; and (2) indirect costs. Such a segregation seems simple to make, yet in the labour consideration of merged and separated functions there was revealed that classifications under direct wages vary with the type of organisation. Some costing methods are used because of their simplicity. Often it is not realised that because of their deficiencies certain classes of unremunerative work are attracted and remunerative work is lost. Such disclosures can only be made by contrasting the costs prepared by the simple system with those obtained by a more reliable method. An example of a simple system is where the whole of a foundry is treated as one department with one overhead rate for all kinds of labour and work. A more reliable method would departmentalise expenses so that labour and overheads could be grouped by kinds of labour or classes of work. An example in foundry work is the segregation of output and the extra costs for dry sand moulding.

In addition to there being variations in the meaning of direct wages there are different methods for the allocation of overheads to the cost of jobs. Perhaps the simplest and most widely used is overheads applied as a percentage of direct labour. This can best be used where there is the closest similarity in the types of labour employed. In other circumstances it is prone to produce costs inappropriate to the work done. Ideally overheads should be related to the causes of their being incurred and to which they are therefore associated. For example, in a foundry overheads will be closely related to various causes such as direct wages, direct labour hours, weight of metal poured, weight of saleable castings and weight of cores.

(*To be continued.*)

## NICKEL BRONZE CASTINGS

An article by Mr. E. Portman in "Metals and Alloys" recommends the following melting practice, when using high frequence coreless induction furnaces for the production of nickel bronzes:—(1) Do not use charcoal on melt; (2) Do not cover the crucible; (3) Melting temperature must not exceed 1,220 deg. C.

An oxidising atmosphere must be maintained during melting. Deoxidation of the melt is accomplished by adding 1 lb. of 10 per cent. phosphor copper per 100 lb. of ingot. If a 100 per cent. remelt charge is used, ¼ lb. of 10 per cent. phosphor copper is added to the melt about 15 sec. before the power is shut off. Residual phosphorus should not exceed 0.03 per cent. Use of excessive phosphor copper, while increasing the fluidity of the melt will result in the formation of a very fluid grey coloured slag that is very difficult to remove by skimming. The slag continues to form even after the greater portion has been skimmed off, and invariably some particles are washed into the mould, resulting in unsightly castings. The only remedy, should the recommended additions of phosphor copper prove to be too high, is the gradual reduction of additions until there is no appearance of greyish, fluid slag on the surface of the melt when the induction current is shut off.

One great difficulty in melting this alloy in high frequency induction furnaces is temperature control. The melting is so rapid, that overheating the metal may be caused within a few minutes unless the melter is experienced and can estimate the temperature accurately by eye. Inexperienced melters should be cautious, shutting off the current before maximum temperature has been reached, taking pyrometric readings, and gradually increasing the heat to the proper point.

High temperature melting (over 1,220 deg. C.) causes excessive gas absorption and porous castings. The proper pouring range is 1,125-1,090 deg. C.; gates, sprues, and runners must be adjusted to insure filling of the mould quickly, yet without turbulence. Melting temperature should be as close to the pouring temperature as possible. The men handling the metal should be ready to remove the crucible as soon as the melting is completed. The molten metal must be skimmed, and carried to the waiting moulds without delay, or the castings will be cold-shut and useless.

In connection with moulding the following recommendations are made:—Sprues and gates should be made somewhat larger than for gun-metal. Risers are cut the same as for gunmetal, and smaller than for silicon bronze. The recommended moulding sand properties are as follow:—

| | |
|---|---|
| Moisture | 5-6 per cent. |
| AFA Green permeability | 22 min. |
| AFA Green compressive str. | 7-10 |
| AFA Grain size | 140-170 |
| AFA Clay content | 7-15 per cent. |

Moulds should be vented to prevent entrapment of gas. Light ramming, and baking or skin drying of large moulds are recommended to help to eliminate gas holes. Fast pouring, keeping the basin full at all times, is essential because of the short freezing range of nickel bronze.

# THE MECHANISED PRODUCTION OF ALUMINIUM GRAVITY DIE-CASTINGS FOR THE MERLIN ENGINE

By JOHN VICKERS

*Discussion on a Paper presented at the Annual Conference of the Institute of British Foundrymen. Mr. V. C. Faulkner (Past-President) occupied the chair. Mr. Vickers' Paper was printed in our issues of November 9, 16, 23, and December 7 and 14.*

The CHAIRMAN said Mr. Vickers had presented a most enjoyable exposition of the subject matter of his Paper, and he was sure it would evoke an interesting discussion.

MR. F. H. HOULT (Member) expressed his opinion that the Paper left little room for criticism; it presented an intriguing study of the work being carried out in the production of die-castings on the Merlin engine. It was an interesting and refreshing contrast to the American Exchange Paper, which had shown how they dealt with an outstanding example of one highly specialised casting. This presented an entirely different set of problems from those which were connected with such a variety of castings as shown by Mr. Vickers.

The American Paper laid great stress upon the use of female labour, and perhaps it was to be regretted that Mr. Vickers had not sufficiently emphasised this point. Much praise was due to the women who were employed upon the castings described in the Paper. In his (the speaker's) opinion, the Paper should have been read to the whole of the Conference and not merely to a section. The American Paper had shown several sandblasting operations taking place during the production of the cylinder head casting. It was noticeable that sandblasting is not mentioned in Mr. Vickers' Paper. Mr. Hoult suggested it would be of interest to learn something concerning the differences of opinion in applying this cleaning method.

### Porous Bricks to Replace Burners

The CHAIRMAN remarked that he had visited a number of die-casting shops and he had been concerned at the enormous waste of town's gas during the heating up of the dies. This made the room very uncomfortable to work in and he was sure that the inefficiency of the process would be of the order of 1 or 2 per cent. When visiting a die-casting works during the previous week, he suggested it would be possible to utilise porous bricks encased in castings and to pass the gas through the brick, which could be shaped to the die, and then igniting. He did not put forward the suggestion as being suitable to every type of die, but a number of dies could be heated in that way.

A point to which he would like to draw attention was the conveyorising of the die shop. In his opinion this was applicable to smaller shops. Die casters imagined that because they turned out their products so quickly no further economies could be effected. Mr. Vickers had clearly shown that there were still further economies to be made, and that if there was quick production then the articles must be disposed of quickly also.

MR. VICKERS said that in the case of the shop under review there was not a labourer employed of any description other than the women who swept the floor.

### Micro-porosity

MR. A. PHILLIPS (Member) said that by looking at the slide illustrations and listening to the excellent description of the work done, it would almost appear as though no troubles were experienced in die-casting manufacture. Superficially, all that would appear to be necessary was to make the die, put in the metal, and the desired result was accomplished. Having had a somewhat considerable experience of die casting, such was not the case and much trouble might occur. One outstanding example was the case of a small circular casting subjected to radiological examination, when micro-porosity would be found; by changing runners and risers it was not possible to remove that porosity. Would Mr. Vickers state what methods were used in the experimental foundry in regard to micro-porosity which it had not been possible to remove by altering the runner or the riser?

He agreed with the point which had been mentioned concerning the use of sand cores in a permanent mould. He utilised women labour on gravity die-casting in which dry sand cores were used. Did Mr. Vickers use sand cores in a natural condition or did he put a coating on them, and, if so, what coating did he use to eliminate the troubles experienced with a sand core in the gravity die-casting? Also, were there any inserts used in any of the gravity die-castings to which reference had been made? An interesting point was that in regard to the RR.50 physical test result it was noticeable there was an increase in tensile strength due to the die-casting. How did Mr. Vickers take his test-pieces, and how did he take a test-piece when he had a casting which was produced by half core and half die?

MR. VICKERS hoped he had not created the impression that no trouble was experienced in connection with die-casting, because that was certainly the last thing he intended to do. He would imagine that, as foundries went, his own had its fair share of trouble. The experimental foundry, however, assisted considerably in eliminating those troubles which would normally appear in the production shop. Mechanical features on the die could be weeded out without holding up a production line, by studying the die in conjunction with the designer and the toolmaker. On

## Aluminium Gravity Die-castings

some occasions, before a die was released, it remained for as long as a month in the experimental foundry, but when once it was released they were sure that if a casting promise was made, they would fulfil it.

With regard to micro-porosity in small covers, all aluminium founders, and particularly those dealing with complex alloys such as RR.50, had had experience of micro-porosity, and he was unable to state any one definite explanation for it. Considerable attention has been given to the subject by the inventors of these materials, and each case of micro-porosity had to be studied separately. In the case of small die-castings, it was sometimes found that if the gating system could not be modified in order to give the desired head-metal over the section that was showing porosity, a counter solution could be applied by removing the die coating in the area affected only, and thereby endeavouring to accelerate the chill effect in that area. Here then were three solutions to the problem: either increase the feed, or render the feed more effective by introducing hot metal into the feed, or remove the asbestos die coating in the affected area on the die to accelerate the chill effect. The porosity question also appeared to be very closely tied up with the subject of prolonged solidification, under certain conditions.

### Core Coatings

Dealing with the question of sand cores in die-castings, his firm's practice normally was to spray all their sand cores with a proprietary plumbago wash supplied by a Lancashire firm. This wash had been found to be extremely satisfactory and consisted of approximately 21 per cent. terraflake; 2½ per cent. plumbago; ¼ per cent. core gum by weight; and the balance, water. The core was restoved and thoroughly dried after the wash had been applied. With regard to the tensile properties of RR.50 and the method of testing, when a casting was half die and half sand core, it was his practice with RR.50 that all test-bars produced in the die-casting department should be die-cast. These had, of course, to yield the specified figures for die-cast test-bars whether the actual casting incorporated sand cores or otherwise.

MR. G. S. STRACHAN (Associate Member) agreed with Mr. Hoult that the Paper should have been presented to the whole Conference; some of the members should hear much more about light alloys than they do. He was convinced that Mr. Vickers and his company were doing extensive pioneer work in respect to modern methods of mechanisation and improved foundry technique on production and the use of light alloys, and he believed that the methods of mechanisation in the Rolls-Royce foundries were second to none.

### Distorted Castings

MR. J. BLAKISTON, A.M.I.Mech.E. (Member), considered that the Paper deserved all attention from foundrymen because it indicated the trend of post-war development, particularly as to the die-casting of large components. In the course of time the tendency would be to cast still larger components by this method. He would like to ask from what material Mr. Vickers made the dies; what was their life, and had he experienced growth after continuous usage? He also noted in the Paper that there was a routine operation for the rectification of distorted castings. Was this rectification on account of the difficulty which would be experienced to incorporate initial camber in the dies or was there some factor in the process whereby variable distortions took place during manufacture?

### Die Material

MR. VICKERS agreed that there was a definite tendency to develop the process for the production of very much larger castings than those which had hitherto been produced. Rolls-Royce were at the moment working on projects of which he was not yet privileged to publish the details, but they would, without a shadow of doubt, bring many aluminium castings at present being produced by sand-casting methods within the scope of die-casting.

With regard to the material of the die itself, it was their practice to use a good quality cylinder iron, or alternatively Grade E Meehanite was used. They did not use any special alloy additions in the material. The life of the dies varied considerably, depending upon such features as the design of the gating system, and the point of impingement of the metal stream on the die cavity. His firm, however, had instances of rocker cover dies which had produced over 100,000 castings and were still in service.

Up to the present no serious difficulty had been experienced with respect to permanent growth of dies. The peak pouring temperature for any die-casting was in the region of 720 deg. C. and permanent growth had not so far proved to be a serious problem. The only growth or intermittent expansion which had been encountered was in connection with a cylinder skirt die where during a production run, due to the presence of a fairly large relative volume of hot metal in feed blocks, these tended to expand more than the adjacent cavity blocks containing a lesser amount of metal to which they were attached. This difficulty was overcome by the simple method of slot screwing these blocks to the blocks carrying the actual casting cavity so as to permit this movement to take place without distorting the die. The amount a die-casting was stretched rarely exceeded 25/50 thousandths of an inch over a 3-ft. 6-in. length. Very few castings were distorted, and distortion, when it occurred, was invariably due to carelessness on the part of the operator when removing the casting from the die. A cambered die had not been considered because a large percentage of the castings were straight, and it was only for those castings which were slightly cambered that the stretching process was used.

### Waster Losses

MR. E. FLOWER (Member), in adding his quota of thanks to Mr. Vickers, said the Paper clearly showed that this country was not just sitting down and look-

ing abroad to indicate the way of future progress, but was even in a position to show initiative in modern foundry practice.

Mention had been made that the Author was quite satisfied with a percentage of 5 per cent. wasters. If Mr. Vickers were prepared to read a Paper to the Institute, explaining the causes of that 5 per cent. scrap, it would probably be of the most entertaining nature. Taking into consideration all the mechanisation which has recently been described, it might have been thought that there could have been less than 5 per cent. scrap.

MR. VICKERS said that when on a visit to the U.S.A. in 1942, he had the opportunity of visiting many of the aluminium plants. One of the factors which prompted him to record the evidence contained in the Paper was the fact that the Americans were not in his opinion as far advanced as this country with regard to the application of gravity die-castings to aero engine work, although with the application of pressure castings they were well ahead of us.

On the subject of the 5 per cent. scrap, to which Mr. Flower had referred, the firm with which he, the Author, was associated, had a very considerable number of jobs which were run without any scrap at all; but when a die was released to the production shop the maximum target scrap was 5 per cent., although on certain of the more complex castings he was not prepared to show the "red light" until it rose to 7 per cent. The high standard of inspection for a class 1 aero engine casting should be taken into consideration in assessing scrap percentages, namely, the chalk test, pressure test, radiological examination, and the final dimensional check. Everything had to be perfectly synchronised in order to ensure a consistently good run on some of the more complex pieces.

MR. J. J. SHEEHAN, B.Sc., A.R.C.Sc.I., A.I.C. (Member), dealing with the question of the reclamation of sand, stated that the foundry referred to in the American Exchange Paper was located near a very good supply of silica sand and therefore reclamation was not justified. He would like to say how much he appreciated the reading of Mr. Vickers' Paper; it was so perfectly complementary to that of Mr. Gregory.

The CHAIRMAN mentioned that Mr. Vickers' contribution had been presented to the American Foundrymen's Association as the official Exchange Paper of the Institute.

### Casting Temperatures

MR. R. A. MILLER (Member), referring to the rocker cover casting made in high silicon alloy, asked if Rolls-Royce found it necessary to employ an abnormally high pouring temperature to look after the extremely thin sections of the job. One or two speakers had referred to porosity in relation to RR.50 alloy, but had not said anything about the fifth alloy mentioned by Mr. Vickers, namely, NA.226. Was Mr. Vickers able to produce a really sound job in this alloy without resorting to exceptionally heavy feeding?

With regard to sand cores employed in semi die-castings, Mr. Vickers stated he was using a wash based on plumbago. Did he prefer that type of wash solely from the point of view of obtaining a clean finish on the casting or was it used to promote a more rapid solidification than might be associated with refractory washes incorporating magnesium silicates? In other words, has the superior heat conductivity of plumbago any bearing on the choice?

MR. VICKERS said it had not been found necessary to use an abnormally high casting temperature for the rocker cover casting. For that particular job quite satisfactory castings could be produced with a pouring temperature, provided the die temperature was carefully balanced, down to as low as 690 deg. C. He was not aware that any trouble existed with pouring temperatures as low as that; he was certainly aware of a trouble they had had in the early stages, when casting them at a higher temperature. They had to take into account the typical defects due to too high a casting temperature with L.33 which could not be eliminated unless the pouring temperature was reduced.

MR. MILLER was aware of an instance where a rocker cover had been poured at as high a temperature as 900 deg. C. He wondered if this was necessary.

MR. VICKERS said it had not been found to be so by his firm. With regard to the NA.226, anyone who had had experience of that particular alloy would agree that it was a most difficult die-casting alloy. They could not produce sound die-casting with NA.226 unless they resorted to heavy feed. Furthermore, both the die and the piece had to receive very careful consideration from the point of view of design in order to eliminate anything in the nature of an undercut which was liable to prevent contraction of the piece during cooling. The experience of his firm with NA.226 was that it was a very good alloy if the piece which it was sought to produce was suitably designed and the design of the die was carefully studied to remove any factors which would prevent or retard solid contraction.

The plumbago wash used was a proprietary material to the composition given earlier. It had been selected after trying out a number of such materials, the prime consideration being to ensure a suitable refractory coating with an extremely low gas content, experience having proved that unless a coating with an extremely low gas content was used, it could cause more trouble than the gas from the actual core.

Upon the motion of the CHAIRMAN, seconded by MR. TURNER, a hearty vote of thanks was accorded to Mr. Vickers for his extremely able and instructive Paper. Mr. Vickers suitably responded.

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**B.O.T. Please Note!** "To permit foundries and other industrial organisations to prepare now for post-war civilian goods production, the [American] War Production Board recently issued a regulation which permits placement of unrated purchase orders for 15 specific types of capital equipment, including foundry equipment."—Mr. Frank G. Steinebach, in an Editorial in "The Foundry."

# THE QUESTION OF WARTIME LEASES

## THE NEW ACT EXPLAINED

By F. J. TEBBUTT

To an extent the Validation of Wartime Leases Act, 1944, is a singular measure, as it really has been passed to make legal certain agreements made for the "duration of the war" (or similar phrase) by persons without the legal knowledge that leases are not good in law, if there is no determining date included or at least the date of termination is capable of ascertainment, and, of course, the duration of the war does not meet this rule.

The first provision of the Act therefore provides that any agreement whether entered into before or after the passing of this Act, which grants a tenancy for the duration of the war, shall have effect as if it granted a lease for ten years, but subject to the right of either the landlord or tenant to determine the tenancy, if the war ends before the expiration of that term by at least one month's notice in writing given after the end of the war.

But as regards the "notice" procedure, if the agreement has made provision for the termination of the agreement by notice before the end of the war that provision has effect. This provision would cover cases where the landlord has given the tenant right of notice while binding himself for the duration of the war. So for the tenant, the position remains unaltered, and the position of the landlord is legalised so far as his part of the agreement. Where the agreement provides for notice to be given after the end of the war that notice period applies; there is nothing to prevent the notice being for a shorter or longer period than the "month" mentioned in the Act.

### German or Japanese Datum Line

If in defining the terms of the agreement the expressions "the war," or "hostilities," or "the emergency," and so forth are used, without anything to denote whether the agreement is to apply for the war against any one country or all the enemy countries and so forth, the agreement is to be taken as if it referred to those countries with which we were at war at the date when the agreement was made, unless it is shown that the parties intended that the expression should be otherwise construed. Thus if the agreement was entered into before December, 1941, the war with Japan would ordinarily be considered as outside the agreement. The dates to apply for the end of the war against any or all of the enemy countries will be declared by Orders in Council.

As regards the Act selecting ten years, this is more or less a notional figure to legalise the lease by including a definite period, and it could have been 10, 20, 99, or 999 for that matter (ten years is really taken so that it does not interfere with certain provisions of the War Damage Acts as regards liability for the "contribution" under that Act).

(*Continued at foot of next column.*)

# BRITISH STANDARDISED SAMPLE OF ACID-RESISTING SILICON IRON

The Director of the National Physical Laboratory announces that a sample of acid-resisting silicon iron (14 to 16 per cent. Si) having a guaranteed silicon content, has been prepared under the ægis of the Advisory Panel on Silicon Iron, Ministry of Supply and of the National Physical Laboratory, for use as an analytical standard for the determination of silicon in materials of this type.

The sample, which is in the form of a fine powder (150 mesh), has been produced in the Ministry of Supply Factory, Darlaston, Staffs, under very carefully controlled conditions to ensure homogeneity. In addition to silicon it contains other elements—carbon, manganese, sulphur, phosphorus, etc.—in such amounts as to bring its composition within the normal specification limits for commercial acid-resisting silicon iron.

The determination of the silicon content of the sample has been the subject of exhaustive examination by a panel of chemists set up by the Advisory Panel on Silicon Iron. The National Physical Laboratory has been actively represented on this panel, which is unanimously agreed that the sample contains 14.95 per cent. of silicon. This value is regarded as known with an accuracy of ± 0.05 per cent.

Samples may be obtained (registered post free to addresses in Great Britain and Northern Ireland) at a price of 10s. 6d. per bottle containing 50 grammes by sending order with remittance to the National Physical Laboratory, Metallurgy Division, Teddington, Middx. Cheques should be made payable to Department of Scientific and Industrial Research and crossed a/c Paymaster General.

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(*Continued from previous column.*)

If the agreement, however, provides for a tenancy for a specified period or the duration of the war whichever is the shorter, that period will apply instead of the ten years; it is interesting to note that if such an agreement was for five years and if made early enough the lease has ended under this provision. If the agreement was for a specified period or the duration of the war whichever is the longer, and the war ends before the specified period, the agreement will apply as if for that period and not such an agreement as this Act provides; if the specified period has been five years, then such an agreement will continue as if for the duration of the war and this Act legalises the position.

Although the Act applies to agreements made both before or after the passing of this Act, if the relationship of landlord and tenant has been terminated before June 13, 1944, this being the date when the Government announced its intention to legalise the position as regards "duration of the war, etc." leases, this Act does not revive such a lease.

# INSTITUTE ELECTS NEW MEMBERS

At a recent meeting of the Council of the Institute of British Foundrymen, held at the Queen's Hotel, Birmingham, the following were elected to the various grades of membership.

## FIRST LIST

### As Subscribing Firm Members

Ace Aluminium & Brass Foundry (Pty.), Limited, 309, Commissioner St. Jeppe, Johannesburg, South Africa (representative, P. A. Grimstead); N. C. Ashton, Limited, St. Andrews Road, Huddersfield (representative, N. C. Ashton); Cape Steel Construction Company (Pty.), Limited, P.O. Box 2121, Cape Town (representative, G. Visser); J. Durrans & Sons, Limited, Phœnix Works, Penistone, Sheffield (representative, P. H. Durrans); Glove Engineering Works, Railway St. Woodstock, Cape (representative, J. M. Russell); Hercules Engineering Works, P.O. Box 85, Boksburn, South Africa (representative, M. J. Jardine); A. S. Smith & Sons, Limited, Charles Street Works, Walsall, Staffs (representative, T. S. Smith); Southern Engineering Supplies (Pty.), Limited, 33, Sandberg St. Denver, Johannesburg (representative, N. J. Smith).

### As Members

L. W. Bowler, superintendent, lead-bronze dept., Rolls-Royce; C. J. Fenner, foundry foreman, J. & E. Hall, Limited, Dartford; F. Fuller, superintendent, engineering works, Speedwell Engineering Works, Stoke-on-Trent; W. D. Hart, foreman pattern and machine shop, Imperial Foundry, Leamington; S. H. Hinde, managing director, Chamberlain & Hill, Limited, Walsall; H. Hughes, assistant superintendent, Union Steel Corporation, Vereeniging, S.A.; D. R. Hunter, works manager, Arbroath Foundry Company, Limited; J. Hunter, foundry manager, Tecalemit, Limited, Montrose; M. L. Jamieson, director, G. & J. Weir, Limited, Glasgow; D. W. L. Menzies, assistant managing director, North British Steel Foundry, Edinburgh; W. G. Ogilvie, chief inspector, G. & J. Weir, Limited, Glasgow; F. J. Owen, works manager, Sheldons, Limited, Bristol; R. A. M. Porter, managing director, Porter Engineering Company, Limited, Carlisle; A. W. Roper, chief draughtsman, E. A. Roper & Company, Keighley; H. P. Taylor, foundry manager, Chamberlain & Hill, Limited, Walsall; E. C. Zeeman, assistant supervisor, S.A.R. Foundries, Cape Town.

### As Associate Members

J. Barnes, foreman patternmaker, G. Perry & Sons, Leicester; G. de Bruin, patternmaker, Globe Engineering Works, Cape Town; Q. Bell, steel moulder, Coltness Iron Company, Limited; T. A. Bloomer, foundry manager, Hunt Bros., Birmingham; F. J. Bredenkamp, assistant metallurgist, Benoni Engineering Works, S.A.; J. E. Chell, assistant to foundry manager, Humber, Limited, Coventry; W. J. Clark, magnesium moulder, Bristol Aeroplane Company; S. J. Daniel, foundry manager, J. Birch & Sons, Limited, Walsall; R. A. Dewar, analytical chemist, Carron & Company; W. H. Dickinson, moulder, Wright Boag & Company, Limited, Johannesburg; F. A. Drane, fettling foreman, Lake & Elliott, Limited, Braintree; E. Francis, iron moulder, Cocksedge & Company, Limited, Stowmarket; A. Grant, moulder, High Duty Alloys, Limited, Slough; N. W. Griffin, B.Sc.(Eng.), assistant chief metallurgist, Kent Alloys, Limited, Strood, Kent; T. A. J. Grimsted, director and secretary, Ace Aluminium & Brass Foundry (Pty.), Limited, Cape Town; J. J. Hamilton, foreman moulder, Rolls-Royce, Limited; W. G. Hawker, assistant foundry foreman, Stanton Ironworks, Limited; F. W. Herbert, chemist, Midland Motor Cylinder Company, Smethwick; D. B. Herbison, foundry metallurgist, Glenfield & Kennedy, Kilmarnock; R. C. Hislop, steel moulder, Coltness Iron Company; A. P. Houlding, moulder, Hillmann & Sons, Weston-super-Mare; W. T. Howard, works director, Homa Foundry, Limited, Birmingham; J. J. S. Hughes, chief chemist, Perry Barr Metal Company, Birmingham; A. Jackson, foreman, Garton & King, Limited, Exeter; E. C. James, foreman, Langley Alloys, Limited, Slough; W. Kay, foreman patternmaker, Davey Paxman & Company, Colchester; N. Key, moulder, High Duty Alloys, Slough; A. E. King, technical representative, Foundry Services, Limited; R. Kleinzeller, moulder, at present in Czech Forces; J. Loudon, metallurgist, Coltness Iron Company, Limited; J. A. Marshall, A.M.I.Mech.E., assistant technical engineer, Midland Motor Cylinder Company, Smethwick; F. A. Matthews, joint managing director, Homa Foundry, Limited, Birmingham; A. D. Morgan, metallurgist, Ideson Motor Cylinder Company, Limited, Birmingham; K. C. Morris, assistant works manager, Alliance Foundry Company, Luton; D. W. Murphy, foundry manager, Timmins Bros., Birmingham; W. McLaren, moulder, Air Conditioning & Engineering Company, Johannesburg; R. J. Nicholls, foreman, Gearings, Limited, Cape Town; C. A. Parlanti, technical director, United Aluminium Foundries, Limited, London; W. A. H. Parnell, metallurgical chemist, British Piston Ring Company, Coventry; T. R. Peiser, patternmaker, Hudson & Hopkins, Cape Town; J. Phillips, steel moulder, Coltness Iron Company; J. Playle, foundry draughtsman, Lake & Elliot, Limited, Braintree; W. H. Rendell, floor moulder, W. L. B. Bloodworth & Son, Stroud; A. Salam, press-tool maker, Lahore, India; A. Schuurman, moulder, H.M. Dockyard, Simonstown; F. H. Smith, metallurgist, Kent Alloys, Limited, Strood; H. S. Springett, foundry draughtsman, Lake & Elliot, Limited, Braintree; A. Stewart, foundry foreman, Baker, Perkins, Limited, Peterborough; Y. Sucu, marine engineer, Loughborough; G. Swinyard, foundry technical assistant, J. Stone & Company, London; D. R. Thomas, patternmaker, Benoni Engineering & Steel Works, Transvaal; H. Valberg, section manager, Stanton Ironworks Company, Limited; A. W. O. Webb, B.Sc., foundry technical assistant, English Electrical Company, Stafford; N. R. L. Webster, foundry foreman, G. Clancy, Limited, Cradley Heath.

## Institute Elects New Members

AS ASSOCIATE

R. H. Sharman, estimator, Wright Boag & Company, Johannesburg.

AS ASSOCIATES (STUDENT)

W. J. Bullock, metallurgical student, H.M. Dockyard, Plymouth; J. W. S. Johnstone, apprentice metallurgist, Glenfield & Kennedy, Kilmarnock.

SECOND LIST

AS SUBSCRIBING FIRM MEMBER

Baker, Perkins, Limited, Westwood Works, Peterborough (representative, G. Lewis).

AS MEMBERS

W. T. Crowley, director, D. H. Die-Casting Company, Limited, London; N. Douzinas, Comm. (E.) R.H.N.; W. S. Evans, partner, Pontardawe Foundry & Engineering Company; G. Farrow, foundry superintendent, J. Stubbs, Limited, Manchester; R. M. George, works manager, Rhondda Engine Works; H. M. Jackson, partner, Jackson Bros., Manchester; J. R. Jones, foundry manager, Baldwins, Limited, Swansea; D. Lang, chargehand, Lupton & Place, Limited, Preston; D. Smith, foundry foreman, Williams Alexander Brass Foundry, Cardiff; S. S. Smith, foundry manager, Preston & Bishop, Limited; A. L. C. Young, patternmaker, G.W.R. Factory, Swindon; G. Barrett, director, Wycliffe Foundry & Engineering Company, Limited, Lutterworth; T. J. M. Buchan, foreman, Northern Aluminium; F. D. Green, director, Glyn Engineering Works, Panteg; I. Jenkins, M.Sc., research metallurgist, Whitehead Mond Steel, Newport; R. S. Turner,* foundry manager, Aero Engines, Limited; J. L. Smith,* foundry manager, Jarrow Metal Industries, Limited.

AS ASSOCIATE MEMBERS

E. C. Ashford, moulder, Simplex Electrical Company, Limited, Birmingham; J. Baston, apprentice supervisor, Jarrow Metal Industries, Limited; E. F. Beer, moulder, W. Lodder, Sheerness; R. A. Betesta, technical assistant, Qualcast, Limited, Derby; W. Bone, chargehand, Whittaker Bros., Accrington; S. F. Bowers, patternmaker, Service Engineering, Stoke-on-Trent; F. Bowman, foreman moulder, Tubal Cain Works, Cardiff; A. W. Brace, assistant metallurgist, Bristol Aeroplane Company; H. J. Corney, company director, J. Williams & Sons, Cardiff; J. Daly, pattern moulder, Prospect Foundry, Bolton; J. Duckworth, assistant foundry foreman, T. Robinson, Limited; F. Dunn, development department staff, B.C.I.R.A.; D. Evans, foundry liaison, Ford Motor Company; W. D. Evans, foundryman, British Piston Ring, Coventry; C. E. Farley, foundry foreman, James & Company, Halesowen; A. T. Goodchild, chargehand, Stuart Turner, Limited, Henley-on-Thames; J. Hagan, foundry foreman, Harland Engine Company, Glasgow; W. J. Harper, metal patternmaker, Wm. Harper, Son & Company, Limited, Willenhall; F. L. Harrison, metallurgical assistant, Qualcast, Limited; T. G. Ireland, foundry progress manager, Newman Industries, Bristol; A. Johnson, progress clerk, Ley's Malleable, Derby; H. Lovell, iron moulder, H. Hollingdrake, Manchester; M. A. MacGavin, steel smelter, Curran Steel Company, Cardiff; T. F. N. Matthews, foundry school instructor, F. H. Lloyd & Company, Wednesbury; W. D. Mendham, assistant metallurgist, Kent Alloys, Limited, Strood; A. Ross, under-foreman, D. Bridge & Company, Rochdale; W. L. Sisson, head steel blower, Stanton Gate Foundry; A. J. L. Smith, coremaker, Langley Alloys, Limited; J. A. Walton, foundry planning engineer, G.E.C., Limited, Birmingham; A. S. Webster, foreman moulder, Stanton Gate Foundry; W. A. Whittaker, coremaker, Manlove & Aliott, Nottingham; H. B. Hanley, foundry manager, American Laundry Machinery Company; O. L. Pollack,* Major R.E.M.E.; C. Badcock,* steel moulder, Brown Lenox, Limited, Pontypridd; R. Gould,* steel moulder, Brown Lenox, Limited, Pontypridd.

AS ASSOCIATE

E. Skelton, assistant metallurgical engineer, J. Gardom & Company.

AS ASSOCIATE (STUDENT)

G. Ashford, apprentice moulder, Brown Lenox, Limited, Pontypridd.

## VACATION COURSES

The tenth annual report of the Imperial College Union Vacation Work Scheme for Students of the Imperial College of Science and Technology makes exceptionally interesting reading at the present time. In 1934 a matter of 31 students from the schools attached to the Imperial College (City and Guilds, Royal College of Science, and the Royal School of Mines) spent the vacations in industrial concerns associated with the scheme. In 1944 this figure had risen to 477. Since the scheme was inaugurated, the vacation courses have been planned methodically through industrial co-operation.

Whilst a few foundry concerns have associated themselves with the college, it would be worth the while of many others to do so, as it presents a golden opportunity to interest youth in the manufacture of castings. Details of how co-operation can be had by writing to the secretary, Mr. J. Newby, Imperial College, Prince Consort Road, South Kensington, London, S.W.7.

**The annual competition** in first aid for the industrial undertakings of Chesterfield was held recently, when first place was gained by the team from the Chesterfield Tube Company, Limited, the runners-up being Markham & Company, Limited. The winners obtained 266 points out of a possible 294 and the runners-up 242.

* Transferred.

# OIL SEALS

## PROTECTING FOUNDRY MACHINERY BEARINGS

In the case of foundry machinery such as Sand-slingers, and with contractors' plant such as concrete mixers, the problem of providing adequate protection for the bearings is vital, especially should anti-friction bearings be employed. Means have to be provided for retaining the lubricant for adequate periods, but it is equally important that sand and other abrasive material should be rigidly excluded. For a long time the foregoing was also one of the main problems confronting the designers of military tanks and similar vehicles, for without adequate protection against the ingress of sand and water to the bearings such heavy vehicles would be practically immobilised through bearing trouble long before they could get into action!

The latest and probably the most effective method of providing such bearing protection is by means of oil seals, the principle of this device being clearly shown by the sectional view in Fig. 1, which shows a standard seal from the range manufactured by Super Oil Seals & Gaskets, Limited, of Birmingham. It will be seen that in essentials the device consists of an L-shaped packing member or ring maintained in light running contact with the revolving shaft by means of a tension spring, the whole being enclosed in a metal casing which serves both to prevent the rotation of the ring with the shaft, and also makes a self-contained assembly, machined to close limits so as to be a press fit in the housing alongside the bearing which the seal is to protect.

### Variations

A variation of this seal is to be seen in Fig. 2, where the tension spring is omitted and a somewhat narrower casing thus secured, suitable for situations where space alongside the bearing is particularly restricted. Fig. 3 shows an external type of seal for such applications as hubs where the shaft is stationary.

For peripheral speeds up to 3,000 ft. per min. and for a bearing temperature not exceeding some 210 to 230 deg. F., the most suitable material for the packing member is leather, either in chrome or super tan.

(*Continued overleaf, column* 1.)

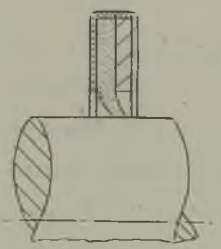

FIG. 2.—SEAL FOR NARROW SPACE.

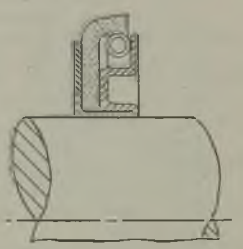

FIG. 3.—EXTERNAL TYPE FOR HUBS.

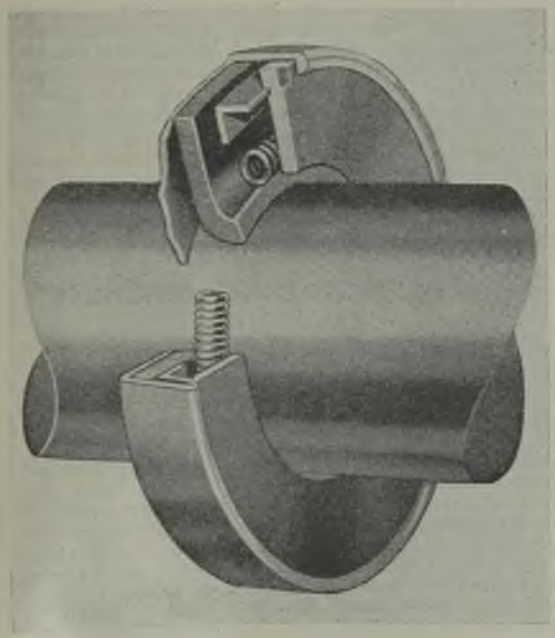

FIG. 1.—SECTION THROUGH STANDARD SEAL.

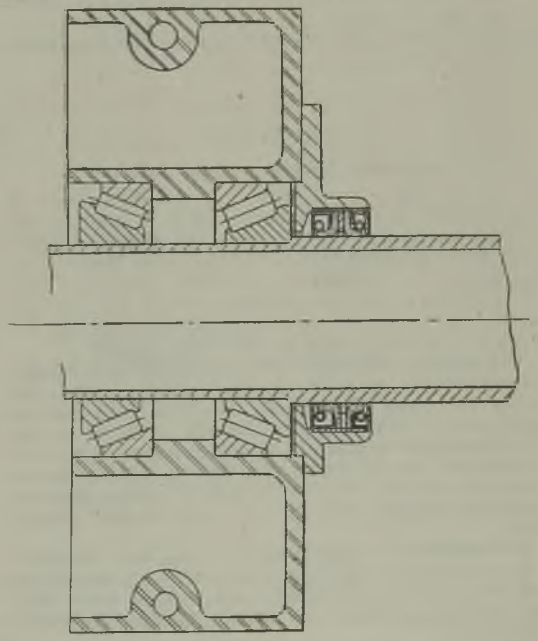

FIG. 4.—APPLICATION TO SANDSLINGER.

## NEW PATENTS

*The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each.*

564,252 Birmingham Electric Furnaces, Limited, and Robiette, A. G. E. Manufacture of malleable iron.

564,291 High Duty Alloys, Limited, and Barber, G. L. Casting.

564,305 International Combustion, Limited, and Harlow, W. F. Centrifugal pumps.

564,342 Fischer Bearings Company, Limited, and Ellis, L. M. Roller and ball bearings.

564,365 Fountain, H. J., and Clarkson Thimble Tube Boiler Company, Limited. Steam generators or water heaters.

564,402 Berk & Company, Limited, F. W., and Slacke, R. L. R. Grinding mills.

564,407 Jennings, H. W. K. (Sturtevant Company, B. F.). Centrifugal fans.

564,432 Butler, W. A. (Butler, W. J. M.). Means of forming railway rail joints.

564,463 Power Flexible Tubing Company, Limited. Internally-insulated metal tubing.

564,488 Crown Cork & Seal Company, Inc. Tin plating baths.

564,492 Superior Steel Corporation. Bi-metallic billet and method of making same.

565,258 Cannon Iron Foundries, Limited, Clayton, R. T., and Oatley, A. F. Ovens and hot chambers of gas cookers.

565,288 Crane, Limited, and Jackson, G. R. Grates for boilers.

## OIL SEALS

(*Continued from previous page.*)

For speeds higher than 3,000 ft., and temperatures up to about 300 deg. F., synthetic rubber is used for the packing member. In the case of certain foundry machinery where bearing pressures also have to be considered, it is interesting to note that such seals are regularly used for pressures up to 200 lbs. per sq. in., and there are instances of pressures of 500 lbs. being successfully sealed by the same means.

The smallest oil seal of the type described is suitable for application to shafts as small as ¼ in. dia., and at the other end of the scale they have been successfully applied to rolling mill bearings up to 42 in. dia. The main requirements in this line, however, whether foundry or general machinery, are for application to shafts below 6 in. dia., and within this range there are some 600 regular sizes in stock and current production.

Fig. 4 shows the application of a dual type of seal to a foundry Sandslinger. In this type, it will be noticed that two packing members and springs have been incorporated in the one casing, facing in opposite directions.

## RESTRICTIONS ON USE OF STEEL

Modifications of wartime restrictions involving the use of iron and steel were announced by Capt. Waterhouse, Parliamentary Secretary to the Board of Trade, at Leicester.

Perambulators can now be made with the normal amount of steel and wheels are to be of the usual pre-war sizes. Production of nickel silver spoons and forks of any design will be resumed, but of special sizes and weight and at controlled prices. Kettles, irons, water-heaters and cookers will be produced more freely. For some years wholesalers of heating apparatus have not been allowed to sell stocks held for emergency users. As from December 1 this restriction is removed. Steel furniture will be sold in the shops without restriction. The use of iron and steel for the manufacture of wringers, mangles, washing machines and carpet sweepers has been authorised. An allocation of materials for lawn mowers has been made, and manufacturers are authorised to get the parts ready for assembling.

## METAL MANUFACTURE IN INDIA

Kamani Metals & Alloys, Limited, has been formed under the Indian Companies Act. The authorised capital is Rs. 1,00,00,000 and the issued capital Rs. 40,00,000. The company will carry on the business of refining and manufacturing non-ferrous metals and alloys, including bearing metals, phosphor bronze, manganese bronze, etc., and the manufacture of sheets, strip, foils of brass, copper, lead, aluminium, phosphor bronze, etc., and wires of various non-ferrous metals. The company has acquired a factory from Kamani Metal Refinery & Metal Industries at Kurla, Bombay. Before the present war, India's requirements of non-ferrous metals were very largely met by imports, while at the same time non-ferrous metal scrap was exported to Germany, Japan, and other countries. Practically all the bearing metals for railways, etc., were imported from abroad and it is considered that there is wide scope for their manufacture in India.

## A NEW MOULDING MACHINE BULLETIN

Carrying the caption "A Guide to Machine Mouldings," the first bulletin issued by Wallwork Gears, Limited, Oceanic House, 1a, Cockspur Street, London, S.W.1, sets a standard which the publishers will perhaps find difficult to maintain. Its contents are admittedly elementary, but there is often a close association between this attribute and fundamental, and the reviewer considers that even the most experienced of foundry managers will derive benefit from studying this well produced brochure.

The subjects included in Bulletin No. 1 are Patterns and Pattern Plates; Box Pins; Moulding Boxes; Presser Head and Board, and Air Compressors. Finally a few notes are appended on the choice and management of the operators.

## BRITISH EXPORTS OF IRON AND STEEL

Figures for the exports of iron and steel and manufactures thereof from the United Kingdom during the years 1939, 1940, and 1941 are shown in the following table, which has been abstracted from returns recently issued by the Board of Trade. The corresponding figures for 1938, 1942, and 1943 were published in a separate return issued a short time ago (*see* JOURNAL for November 16, 1944).

*Total Exports of Iron and Steel and Manufactures Thereof.*

| | 1939 Tons | 1940 Tons | 1941 Tons | 1939 £ | 1940 £ | 1941 £ |
|---|---|---|---|---|---|---|
| Eire | 56,298 | 48,269 | 21,778 | 1,464,734 | 1,615,356 | 1,076,909 |
| Channel Islands | 6,723 | 1,876 | — | 201,920 | 75,547 | — |
| Palestine | 35,579 | 12,534 | 4,765 | 662,099 | 376,327 | 159,413 |
| British West Africa | 39,630 | 18,690 | 17,980 | 827,695 | 566,790 | 609,404 |
| Union of South Africa | 167,821 | 104,240 | 36,698 | 3,581,426 | 3,254,645 | 1,710,681 |
| Northern Rhodesia | 9,874 | 3,785 | 2,738 | 167,408 | 106,783 | 113,435 |
| Southern Rhodesia | 17,607 | 6,102 | 3,681 | 393,739 | 218,732 | 173.669 |
| British East Africa | 16,265 | 14,430 | 7,893 | 351,914 | 411,326 | 305,476 |
| Anglo-Egyptian Sudan | 11,415 | 5,954 | 2,611 | 226,087 | 149,407 | 91,926 |
| British India | 141,750 | 94,572 | 41,825 | 2,625,870 | 2,676,749 | 1,869,996 |
| Burma | 25,978 | 16,139 | 7,238 | 468,342 | 400,008 | 263,566 |
| British Malaya | 41,927 | 34,439 | 18,847 | 923,241 | 941,414 | 689,890 |
| Ceylon | 19,386 | 13,572 | 4,527 | 392,847 | 338,784 | 186,936 |
| Hong Kong | 17,593 | 14,490 | 12,560 | 282,760 | 338,246 | 303,432 |
| Australia | 101,006 | 157,872 | 67,713 | 2,672,098 | 4,887,601 | 2,637,609 |
| New Zealand | 73,146 | 57,083 | 25,607 | 1,654,448 | 1,730,480 | 965,057 |
| Canada | 87,669 | 67,869 | 15,303 | 2,182,859 | 2,247,759 | 1,151.058 |
| British West India Islands | 35,642 | 30,019 | 10,817 | 737,597 | 796,463 | 368,009 |
| Other British Countries | 17,649 | 12,298 | 3,548 | 406,518 | 356,693 | 138,925 |
| Dutch East Indies | 30,308 | 27,633 | 20,930 | 678,245 | 769,894 | 652,848 |
| Dutch West India Islands | 1,333 | 1,653 | 1,148 | 29,367 | 49,430 | 39,719 |
| Portuguese East Africa | 7,935 | 2,030 | 850 | 163,072 | 60,214 | 33,370 |
| Egypt | 48,496 | 31,254 | 9,904 | 749,398 | 602,826 | 334,197 |
| Iraq | 8,042 | 8,390 | 16,727 | 193,237 | 246,306 | 562,129 |
| Iran | 58,205 | 25,386 | 8,784 | 1,230,378 | 607,272 | 294,639 |
| United States of America | 1,888 | 1,825 | 13,162 | 89,693 | 102,613 | 318,594 |
| Chile | 6,409 | 5,564 | 771 | 145,556 | 162,541 | 33,080 |
| Brazil | 13,451 | 7,623 | 2,955 | 289,320 | 238,428 | 121,228 |
| Uruguay | 7,842 | 11.951 | 3,213 | 165,349 | 341,065 | 107,986 |
| Argentine Republic | 118,714 | 67,448 | 57,560 | 2,446,597 | 1,905,252 | 1,964,423 |
| Enemy and Occupied Europe | 243,592 | 94,121 | 3,706 | 3,883,198 | 2,171,722 | 127,860 |
| Japan | 686 | 370 | — | 41,510 | 15,339 | 10 |
| Iceland | 698 | 1,058 | 3,472 | 14,866 | 44,250 | 160,373 |
| Other Foreign Countries | 111,775 | 76,457 | 38,187 | 2,488.217 | 2.230,681 | 1,360,670 |
| Total | 1,582,332 | 1,076,996 | 487,498 | 32,831,605 | 31,036,943 | 18,926 517 |

**The Minister of Labour,** after considering differences between the Shipbuilding Employers' Federation and the United Society of Boilermakers and Iron and Steel Shipbuilders over the introduction of flame-planing machines at a shipbuilding yard, has appointed Sir John Forster to hold an inquiry and to report on the arrangements for manning the machines during the war.

## NEWS IN BRIEF

THE WROUGHT LIGHT ALLOYS DEVELOPMENT ASSOCIATION has put forward to the Government proposals for building the Portal house in aluminium.

AN EXTRAORDINARY GENERAL MEETING of Richard Thomas & Company, Limited, is to be held at Grosvenor House, London, W.1, on December 29, to consider resolutions approving the provisional heads of agreement for amalgamation entered into between the company and Baldwins, Limited, and increasing the capital by £3,000,000.

THE FIRST LORD OF THE ADMIRALTY and the Minister of War Transport, Mr. Alexander and Lord Leathers, have appointed a committee to advise them in the transitional period from war to peace economies on all matters concerning priorities for building as between different types of merchant vessels and the allocation of shipbuilding facilities between British, Allied and neutral shipowners.

MR. A. CALLIGHAN, general secretary of the National Union of Blastfurnacemen, addressing Middlesbrough Rotary Club, said that Tees-side, by virtue of its history, had a prior claim to the establishment of the most up-to-date and efficient iron and steel production units in the country. His union would not seek to hinder the modernisation of the industry if the workpeople displaced by such a policy received consideration from the industry as a whole. They had a record of which the union was proud—no strike or unofficial stoppage of any kind had occurred in the industry during the war.

MR. E. C. GORDON ENGLAND, chairman of the Engineering Industries Association, in an address to members of the Yorkshire Region of the Association, at Leeds, said that widespread unemployment would occur after the war if the Government continued to pursue their erroneous theory that the problems of peace and war were divisible. The Association wanted from the Government full information of its plans for industry now. To meet transitional costs, the average engineering firm would need cash to the extent of 65 per cent. of its issued capital; but, as yet, there was no gesture on the part of any spokesman to show that the Government had the slightest appreciation of that fact.

THE NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS, Tavistock House, North Tavistock Square, London, W.C.1, have issued a small booklet entitled "Dust Diseases." It refers briefly to those industries where workers encounter dust, to the advantages of good ventilation, and to personal protection by means of overalls, protective gloves, etc., with some notes on dust sampling, tuberculosis and dust disease, and to the subjects of compensation, medical examinations and decisions. The booklet, it is stated, can only give broad indications for the traveller in the difficult country of dust diseases, but it may provide the basis for more ambitious journeys. The cover of the booklet bears outlines of crystals representing particles of silica dust, magnified some 500 times.

## PERSONAL

MR. R. HILLS has been appointed secretary of Ambrose Shardlow & Company, Limited, of Sheffield.

LORD FALMOUTH has been elected by the governing body of the Imperial College of Science and Technology to an honorary Fellowship of the college.

MR. R. LLOYD ROBERTS has been released from his appointment as Under-Secretary in the Ministry of Labour and National Service, at the request of the board of Imperial Chemical Industries, Limited.

MR. F. A. MELMOTH, managing director of the Detroit Steel Castings Company, is on a short visit to this country. He can be communicated with c/o Mr. H. P. R. Scot, Deputy Director for Steel Castings, Iron and Steel Control, Ministry of Supply, Ashorne Hill, Leamington Spa.

MR. NORMAN CLARK has been appointed to the boards of Darwins, Limited, Andrews, Toledo, Limited, and the Wardsend Steel Company, Limited. Mr. Clark is general manager of the Darwins-Toledo group of companies, and was formerly general manager of Reynolds Rolling Mills, Limited.

MR. W. F. HIGGINS, secretary of the National Physical Laboratory, has been appointed superintendent of the physics division, in which capacity he had been acting since the death in 1941 of the late Dr. G. W. C. Kaye. He is succeeded as secretary by MR. E. S. HISCOCKS. MR. G. A. HAWKINS has been promoted superintendent of the engineering division.

## OBITUARY

MR. J. H. FARTHING, a director of the General Electric Company, Limited, died on December 10, aged 67.

MR. J. H. GUNTER, who was for 25 years works manager for Dorman, Long & Company, Limited, has died at the age of 90. He served on the Middlesbrough Town Council from 1899 to 1902.

MR. ALEXANDER PATERSON COCKBURN died in a Glasgow hospital on December 7, in his 76th year. He was the younger son of the late Mr. George Cockburn, one of the founders of Cockburns, Limited, Cardonald. In 1908, Mr. Cockburn left Cardonald to found the firm of A. Cockburn & Company, valve makers, of Dennistoun, Glasgow. He retired some time ago.

## CONTROL OF BOLTS AND NUTS

The Minister of Supply has made the Control of Bolts, Nuts, Screws, Washers and Rivets (No. 6) Order, 1944, which came into force on December 12. The Order increases the maximum price of wrought-iron rivets and of small steel rivets, and cancels the maximum prices of gimlet-pointed square-head coach screws.

Copies of the Order may be obtained from H.M. Stationery Office, or through any bookseller, price 1d. (S.R. & O., 1944, No. 1347).

## COMPANY RESULTS

*(Figures for previous year in brackets.)*

**Wellman Smith Owen Engineering**—Interim dividend of 5% (same).

**Aeroplane & Motor Aluminium Castings**—Interim dividend of 5% (10%).

**Johnson, Matthey & Company**—Interim dividend on the ordinary shares of 3% (same).

**S.G.B. (Dudley)**—Net profit for the year ended June 30, £18,589 (£17,314); ordinary dividend of 8% (5%); forward, £13,459 (£5,369).

**Alliance Aluminium Holdings**—Net profit, after tax and N.D.C., £16,155 (£19,666), increasing the credit balance brought in from £56,186 to £72,341.

**Masson Scott**—Net profit to March 31 last, £3,273 (£6,179); dividend of 5% (same, plus bonus of 5% in lieu of dividend to March 31, 1942); forward, £4,097 (£4.037).

**Hepworth & Grandage**—Net trading profit and investment income to September 30, £82,101 (£74,250); tax, £29,488 (£20,871); war damage, £1,691 (£2,858); dividend of 12½% (same); to reserve, £20,000 (same); forward, £18,244 (£14,246).

**Wolverhampton Die-Casting Company**—Net trading profit for the year ended June 30, 1944, £29,319 (£36,769); depreciation, £7,239; reserve for income-tax, £11,397 (£17,340); net profit, £10,683 (£11,602); dividend of 12½% (same); forward, £26,437 (£20,649).

**Brown Bayley's Steel Works**—Profit for the year to July 31 last, after depreciation, taxation, etc., £136,077 (£104,277); ordinary dividend of 13%, tax free (same); to general reserve, £50,000 (same); to obsolescence reserve, £20,000 (nil); forward, £34,258 (£32,181).

**Imperial Smelting Corporation**—Dividends from subsidiaries and other income, £280,934 (£300,338); provision for group E.P.T., £32,500 (£51,000); directors' remuneration and fees, £11,678 (£11,298); income-tax on dividends, less tax recoverable, £117,232 (£118,873); net profit, £119,524 (£119,167); ordinary dividend of 4% (same); forward, £54,244 (£53,721).

**Kendall & Gent**—Profit on trading during the year to September 30, including investment income, after charging management and other expenses, fees and war damage contribution, £40,842; depreciation, £7,036; net profit, £33,806 (£28,248); final dividend of 10% and bonus of 5%, making 20% (same); tax, £12,500; special depreciation, £5,000; forward, £19,748 (£14,441).

**Atlas Steel Foundry & Engineering Company**—Profit, including investment income, for the year ended September 30, after providing for taxation and contingencies, £29,576 (£34,064); depreciation, £2,423; interim dividend of 3s. per share, less tax, £8,437; final dividend of 3s. 6d. per share and bonus of 2s. per share, less tax, £15,469; forward, £10,002 (£6,755).

**William Asquith**—Trading from August 13, 1943, to August 17, 1944, including £3,120 of previous provisions now released, £95,939 (£118,389); net profit, £71,123 (£97,498), after £13,710 (£15,159) for depreciation, and £6,100 (nil) for deferred repairs; tax, £50,000 (£75,000); ordinary dividend of 5% (same); to general reserve, £10,000 (same); forward, £27,490 (£26,196).

**Walter Somers**—Trading profit to March 31 last, after making provision for taxation, £39,051; debenture interest, £4,300; depreciation, £16,092; net profit, £18,406 (£18,238); dividend on the 6½% employees' cumulative preference shares, £143; dividend of 1s. per share, less tax (same), £8,750; to deferred repairs and contingencies reserve, £10,000; forward, £36,853 (£37,341).

**Heenan & Froude**—Trading profit for the year ended August 31, 1944, £55,990 (£48,886); dividends from subsidiaries, £2,081; to staff superannuation fund contribution, £5,161 (£3,596); interest and charges, £3,741; net profit, £47,368 (£42,487); taxation, £22,000 (£17,000); final dividend of 5% and a bonus of 5%, making 15% (same); to general reserve, £625 (£5,000); forward, £10,472.

**Wm. Doxford & Sons**—Profit for the year to June 30, 1944, after taxation and deferred repairs, £239,157 (£212,699 after taxation); net profit, £173,323 (£164,005), after fees, A.R.P., war damage insurance, and £50,000 (£30,000) for depreciation to general reserve, £50,000 (£25,000); to reserve for contingencies, £30,000 (£20,000); participating dividend on the preference shares of 1% (same); ordinary dividend of 15% (same); forward, £52,015 (£48,691).

## COKE RESEARCH

The British Coke Research Association, which was formed in June, held its first meeting at Leeds University. Representatives from the Midlands, North and Scottish areas attended. Mr. R. Alsop, chairman of the Association, stated that it was the plan of the organisation to develop research work and pass on the results to the whole of the Ministry. Sir Harold Hartley, of the Fuel Research Board, said he was impressed with the advantages which should accrue to the coke-oven industry from the Association's work. Sir H. Houldsworth, Controller-General of the Ministry of Fuel and Power, referred to Britain's need to restore its export trade after the war, and said that there must be a complete mobilisation of science, pure and applied, if we were to achieve that great duty.

## INGOTTING NON-FERROUS METALS

The Non-ferrous Metals Control has decided that licences will now be granted for the acquisition of non-ferrous materials for melting into secondary ingots and/or billets for stock. All such applications must be accompanied by an undertaking from the applicant, or, if the ingots and/or billets are required to be held by the applicants' customer for his stock, then by that customer, that he will not sell or further process the ingots and/or billets until the Control's approval has been first obtained.

NOTICE IS GIVEN of the release as from November 27 of the liquidator of United Silica Industries, Limited, Amman Yard, Brynamman, Glamorgan.

## *Raw Material Markets*

### IRON AND STEEL

No branch of industry is exempt from the obligation to exercise the most rigid economy in the use of fuel, and although lack of coke has not as yet retarded foundry operations, those establishments which rely on weekly deliveries may encounter difficulties arising from short supplies. Pig-iron production is maintained on an even keel. Relatively small tonnages remain to be delivered under licences for the current quarter, and some of the light foundries are now negotiating for supplies of high-phosphorus iron for January and February delivery. Both for light castings and for general engineering work a rather better position is developing. The output of low-phosphorus iron and also of refined iron, which is extensively used in place of hematite, is fully absorbed. Demand for the heavier grades of scrap is increasing, but the lighter varieties attract little attention at the moment.

Producers of finished iron are still hoping for an acceleration of orders from the shipyards, but as yet this improvement has not materialised. From other sources there is, however, a fairly steady demand for common iron bars, and forward bookings are not unsatisfactory.

Good tonnages of semi-finished steel are also on order, but the re-rollers report the suspension or cancellation of a not inconsiderable volume of orders, which may exercise an adverse influence on production in the near future unless replacements come along. The outstanding feature of the steel trade is the mounting demand for sheets. Light gauges are very extensively specified, and orders already in hand ensure maximum employment for the mills over the next three months.

There is still only a very limited market for heavy sections, and rollers are in a position to offer prompt deliveries. The plate mills, too, could handle a much bigger volume of orders than has recently been placed, though the thinner gauges are in fairly brisk demand. There is a noticeable lack of interest in heavy plates, and the steady demand from locomotive and wagon works, power plant producers and others fails to compensate for the lessened requirements of the shipyards.

### NON-FERROUS METALS

Supplies of the non-ferrous metals, with the exception of tin, continue to come forward satisfactorily, and in spite of the slight increase in certain branches of war production, there is still a tendency for the demand to fall away. The stocks now held in this country are probably the largest they have been since the war began. During the war the production of copper and other metals in Rhodesia, Canada and the Belgian Congo has been considerably increased, and if this rate of output were to continue, a large surplus would be on hand during the next year. Negotiations with these producers are still taking place as to the disposal of the 1945 production, but the outcome is not yet definitely known. It is certain that the United States does not require any additional supplies of copper or zinc. There may, however, shortly be a market for these products on the Continent of Europe.

The Non-Ferrous Metals Control has given notice of the cancellation of all previous offers to purchase brass skimmings and will not accept any deliveries of these materials despatched after December 31, 1944.

There have been no fresh developments in regard to the consumption of lead in this country. In the United States, stocks of lead at refineries and smelters were stated by the American Bureau of Metal Statistics to be 129,497 short tons at the end of September.

There is now no shortage of light metals in this country. Releases of aluminium and its alloys for civilian purposes are gradually taking place. As in many other cases, however, the shortage of labour presents a serious problem. This now seems to be the deciding factor in the question of civilian production, rather than the supplies of material actually available for the work. Licences have been granted to 21 firms for the manufacture of aluminium hollow-ware, of which there is a pronounced scarcity throughout the country. It was announced some time ago that aluminium and magnesium were to be released for civilian production and to build up stocks against the time when more machine tools, space and labour will be available for peacetime purposes.

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MR. V. R. HUNT, who joined the Carborundum Company, Limited, in 1907, has died at the age of 58. He was one of the small band of pioneers who was employed by the company in London, prior to the building of the works at Trafford Park, Manchester.

# CURRENT PRICES OF IRON, STEEL AND NON-FERROUS METALS

*(Delivered, unless otherwise stated)*

Wednesday, December 20, 1944

## PIG-IRON

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

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

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

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

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

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

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

**Cold Blast.**—South Staffs, 227s. 6d.

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

## FERRO-ALLOYS

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

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

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

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

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

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

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

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

**Cobalt.**—98/99 per cent., 8s. 9d. lb.

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

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

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

## SEMI-FINISHED STEEL

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

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

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

## FINISHED STEEL

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

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

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

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

## NON-FERROUS METALS

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

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

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

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

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

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

**Brass.**—Solid-drawn tubes, 14d. per lb.; brazed tubes, 16s.; rods, drawn, 11⅜d.; rods, extruded or rolled, 9d.; sheets to 10 w.g., 11⅛d.; wire, 10⅞d.; rolled metal, 10½d.; yellow metal rods, 9d.

**Copper Tubes, etc.**—Solid-drawn tubes, 15¼d. per lb.; brazed tubes, 15¼d.; wire, 10d.

**Phosphor Bronze.**—Strip, 14½d. per lb.; sheets to 10 w.g., 15¼d.; wire, 16½d.; rods, 16½d.; tubes, 21½d.; castings, 20d., delivery 3 cwt. free. 10 per cent. phos. cop. £35 above B.S.; 15 per cent. phos. cop. £43 above B.S.; phosphor tin (5 per cent.) £40 above price of English ingots. (C. CLIFFORD & SON, LIMITED.)

**Nickel Silver, etc.**—Ingots for raising, 10d. to 1s. 4d. per lb.; rolled to 9 in. wide, 1s. 4d. to 1s. 10d.; to 12 in. wide, 1s. 4¼d. to 1s. 10¼d.; to 15 in. wide, 1s. 4½d. to 1s. 10½d.; to 18 in. wide, 1s. 5d. to 1s. 11d.; to 21 in. wide, 1s. 5¼d. to 1s. 11½d.; to 25 in. wide, 1s. 6d. to 2s. Ingots for spoons and forks, 10d. to 1s. 6½d. Ingots rolled to spoon size, 1s. 1d. to 1s. 9½d. Wire, round, to 10g., 1s. 7½d. to 2s. 2½d., with extras according to gauge. Special 5ths quality turning rods in straight lengths, 1s. 6¼d. upwards.

## NON-FERROUS SCRAP

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

**Returned Process Scrap.**—(Issued by the N.F.M.C. as the basis of settlement for returned process scrap, week ended Dec. 16, where buyer and seller have not mutually agreed a price; net, per ton, ex-sellers' works, suitably packed):—

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

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

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

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

## IRON AND STEEL SCRAP

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

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

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

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

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

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

## SITUATIONS

DIECASTING PRODUCTION SUPERINTENDENT wanted by firm of Electrical Engineers in East Anglia. Practical and technical experience of gravity and pressure casting in non-ferrous alloys essential, together with experience of die-design and shop organisation. Salary approximately £400 per annum.

Applications in writing (no interviews), stating date of birth, full details of qualifications and experience (including a list in chronological order of posts held), and quoting reference No. 276, should be addressed to the MINISTRY OF LABOUR AND NATIONAL SERVICE, Appointments Office, 31, St. John's Street, Colchester.

OVERSEAS MARKET.

The Indian Iron & Steel Co., Ltd., require the services of a FOUNDRY MANAGER, with experience in the production of medium and heavy grey iron castings. Experience in the production of vertical cast pipes would be an advantage. The successful applicant would be given a 4 years' contract, with a minimum salary of 1,100 Rupees per month (£82), with free passages, medical attention, unfurnished quarters, and Provident Fund.

Applications in writing (no interviews), stating date of birth, full details of qualifications and experience, including present employment; also Identity and National Service or other registration particulars, and quoting reference No. O.S. 481, should be addressed to the MINISTRY OF LABOUR AND NATIONAL SERVICE, Appointments Department, Sardinia Street, Kingsway, London, W.C.2.

PRACTICAL Foundry Foreman or Superintendent required for firm of Engineers producing own grey iron castings up to 2 tons maximum; 40 to 50 tons per week; good prospects with post-war work; write, stating age, experience, and salary required.—Box 810, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

REQUIRED, immediately, Technical Sales Representative for Light Alloy Foundry; experience of trade necessary, with preferably some knowledge of metals.—Write, detailing experience and salary required, to Box 820, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

REPRESENTATIVE, now calling on Foundries regularly, is wanted by a well-known manufacturing firm of high grade Core Oils and Compounds, Parting Powders, Iron Cement, Fluxes and Allied Foundry Items; liberal commission basis; please advise territories covered, lines now handled, experience with foundry items, etc.—Box 818, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

EDITORIAL ASSISTANT (male or female), with knowledge of metallurgy, required.—State age, experience, salary required, etc., to THE IRON AND STEEL INSTITUTE, 4, Grosvenor Gardens, London, S.W.1.

## PARTNERSHIP

FOUNDRY ENGINEER, with 20 years' successful experience in jobbing foundry Management (hand and machine moulding up to 10 tons; mixed labour), desires Investment and active Partnership in progressively-minded Foundry concern, with good E.P.T. standard.—Box 812, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

## MACHINERY

WANTED.—Cupolette or small Cupola, Cupola Hoist, Hand Squeeze Moulding Machines, Electric Grinder, Foundry Riddle; advise surplus plant.—Box 814, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

MISCELLANEOUS.

**Standard Size Adaptable Moulding Machines, etc.**
**"Ajax" No. 9 Macdonald Pneumatic Jolter turnover table, 36 in. by 46 in.**
**Coal and Coke Crusher; 2 ft. 6 in. dia.**
**Brearley Type Sand Disintegrator.**
**Macnab 5 ft. 6 in. Sand Mills, Size No. 2, with or without 3/50/400 v. motor.**
**Broadbent Brick Crusher; 8 in. jaw.**
**Broadbent Brick Crusher; 11 in. jaw.**
**Sandblasting Plant; 50 Air Compressors;**
**500 Electric Motors, Dynamos, etc.**

S. C. BILSBY,
CROSSWELLS ROAD, LANGLEY,
NR. BIRMINGHAM.
Broadwell 1359.

AIR COMPRESSORS.

1,200 cub. ft., vertical, 4-cylinder, BROOM & WADE; water cooled, 80 lbs. pressure; driven by 200 h.p. Crompton Parkinson motor, 3,300 volts, 3-phase, 50 cycles, 720 r.p.m.; with Starter, Auto unloader.

500 cub. ft., ROBEY, vertical, twin cylinder; two stage, water cooled, 100 lbs. pressure; driven by 100 h.p. Bruce Peebles motor, 400 volts, 3-phase, 50 cycles; with Starter, Auto unloader, Intercooler. Pump and Receiver.

300 cub. ft., HOLLAND/SLM; rotary, water cooled, two stage; 150 lbs. pressure; complete with Auto unloader, Intercooler, extended Bedplate and Receiver.

175 cub. ft. ditto machine and accessories.

175 cub. ft., TILGHMAN, vertical, single cylinder; water cooled, two stage, 100 lbs. pressure; Auto unloader, Receiver, Intercooler; belt drive.

130 cub. ft. BRACKET; vertical, twin cylinder; water cooled, 100 lbs. pressure; Auto unloader, Receiver; gear driven from 3 h.p. motor, 400 volts, 3-phase, 50 cycles, with Starter.

100 cub. ft., BROOM & WADE, vertical, single cylinder; water cooled, 100 lbs. pressure; Auto unloader, Receiver; belt drive.

80 cub. ft., TILGHMAN, vertical, single cylinder; water cooled, 100 lbs. pressure; Auto unloader, Receiver; belt drive.

50 cub. ft., AEROGRAPH, vertical, twin cylinder; water cooled, 100 lbs. pressure; Auto unloader, Receiver; belt drive.

45 cub. ft., vertical, single cylinder; air cooled, 200 lbs. pressure; belt drive.

7 cub. ft., vertical, single cylinder; air cooled, 200 lbs. pressure; Receiver; driven by 3 h.p. Crompton Parkinson motor, 400/440 volts, 3-phase, 50 cycles.

LOW PRESSURE COMPRESSORS.

750 cub. ft., REAVELL, horizontal, single cylinder; water cooled, 20 lbs. pressure; belt drive.

260 cub. ft., INGERSOLL-RAND, horizontal, single cylinder; water cooled, 35 lbs. pressure; belt drive.

175 cub. ft., HOLLAND/SLM; rotary; water cooled, 60 lbs. pressure; new 1941; complete with Auto unloader, Receiver; extended Bedplate for motor.

12 in. by 18 in., REAVELL, rolling drum Compressor; 900 cub. ft., at 3 lbs. pressure; 670 cub. ft. at 15 lbs. pressure; extended Bedplate for motor.

NEWMAN INDUSTRIES, LTD.,
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**THOS. W. WARD LTD.**

LANCASHIRE BOILER; 30 ft. by 8 ft. by 120 lbs. w.p.

COCHRAN MULTI-TUBULAR BOILER; 11 ft. 3 in. by 5 ft. by 100 lbs. w.p.

VERTICAL MULTI-TUBULAR BOILER; 4 ft. by 1 ft. 8 in. by 80 lbs. w.p.

VERTICAL CROSS-TUBE BOILER; 7 ft. 6 in. by 3 ft. 2 in. by 80 lbs. w.p.

VERTICAL CROSS-TUBE BOILER; 10 ft. 6 in. by 4 ft. 3 in. by 80 lbs. w.p.

VERTICAL CROSS-TUBE BOILER; 7 ft. by 2 ft. 9 in. by 80 lbs. w.p.

PORTABLE BOILER and ENGINE; 30 b.h.p.; 120 lbs. w.p.

NEW PRESSED STEEL SECTIONAL STORAGE TANKS; plates 4 ft. square.

Large and Varied Stock good Second-hand Rolled Steel Joists, Angles, Channels, Roof Principals, etc.

LOW PRICES. QUICK DELIVERY.

ALBION WORKS, SHEFFIELD.
'Grams: "Forward." 'Phone: 26311 (15 lines).

FOR SALE.—Shot-Blasting Cabinet; reconditioned; interior 4 ft. 11 in. by 3 ft. by 2 ft. 9 in. deep; door opening 3 ft. 2 in. by 2 ft. 11 in.; suitable for 100 lbs. pressure; approx. shot capacity, 1 cwt.—COMMERCIAL STRUCTURES, LTD., Staffa Road, Leyton, London, E.10.

## BUSINESS FOR SALE

IRON and BRASS FOUNDRY Business; established 1894; Glos.; stone and brick buildings; 3,000 sq. ft.; cranes and machinery; castings up to 5½ tons; price £4,750.—Full particulars from HENRY BUTCHER & Co., 73, Chancery Lane, London, W.C.2. Telephone No.: Holborn 8411 (5 lines).

## MISCELLANEOUS

CONSIDERABLE tonnage Nickel Catalyst Residues for disposal in Manchester area; sample on request; metal content approx. 10 per cent.—Offers to Box 806, FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

HIGH-CLASS MALLEABLE FOUNDERS of repute have immediate capacity available for repetition Light Castings in Malleable Iron, Grey and High-duty Iron, Brass, Bronze and Aluminium Alloys; also certain Machining capacity available.—Box 816. FOUNDRY TRADE JOURNAL, 3, Amersham Road, High Wycombe.

**'Phone: 22877 SLOUGH**
**NEW SHOT BLAST CABINET PLANTS with motor driven Exhaust Fans, complete, all sizes; air compressors to suit in stock, also motors if required.**
**Britannia large size plain jolt and pattern draw moulding machine, 8 in. dia. cylinder, table 4 ft. x 3 ft. reconditioned.**
**Genuine Morgan lip axis 600 lbs. capacity furnace.**
**Pneulec swing frame Grinder, motorised, as new.**
**Jackman taper roll Sand Mill, reconditioned.**
**Several good Foundry Ladles 1 ton to 10 tons capacity.**

**Alex. Hammond,** Foundry Machinery Merchant.
**14 AUSTRALIA Rd. SLOUGH**
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