

of presenting in this paper, forty-six sets or 273 separate analyses, from leading laboratories in the different iron working sections of this country and one from Canada. The samples the writer selected for the drillings lie before you on the table. Here are three pieces of pig about nine inches long, having 7-inch holes drilled about 2½ inches deep from the face down, and as close as they could be obtained. The drillings from these samples of foundry, Bessemer and charcoal pigs respectively, were kept separate and those for each pig thoroughly mixed, so as to ensure that all samples sent out were exactly alike, as far as it was possible to get them by the use of pig metal. Pig iron was selected in place of making any special castings, so as to test particularly the ordinary practice followed at blast furnaces, in taking drillings from pig metal.

The writer's thanks are tendered to the various firms and chemists mentioned in Table 4, for so kindly furnishing the analyses seen in Tables 1, 2, and 3. It has taken no small expenditure of time and money to obtain these analyses, and it is to be hoped that the end sought by this paper will lead all the contributors to feel that their labors have been devoted to a good cause.

Considering that drillings were taken from pig metal, which are not as good for checking purposes as those taken from a clean, especially prepared and solid casting, and that there is no uniformity of method in analyses at the present time, the close results seen in Tables 1, 2, and 3, are very creditable to the various chemists and demonstrate that great care was exercised by all. In justice to the donors of these analyses it is to be said that the analyses given by the respective firms and chemists may not represent half of their work, as checks were run on the analyses reported to make sure no error had been made. To illustrate what is meant by "checks" the last two analyses of each table are cited, which are Dr. Moldonko's checkings. This is, of course, more exacting practice than is generally carried on in the daily routine work of furnace laboratories. For this reason, a much greater variation in the analyses of pig iron, as it leaves the furnace yard for the foundry, may be expected than is shown by Tables 1, 2, and 3.

The first suggestion that will come to the practical furnaceman and founder in studying Tables 1, 2, and 3 (which are arranged according to the variations in the silicon), is whether the variations found in the analyses of the respective pig metals are sufficient to have any serious effect on their comparative value, when applied to making mixtures of iron. To aid in seeing clearly what are the greatest variations to be found in the analyses shown, attention is called to the last line of each table. In Table 1, there is an actual difference of .27 for silicon, .0155 for sulphur, .114 for phosphorus, .23 for manganese and 1.09 for the total carbon. Table 2 shows a variation of .32 for silicon, .018 for sulphur, .031 for phosphorus, .36 for manganese and 1.01 for total carbon. Table 3 shows .21 for silicon, .020 for sulphur, .067 for phosphorus, .22 for manganese and .30 for total carbon. When such a difference is to be found in analyzing pig metal where the greatest care and skill has been exercised, as exhibited in Tables 1, 2, 3, what are the chances to be run in accepting analyses made by the different rapid methods in the rush of every day furnace practice? Here we have, with the best of care and skill, a variation in the ingredients, mainly due to a lack of uniformity in

laboratory methods and of a standard for analyses sufficient to affect two-thirds of all the castings made, causing them to be either bad, or ill-suited for the use for which they were intended.

Is it not time that furnacemen and foundrymen were awakening to the necessity of co-operating to secure greater uniformity in the methods of making chemical analyses and in establishing a central standardizing agency?

The writer holds a description of several of the methods used for obtaining the analyses shown in the tables and chemists who have seen them could outline their reasons for giving different results. As the writer is not a chemist he does not assume to discuss anything regarding their work. Some good work is now being done in this line by a committee headed by the eminent Dr. C. B. Dudley. It is to be hoped that the near future may see such a co-operative agency as that referred to, so that it may be patronized by all chemists employed in the manufacture or use of cast iron.

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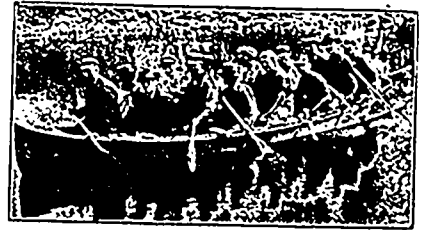
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