hand, only a portion of the necessary money is to be had at once and it is desired to start manufacturing in a small way at first, then the procedure will be somewhat different.

If at all practicable, it will be best to arrange so that the actual work of manufacturing will begin in the spring or early summer. It will be easier to hold a new organization together during the summer and get them in working order than it will be in the winter. Construction should be started in the early fall so that the water service sewers, tracks and all foundations for buildings may be finished, and the power house and template shop closed in, before cold weather stops the outside work. During the winter the electrical equipment and the compressed air plant can be installed and the template shop fitted up for work. The structural steel for the main building can be erected and the orders placed for the rest of the machinery for delivery in early spring. Orders for raw material should also be put in so that it may be on hand when the time comes to start work.

As soon as the weather permits, the foundations for the machinery may be built and the main building completed. Then, as fast as the machines arrive they may be set up and made ready for operation. In the meantime the template shop has prepared templates and the raw material has been marked for punching; thus gradually the different departments are organized. By the end of May or even earlier, shipments of finished material are being made.

If the above plan of construction is followed, it will be necessary to have another company fabricate the steelwork for the power house and the main building. Or, if desired, only one aisle of the main building may be thus arranged for and the rest of the steel work, including crane, runways and bridges, can be manufactured at a reasonable cost on the spot. This, however, would mean some delay in the completion of the buildings.

THE INFLUENCE OF SILICON ON THE CORROSION OF CAST IRON.*

***By J. Newton Friend and C. W. Marshall (Worcester).**

Owing to its relatively low melting point, the ease with which objects may be cast from it, and their extreme hardness when completed, cast iron is now being used for commercial purposes in ever-increasing quantities. It is eminently desirable, therefore, in view of the serious nature of the corroding influences to which articles are exposed, to determine what the influence of varying constituents may be on the corrodibility of cast iron, and to learn what particular compositions offer the maximum resistance to corrosion.

Hitherto but little work has been done in this connection, which affords a wide field for research, inasmuch as the chemical composition of cast iron and the physical conditions at the time of experiment, admit of enormous variation. The problems are in consequence proportionately complicated, and a vast amount of work remains to be done before generalizations of any real value can be made. In the present paper the authors give the results of a study of the influence of silicon upon the corrodibility of cast iron.

For many years chemists have recognized that the presence of alloyed silicon tends to retard the corrosion of iron. Thus Mallet† more than seventy years ago was aware that cast iron rich in silicon is less readily attacked by acids, and Jouve‡ has recently proved that alloys of silicon and iron containing 20 per cent. of the former element are remarkably resistant to acid attack. But alloys such as these are not cast iron, and their utility is greatly restricted by the difficulty of working them on account of the peculiar properties imparted to them by the silicon.

The authors have therefore confined their attention to the influence of corrodibility exerted by a silicon content varying from 1.24 to 2.28 per cent. They would gladly have extended this series had it been possible, but the advantage of studying this particular range is twofold:—(1) It covers many of the various silicon contents usually met with in commercial cast irons and the results are not therefore of purely scientific interest. (2) The silicon is never so great as to interfere with the nature of the carbon content.

The latter is a most important point, and one to which we hope it may be possible to give further attention at a later date. As is well known, the presence of silicon tends to throw out the carbon as graphite, thereby rendering the metal porous and more liable to corrosion. Consequently, unless particular care be taken to keep the carbon in the same condition, both physically and chemically, the influence of the silicon per se upon the corrodibility of the metal must be affected by the proportion of graphitic carbon, and the results rendered misleading. The various cast irons used in this research were especially prepared for the authors by Messrs. Green and Company, of Wakefield, and they have pleasure in acknowledging their indebtedness to the manager, Mr. W. B. Greener, for his kindness. The irons were cut into blocks measuring 4.8 x 1.1 x 1.5 cubic centimetres, and, after rubbing with emery paper, were tested in this form. The authors wish also to thank Mr. A. E. Page, chemist to Messrs. Green and Company, for kindly analysing the metals for them. The results of these analyses were as in Table I.:—

TABLE I.

Percentage of Composition.

Cast iron No.	Silicon.	Graphite.	Combined carbon.	Manganese.	Sulphur.	Phosphorus.
1 . . .	1.24	2.70	0.65	0.63	0.096	0.99
2 . . .	1.29	2.65	0.68	0.75	0.093	1.05
3 . . .	1.45	2.55	0.65	0.89	0.082	1.04
4 . . .	1.55	2.70	0.67	0.86	0.079	1.02
5 . . .	1.72	2.75	0.61	0.75	0.085	1.06
6 . . .	2.04	2.60	0.51	0.86	0.115	1.09
7 . . .	2.28	2.75	0.55	0.69	0.076	1.04

It will be observed that, with the exception of the silicon, the other elements are present in the cast iron in remarkably uniform proportions. The corrosion of the samples containing the lowest quantity of silicon (No. 1) is in all the accompanying series taken as 100, the corrodibilities of the other samples being expressed accordingly.

I.—Tap Water Tests.—The samples of iron were laid on sheets of paraffin wax in glass beakers containing 500 cubic centimetres of tap water. After seventeen weeks the irons were removed, carefully scraped free from rust, rinsed in alcohol, and dried in a steam oven. They were then weighed, the loss in weight being taken as a measure of the corrosion (see Table II.).

*Paper read before the Iron and Steel Institute, May 1st, 1913.

†British Association Reports, 1838, p. 277.

‡Journal of the Iron and Steel Institute, 1908, No. III., p. 310.