

THE MODERN BASIC OPEN HEARTH PROCESS.

BY F. N. SPELLER, B.A. Sc.

A subject dealing with such an important material as structural steel requires little in the way of introduction before a society such as this, neither will it be necessary to take up the time in proving the value of a study in detail of the manufacture of this material for all engineers and architects, or the mistake of leaving the subject wholly to the province of the metallurgical engineer. However, to the latter class, and to those specially interested in the advancement of this branch of practical science, it affords an unparalleled example in its development, to the present state, of the achievements made possible by chemistry and mechanical engineering applied together.

The varieties of steel are so numerous, and the effects of extremely small quantities of certain impurities so fatal, that the question of specifications which will ensure absolute safety for any special case becomes one of vital importance. Two classes of tests must be specified—separate and yet intimately related—dealing with first the chemical composition, and secondly, the physical properties of the metal.

* It is not intended to discuss specifications in this paper, although much useful discussion might be provoked thereby; however, the short-sighted policy of indifference to the chemical side of the question so long as certain physical tests are fulfilled, for sometime manifested by some is fortunately becoming a thing of the past, perhaps when the engineer did not take the trouble to inform himself on all points of the treatment of steel from the ore to the finishing mill, this wise indifference was best.

Steel may be made in the crucible, Bessemer converter, or in the open hearth furnace, of exactly the same chemical composition in C, P, Mn, Si, S, etc., and yet possess radical different properties and uses. It is for chemistry to settle the cause of this phenomena.*

* Oxygen, hydrogen, and nitrogen have been found in various proportions in steel, and their presence in varying proportions in Bessemer, Open Hearth, and Crucible steel, has led to the conclusion that they have some essential influence over the