of phosphorus usually met with in pig iron by the basic open hearth, but it is generally more economical to use a good quality of metal, and save time and wear in the furnace.

Open hearth steel can hardly compete with Bessemer in price, even under the most favorable conditions, although in the great mills where special facilities exist for handling material, economy of manufacture has brought the two processes very close together in this respect. The difference in cost of manufacture is almost wholly made up in the increased length of time the open hearth charge is retained in the furnace. the extra cost of machinery in the Bessemer plant balancing the fuel required for the open hearth furnace. The superiority of open hearth steel for special structural parts, axles, tires, springs, boiler plate, armor plate, etc., has been proved by experience, and by the same process we have learned to distrust Bessemer steel for such service. This must not be forgotten, even though the chemical and physical tests as far as they go show no difference.

Engineers are gradually recognizing the advantage of this steel where a large quantity is required of a certain composition within narrow limits; a high degree of uniformity is ensured, and further, greater homogeneity, especially in high carbon steels, is obtained.

Any order for steel from .07 to 1.25% carbon with P below .030% and sulphur below the same limit, and any manganese required, can be filled in the open hearth department, as the heat is under perfect control from the start and can be manipulated at the will of the melter. In making high carbon spring steels up to 1.25C, special quality pig iron is used and the heat melts high; when laboratory tests show the carbon to be down to .90 or 1.00%, the heat is tapped and recarburized thirty or thirty-five points to the required temper.

It will not be possible within the limits of this article to go into those modifications of the open hearth process which show more or less promise of success, such as the Bertrand-Thiel process and others, but the direct process in connection with the open hearth furnace should be mentioned, as it has been tried on the large scale and promises great success.

A mixer, which is simply a large brick-lined vessel revolving on rollers, is filled with about 250 tons of pig metal brought while molten at intervals from the blast furnaces, which may be several miles away. A uniform supply is thus kept at hand and drawn off as wanted for charging the regenerative furnaces. The action is much more violent when using this hot metal than when all the stock is