

IRON ORE OF THE PACIFIC NORTHWEST.

BY a curious, but valuable, provision of nature, iron, the most indispensable of metals, is also the most widely disseminated, being found in nearly every geological stratum, and amidst the most diverse surroundings. It is, therefore, not to be accounted extraordinary that its ores are extremely common throughout the Pacific Northwest, being found in nearly every county in Oregon, Washington and Idaho, as well as in many districts of British Columbia, to the northward.

The parsimony, or rather, the ignorance, of legislatures, has thus far prevented the almost unmatched mineral resources of this part of the Union becoming known through an always necessary geological survey, and left to chance or the exertions of voluntary and usually inaccurate observers, the dissemination of that information which should be the care of the state. Consequently, whatever is at this day said of the occurrence and extent of the iron ore bodies is largely approximate in its application, and the same is true of the deposits of all other valuable minerals.

Notwithstanding a certain barrenness of detail which enfolds the subject, one is able, by the help of what has been printed in relation to the iron ores of the Pacific Northwest, to point out the existence and locality of several beds, or collections of beds, which by their extent and position warrant one in assuming that they will be the future source of the greater part of the iron made in this region. These deposits may be designated, first, the Lower Willamette Beds; second, those of Snoqualmie, W. T.; and third, those of Texada island, in the Gulf of Georgia, B. C. These do not, by any means, comprehend all of the valuable deposits, but are simply the most extensive, and at present, by reason of their location, appear as the most easily and profitably worked. There are, as is well known, a great many considerations which affect the value of a deposit of any ore besides its extent and purity. The principal one in the case of iron ores is accessibility; for the product, crude cast iron, is of such great weight for a given value that cheap transportation to market is an imperative necessity. Second is the question of fuel and fluxes for smelting the raw ore into merchantable metal; mineral coal is the only fuel used in a large way, enabling the art of smelting to rise to the dignity of a business, and this fuel must be mined close to the blast furnace where it is to be consumed, for like crude cast iron, it will not pay expensive transportation. Then a bulky flux, limestone, is used, and it, too, requires to be had very cheaply. It is only by a combination of cheap ore, cheap fuel and cheap limestone, with an enormous output, that American ironmasters are able to maintain themselves against a powerful competition that lays down an excellent article of pig iron in New York for less than twenty dollars per ton, and promises to do even better with the removal of the duty.

There is a locality that combines all the above cited advantages in an eminent degree; so much so, in fact,

that it seems as if the Divine Architect had decreed that the seat of great iron manufactories should be on Puget sound. Rather more enterprising than their Oregon neighbors, the people along the "Mediterranean of the Pacific coast" have examined into and mapped out and described their principal mineral deposits, and are enabled to inform the world that upon certain islands and the neighboring main lands there exist beds of iron ore, coal, and limestone, sufficient beyond doubt to furnish steel and iron for the universe. There are deposits of an excellent quality of brown hematite (limonite) in Skagit county. Three inexhaustible beds on Cypress island have received particular attention, and an examination by an expert has revealed some facts of great value. These ores are magnetic, and lie in sandstone and slate, but of what geological age does not appear. The Tyll lode has two parallel beds twenty-eight feet apart, and of a thickness of thirty-two and thirty-seven feet respectively, and are traceable on the surface for over three thousand feet. The Mabel, varying from twenty to sixty feet in thickness, and the Conner, fifteen feet, are, like the former, easy of access, and are composed of oxidized ores of a uniformly high percentage value. A trial lot was smelted and pronounced first-class. The principal value of these beds, like the others on Puget sound, lies mainly in the cheapness of transportation and the nearness of coal and limestone in immense quantities. Other deposits of nearly as great value exist in numerous localities on and near the sound, notably one within fifteen miles of Tacoma. The Chinacum beds have furnished hematite ores for the blast furnace at Irondale, and promising ores exist in Whatcom and other counties. In the aggregate the accumulations of bog (limonite) and magnetic ores seem inexhaustible, and the iron workers of the far distant future centuries will very likely take the same view.

Perhaps the most remarkable of all the iron deposits are those of the Snoqualmie pass, which also rank among the most important on the coast. Pretty well up in the Cascades, seventy miles from tidewater, there exist ores which compare well in chemical composition with those of the famous Lake Superior beds. Iron mountain is three miles from the pass, and is penetrated by immense layers of magnetite of the following composition:

Metallic iron.....	67.	71.	per cent.
Silica.....	1.3	4.02	"
Phosphorus.....	0.031	0.039	"
Sulphur.....	0.003	0.042	"

This analysis is certainly very low in those objectionable substances, sulphur and phosphorus, and there is no doubt the ore would smelt into an uncommonly pure iron. Still it is not by the result of the analysis of a single test sample that practical iron workers are guided, but by the average composition of a great lode. The deposits are known as the Denny mass, and have a vertical outcrop strike nearly north and south, and vary from six to one hundred and fifty feet in thickness. The analysis given is from a specimen taken from the