1916

[Manganese in] Brazil

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Brazil (By Joseph T. Singewald, Jr. and Benjamin LeRoy Miller).—The production of manganese in Brazil in 1915 was about 350,000 tons which exceeds all previous figures. The outputs of British India and Russia have greatly decreased since the outbreak of the war, so that there

has been an increasing demand for Brazilian ores, especially in the United States. In 1913, one-fifth of our imports came from Brazil, whereas in 1915, that country furnished nine-tenths. Practically the entire Brazilian manganese output comes from the southern part of the State of Minas Geraes from mines along the Estrada da Ferra Central do Brazil. It consists of very high-grade ore averaging about 50 per cent. manganese, only 1 to 2 per cent. silica, and low in phosphorus. These deposits were described in some detail by the writers in *Iron Age*, Feb. 17, 1916.

There are two types of deposits in the region occurring in two separate areas known as the Miguel-Burnier district and the Queluz district respectively. The Miguel-Burnier district extends as a narrow belt 10 miles long parallel to the Ouro Preto branch of the railroad, and centers about the station Miguel-Burnier, 496 km. north of Rio de Janeiro. It lies at the southern edge of the great iron-ore region of Minas. The Queluz district lies to the south and centers about Queluz or Lafayette, a station 463 km. from Rio de Janeiro.

The Miguel-Burnier manganese ores occur in the Itabira iron formation which is a sedimentray series of probable Algonkian age and is the same formation that includes the great Brazilian iron-ore deposits. They occur in the form of bedded deposits of limited extent and a width of a few meters. There is some difference of opinion as to their relations to this series of rocks; according to one view they represent replacements of some of the numerous intercalated lenses of limestone, but according to another, they are regarded as syngenetic deposits forming an integral part of the sedimentary series in the same manner as the iron ores.

Of much greater importance as a producer is the Queluz district. The deposits in this district occur as elongated masses of more or less lenticular shape in an area of supposed Archean rocks consisting of granites, gneisses and schists. The ores are surface alterations of an original manganese rock known as queluzite, of which the most common and characteristic constituents are the manganese garnet spessartite, tephroite which is the manganese equivalent of olivine, and more or less manganese carbonate. Rhodonite is conspicuous locally and one phase of the rock consists of garnet and quartz. There is considerable doubt as to the exact nature of the queluzite; some look upon it as an igneous rock, and others as the product of contact metamorphism of lenses of manganese carbonate intercalated in the schists. The largest of the mines is the Morro da Mina, which in 1915 produced 200,000 tons, has produced a total of over 1,000,000 tons and has an estimated ore reserve of 10,000,000 tons. This is probably the largest deposit of high-grade manganese ore in the world. Mining is mostly by opencut and by hand. Costs in

1914 were 60 cts. per ton. Freight to Rio de Janiero is $1.50 per ton and from there to the United States $5 per ton. About 500 men are employed who are well treated by the company. All ore is passed over a 2-cm. screen, the oversize being shipped. The undersize, about 15 per cent. of the total, containing 35 per cent. manganese, is stored for future washing or other treatment.

Manganese ore exports from Brazil in the last three years, and their destination, are given as follows by U. S. Consul A. I. M. Gottschalk, Rio de Janeiro. The figures are, in metric tons:

Exported to	1913.	1914.	1915.
United States	39,400	87,630	266,877
Great Britain	16,800	23,500	10,100
Germany	5,000	.....	.....
Belgium	11,800	10,600	.....
France	.....	11,400	.....
Total exported	122,300	183,630	288,671