

PRODUCTION OF RARE METALS.

Everett Smelter First in America to Turn Out Arsenic.

Among the new industries that have been recently developed in the United States is the manufacture of arsenious oxide, says Dr. Joseph Struthers in Mineral Resources of the United States, 1901, now in press, United States Geological Survey, David T. Day, chief of division. This manufacture was taken up during 1901 by the Puget Sound Reduction company, at Everett, Washington, and an output of 300 short tons was placed on the market. Previous to 1901 the world's supply of arsenic and arsenious compounds was derived chiefly from the mines in Cornwall and Devon, England, and at Freiberg, Germany. In 1899 the world's production of the forms of arsenic amounted to 14,936,165 pounds, valued at \$581,911. The imports of arsenic into the United States during the last five years have averaged about \$340,000 per annum, which seems to show that the exploitation and manufacture of arsenic and its compounds in this country could be profitably developed.

ALUMINUM.

The production of aluminum in the United States during 1901 amounted to 7,150,000 pounds. The Pittsburg Reduction company, operating the Hall patents, remains still the sole producer of aluminum in this country. The price of aluminum per pound remained practically stationary throughout the year, although the demand for the metal increased. The total imports of all forms of aluminum in 1901 were valued at \$109,748, as compared with \$50,444 in 1900.

BAUXITE.

Georgia produced the bulk of the domestic bauxite in 1901, the remainder being supplied by Alabama and Arkansas. The total production was 18,905 long tons, valued at \$79,914, as compared with 33,184 tons, valued at \$89,676, in 1900. Bauxite is used mainly for the manufacture of aluminum, although a considerable quantity is used for the manufacture of aluminum sulphate and crystallized alum. The Pittsburg Reduction company is installing a large plant at Bauxite, Saline county, Arkansas, which promises to increase largely the output from Arkansas in 1903. The import of bauxite into the United States during 1901 amounted to \$67,117; the exports were valued at \$300,000; and the consumption seems to have been 39,658 long tons, valued at \$151,262. The imports in 1901 were 18,313 long tons, as compared with 8,656 tons for the preceding year, an increase due mainly to the low ocean freight rates from foreign ports. This low freight rate caused bauxite to be delivered, duty included, from the south of France at New York, Philadelphia and Baltimore at a lower rate per ton than it cost to ship it from Georgia or Alabama to Philadelphia. The principal commercial salts of aluminum are aluminum sulphate and crystallized alum, for the manufacture of which bauxite and Greenland cryolite are used. The Pennsylvania Salt company possesses the exclusive privilege of importing cryolite into North and South America. In 1901 the production of aluminum sulphate was 74,721 short tons, and that of crystallized alum was 7,756 tons.

TITANIUM.

The occurrence and production of titanium ores is discussed by Mr. W. O. Snelling, with special reference to the recent discovery of large deposits of rut-

ile in Virginia, which has brought to the attention of the ceramic and the steel industries the commercial possibilities of this ore of titanium. Hitherto, owing to the small supply that has been available, and to the impure state in which it is generally found, rutile has been but little used in this country, the few hundred pounds produced annually going largely to collectors of minerals and to the manufacturers of artificial teeth, who use the pure oxide as a pigment in reproducing in porcelain the natural yellow color of the tooth, notwithstanding the recognized value of titanium as a component of a special steel, and notwithstanding the use of the oxide for many years past by foreign manufacturers of pottery. Minerals containing titanium are found widely distributed and in such large quantities as to make it a relatively abundant element, though nearly all of text books on chemistry speak of titanium as one of the rare metals. In some places, particularly in the Adirondacks, titaniferous ores are found in enormous quantities, making one of the principal components of the great rock masses which form mountains and constitute a geological formation.

Ilmenite is the most abundant of all the titanium minerals, and is found in beds of great extent at Kragero, in Norway, Bay St. Paul, in Canada, and in Rhode Island, Connecticut, New York, North Carolina, Pennsylvania and Vermont, in the United States. Rutile is generally found wherever large deposits of ilmenite occur, and besides the localities mentioned for ilmenite, it is found in notable quantities at Graves Mountain, Georgia; Magnet Cove, Arkansas, and on both sides of the Tye river, near Roseland postoffice, in Nelson county, Virginia, where the deposit is very large.

Under favorable conditions titanium oxide imparts to porcelain a fine yellow color. It is capable of being used with other substances to produce secondary colors, and it will withstand, without difficulty the heat of the kiln, although at very high temperatures it increases the fusibility of the porcelain somewhat, acting as a flux. Mr. Snelling does not seem to think, however, that any extensive market for this Virginia rutile will develop in the pottery industry. With regard to steel, the experimental work, so far as tried, seems to show that the addition of titanium gives the steel a high limit of elasticity and a greater elongation as well as an increased ductility over simple carbon steel; and as titanium steel takes a good temper and is very hard, a number of possible uses suggest themselves for it, dependent only upon the economical preparation of some titanium alloy, the commercial

production of which seems not to be an easy matter. As ilmenite is at the present time used exclusively as a source of titanium for steel, the outlook for the market for Virginia rutile seems a poor one in this industry also; and its use, amounting to a few hundred pounds annually, in the artificial tooth industry is supplied by the rutile deposits of Chester county, Pennsylvania. Even under the most favorable conditions, says Mr. Snelling, the annual domestic market for rutile is not likely to exceed in value \$2,000. In 1900 the production of rutile

in the United States amounted to 300 pounds, valued at \$1,300, and the production of Norway amounted to 57,485 pounds, valued at \$5,643. The production of the Virginia rutile deposits, beginning in 1900, have amounted, up to date, to about 40,000 pounds, making an estimated output of rutile in the United States for the year 1901 of about 44,000 pounds.

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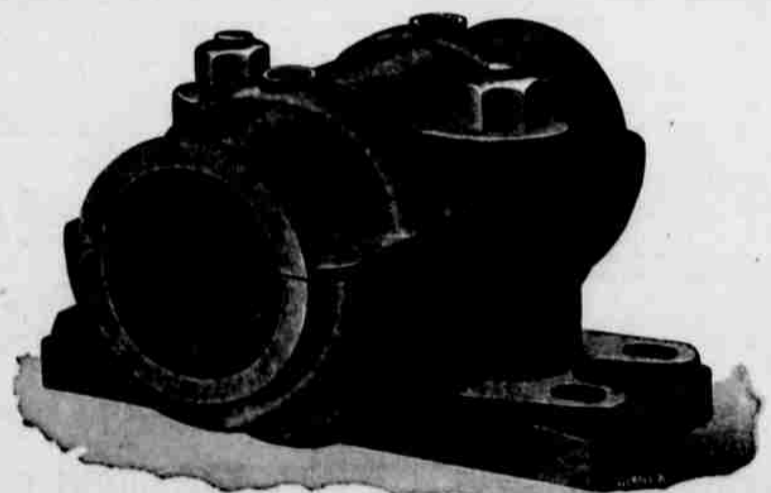
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