1917

Cadmium

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CADMIUM

By Allison Butts

Germany has been the chief producer of cadmium in past years. The metal was first produced in the United States in 1906 by the Grasselli Chemical Co. Since then domestic production has increased until at present it exceeds the demand for home consumption. The imports have decreased correspondingly from a value of $10,552 in 1906. The following table shows the imports for the fiscal year ending June 30:

	Pounds.	Value.
1910	3,083	1,657
1911	5,956	3,718
1912	6,396	4,603
1913	1,999	1,508
1914	1,543	1,239
1915	264	278
1916	5	6

The production in Upper Silesia, the cadmium district of Germany, is shown in the following table:[1]

Year.	Kilograms.	Value, Marks.
1909	37,187	198,288
1910	41,057	165,166
1911	42,575	224,254
1912	42,757	267,399
1913	38,575	233,812

According to Messrs. Speier of Breslau the production in Upper Silesia was 8815 kg. for the first quarter of 1914.

There are now several producers in the United States, but the bulk of the production is by three companies: the Grasselli Chemical Co., the American Smelting and Refining Co., and the United States Smelting Co. Most of the American production is obtained by treatment of bag-house fumes from lead smelters and is marketed in the form of sticks of refined metal. Some is obtained in different ways in the treatment of zinc-bearing material, and some is marketed as the sulphide known as "cadmium yellow." A large proportion of the foreign production is in this form, and in Germany it is obtained almost wholly as a by-product in zinc smelting by fractional distillation.

[1] *Metall und Erz*, **12**, 235 (1915).

PRODUCTION OF CADMIUM IN THE UNITED STATES (a)

Year.	Metal, Lb.	Value.	Sulphide, Lb.	Value	Total Cadmium Content, Lb.	Total Value
1911	26,152	$17,566	2,392	$1,674	28,012	$19,240
1912	52,508	39,875	8,998	6,400	59,504	46,275
1913	54,198	41,838	17,302	12,136	67,650	53,974
1914	91,409	81,205	22,723	20,241	109,076	101,446
1915	91,415	108,443	10,624	12,057	99,675	120,500
1916	.....	.....	.....	.....	.....	.....

(a) U. S. Geological Survey.

The demand has been nearly stationary during 1916. The price dropped in the first part of the year from $1.75 to $1.90 per lb. to $1.30 to $1.50, and then remained at the latter figure.[1] These quotations are for stick metal in quantity.

A process developed by R. H. Stevens for recovering cadmium and other metals from bag-house dust has been assigned to the United States Smelting Co.[2] The material is first dead-roasted, converting all cadmium to the oxide. It is then pulverized and leached with sulphuric acid. Copper, bismuth, etc., dissolved in this solution are first removed by electrolysis and the solution is then electrolyzed for cadmium at a voltage of from 2.2 to 3.4, and a current density of from 1.5 to 7.5 amp. per sq. ft. The deposit is usually non-coherent and the tanks are provided with false bottoms for its removal. The deposit is melted under a cover of fused sodium hydroxide to remove arsenic and tellurium, cast into anode plates, and refined electrolytically. The electrolyte is a solution of cadmium sulphate, sulphuric acid, and a salt of sulphocyanic acid which prevents deposition of copper. The voltage is about 0.4 and the current density about 5 amp. per sq. ft. A coherent deposit is obtained by agitation of the electrolyte. The solution tends to build up in cadmium, requiring the use of insoluble anodes. These are arranged one in each regular tank and connected to an independent circuit of which the current is so regulated as to maintain the proper acidity.

A translation by Oliver C. Ralston[3] of an article by Franz Juretzka in *Metall und Erz* discusses the European metallurgy of cadmium in some detail.

There has been considerable discussion in the technical press of the effect of cadmium as impurity in spelter. W. R. Ingalls read a paper on this subject before the Institute of Metals. He states that to his knowledge the injurious effect of cadmium in spelter has been definitely established only in the case of sheet-rolling, wire-galvanizing, and the making of certain ornamental castings.

[1] *Eng. Min. Jour.*
[2] *Min. Eng. World*, **45**, 661.
[3] *Met. Chem. Eng.*, **16**, 146.