

ber of mills in production in 1956 was 109, with 43 working chiefly lead, and 66 milling and producing chiefly zinc concentrates. The number of primary lead smelters and refineries in operation as of the end of 1956 was 13, and the number of primary zinc smelters, 18.⁹

Of the 696 lead mines and zinc mines in operation during 1956, 557 mines, or 80 percent, accounted for only 3 percent of the annual production of the two metals (895,166 short tons). Each of these mines produced less than 499 tons of either metal during the year. Only 37 mines reported a production of recoverable metal in excess of 5,000 short tons during the year; but these mines alone accounted for 73.4 percent of total domestic production.¹⁰ The number of the larger mines remains relatively constant from year to year, whereas the number of smaller mines fluctuates widely, depending on the prevailing prices of the metal.

The five largest domestic producers of lead normally supply over half of the total output on a mine basis.¹¹ Some of these companies also have substantial lead-mining interests in foreign countries. In the case of zinc, the six largest companies supply less than half the total.¹² Nearly 60 percent of domestic lead mine production and about 67 percent of domestic zinc-mine production normally comes from the Western States.

PRICES, RESERVES, AND SUBSTITUTES

Production of the two metals is governed by prices. An outstanding feature of lead and zinc market prices is their relative instability. This in turn results in fluctuating incomes for the industry, especially for the mining and milling segment. Here one finds many concerns with limited financial resources, unable to endure a period of very low prices. Price fluctuations also lead to instability in the cost of raw materials for industries manufacturing lead and zinc products. The uncertainty thus created tends to narrow the competitive advantage of lead and zinc over substitute raw materials, such as aluminum, which enjoy relative price stability.¹³

Until the early 1920's, the market price of zinc generally exceeded the market price of lead. Since then, the relationship has been reversed, except in times of war; zinc enters into military products (brass shell cases, for example), in greater volume than lead.¹⁴

Prices also have a bearing on deposits and reserves. Estimates of lead and zinc in ores only represent the reserves shown by development work. Because of the expense involved, mining companies usually do not develop ore bodies for more than 4 or 5 years ahead of mining. The reserves, moreover, are those regarded as profitably exploitable at metal prices and production costs prevailing at the time the estimates are made. The estimates in turn depend upon

⁹ Ibid., tables 43 and 44.

¹⁰ Ibid., table 32.

¹¹ See Bishop, O. M., and Mentch, R. L., "Lead" in *Mineral Facts and Problems*, USBM Bulletin No. 556 (Washington, D.C., 1956), pp. 418-443.

¹² See Bishop, O. M., and Mentch, R. L., "Zinc" in *Mineral Facts and Problems*, USBM Bulletin No. 556 (Washington, D.C., 1956), pp. 977-1002.

¹³ U.S. Tariff Commission, "Lead and Zinc Industries" (1954), pp. 65-66.

¹⁴ The development of selective flotation, allowing recovery of most of the zinc content in the more abundant lead-zinc, or zinc-lead ores (as opposed to pure lead ores) is believed to have had a bearing on that secular change in relative prices. Also, ores containing both metals are found to be richer in zinc than in lead as mining operations penetrate to deeper levels.