UNITED STATES TARIFF COMMISSION

LEAD AND ZINC

Report to the President on Investigation
No. TEA-IA-3 Under Section 351(d)(2)
of the Trade Expansion Act of 1962

TC Publication 157

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UNITED STATES TARIFF COMMISSION

Address all communications to
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C O N T E N T S

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Note.--The whole of the Commission's report to the President may not be made public since it contains certain information that would result in the disclosure of the operations of individual concerns. This published report is the same as the report to the President, except that the above-mentioned information has been omitted. Such omissions are indicated by asterisks.

REPORT TO THE PRESIDENT

U.S. Tariff Commission,
June 8, 1965.

To the President:

This report is made in response to your request of March 2, 1964, pursuant to section 351(d)(2) of the Trade Expansion Act of 1962 (76 Stat. 900), 1/ which provides that--

> Upon request of the President or upon its own motion, the Tariff Commission shall advise the President of its judgment as to the probable economic effect on the industry concerned of the reduction or termination of the increase in, or imposition of, any duty or other import restriction pursuant to this section or section 7 of the Trade Agreements Extension Act of 1951.

INTRODUCTION

The investigation upon which this report is based was instituted by the Commission on March 4, 1964. A public hearing was held in connection therewith June 23-25, 1964. The increased import restrictions that were imposed, effective October 1, 1958, 2/ under section 7 of the Trade Agreements Extension Act of 1951 consist of absolute quarterly quotas on the quantities of commercial imports 3/ of unmanufactured lead and zinc (table 1, in the appendix).

The quotas on unmanufactured lead and zinc apply to lead and zinc in ores and other raw materials (such as flue dust, dross, skimmings,

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1/ This report is also submitted as the Commission's annual report on lead and zinc for the purpose of section 351(d)(1) of the act.
2/ Proclamation No. 3257, 3 CFR, 1954-1958 Comp., p. 165.
3/ "Commercial imports" refers to dutiable imports entered, or withdrawn from warehouse, for consumption exclusive of imports for U.S. Government account.

and scrap), intermediate products (such as lead bullion), refined lead and zinc metals, and antimonial lead. The import quotas do not apply to the following articles: Zinc fume (although it is an unmanufactured zinc article used like zinc ore), mill shapes (plates, sheets, strips, wire, pipe or tubing, extrusions) or other fabricated articles, chemical compounds of lead or zinc, and alloys of lead or zinc (such as solder, bearing metal, type metal, or die-casting alloy) other than antimonial lead. The domestic industry of concern in this investigation--i.e., that producing unmanufactured lead and zinc--is composed of the establishments engaged primarily in mining, milling (concentrating), smelting, and refining operations.

The quotas were fixed at 80 percent of the average commercial imports during 1953-57. A separate quarterly quota was established for each of four categories of articles (as shown in table 1); essentially, these categories cover lead ore, lead metal, zinc ore, and zinc metal. Each of these quotas was allocated among the countries that were principal suppliers in 1953-57 and "all other" countries combined.

The import quota restrictions that were imposed on October 1, 1958, made no change in the rates of duty on unmanufactured lead and zinc. These rates, virtually unchanged under the new TSUS, are shown in table 2. The rates of duty on unmanufactured lead articles in 1964 were equivalent on the average to about 10 percent ad valorem. About a third of the quantity of dutiable lead imported in 1964 consisted of lead in ores; the remaining two-thirds consisted of lead metal (table 42). The rate of duty on imports of lead ore was equivalent to an average of 9 percent

ad valorem, and the rates of duty on refined lead metal were equivalent on the average to 10 percent ad valorem. The average ad valorem equivalent of the rates of duty on unmanufactured zinc articles imported in 1964 was 9 percent. Unlike imports of lead, most dutiable imports of zinc in 1964 consisted of zinc in ores (about 70 percent of the total in 1964), and the remainder of zinc metal (table 48). The rate of duty on zinc ores was equivalent to an average of about 12 percent ad valorem, and the rates on refined zinc metal were equivalent on the average to 6 percent ad valorem.

The import quotas on lead and zinc were imposed in 1958, following the Commission's report on its escape-clause investigation; 1/ since then, the Commission has completed four reviews of developments in the trade and reported thereon to the President. 2/ These investigations were undertaken to determine whether conditions had so changed as to warrant a full-scale investigation such as the one that forms the basis for this report. Additional information is contained in comprehensive reports by the Commission to the Congress in 1960 and 1962 in response to Senate resolutions. 3/

1/ U.S. Tariff Commission, Lead and Zinc: Report to the President on Escape-Clause Investigation No. 65 . . . , 1958 (processed).

2/ Reports were submitted in October of each year during 1960-63; the latest was Lead and Zinc: Report to the President (No. TEA-IR-8-63) Under Section 351(d)(1) of the Trade Expansion Act of 1962, TC Publication 111, 1963 (processed).

3/ U.S. Tariff Commission, Lead and Zinc: Report to the Congress on Investigation No. 332-26 (Supplemental) Under Section 332 of the Tariff Act of 1930 Made Pursuant to Senate Resolution 162, 86th Congress . . . , 1960 (processed), and Lead and Zinc: Report to the Congress on Investigation No. 332-26 (Supplemental 2) Under Section 332 of the Tariff Act of 1930 Made Pursuant to Senate Resolution 206, 87th Congress . . . , TC Publication 58, 1962 (processed).

This report deals principally with developments since the import quotas were imposed (1958), particularly those not covered in the Commission's earlier reports; it also appraises the probable economic effect of a relaxation or termination of the import quotas.

PROBABLE ECONOMIC EFFECT OF A RELAXATION OR TERMINATION OF THE IMPORT QUOTAS

When import quotas were imposed in October 1958, domestic lead and zinc producers were experiencing the consequences of a large excess of supplies over consumption requirements--burdensome producers' stocks, depressed prices, underutilization of mining and smelting facilities, reduced employment, and declining profits. To a large degree this was also the situation throughout the free world.

This imbalance had resulted from many interacting forces, including not only worldwide postwar industrial expansion, but also various actions of the U.S. Government. For example, following the Korean conflict, the United States had employed a variety of measures which had the effect of expanding the production of lead and zinc both in the United States and abroad, including large purchases of lead and zinc metals from newly mined domestic ores for the strategic stockpile and the acquisition of foreign lead and zinc for the supplemental stockpile in exchange for surplus agricultural commodities. Subsequently, domestic producers experienced serious difficulties in adjusting to the forces of competitive commercial markets. It was the termination of the Government programs, in addition to reduced industrial consumption, that

largely precipitated the distress of domestic producers in the period just before import quotas were imposed.

Free-world production of lead metal approximately balanced free-world consumption of that metal in 1963; production exceeded consumption in 1959-62; and consumption exceeded production after 1963. Free-world consumption exceeded production of zinc metal in all quota years, although consumption and production were nearly equal in 1960; thereafter, consumption exceeded production by increasing amounts. The recent changes in the free-world supply-demand relationships reflected mainly a substantial growth in the consumption of lead and zinc in Western Europe and Japan and increased industrial activity in the United States. For the past 3 years, free-world consumption of both metals--which was at record levels--has exceeded increased smelter production. Producers' stocks of the metals have also been substantially reduced, and such stocks are now at low levels in relation to consumption.

The strengthened demand brought about price increases for the two metals in the leading markets of the free world. U.S. prices, which were low in 1962, increased in 1964 to levels higher than had prevailed in more than 7 years for lead and 12 years for zinc, but the price increases were greater outside the United States than in the U.S. market. Foreign lead and zinc producers, who formerly depended significantly on sales in the U.S. market, found attractive markets elsewhere for their concentrates and metal. If the situation continues, the United States may experience further difficulty in the near future in obtaining enough

lead and zinc supplies from foreign sources to bridge the gap between domestic production (from mines and scrap) and U.S. consumption.

In 1964 the U.S. consumption of lead (about 1.2 million tons) and the U.S. consumption of zinc (about 1.47 million tons) were the largest in nearly a decade. In satisfying the strong demand, U.S. producers' stocks of both the raw materials and the refined metals have been reduced to virtually minimum working levels. By the end of February 1965 (the latest date for which data are available), producers' stocks of refined lead, at their plants and elsewhere, were equal to 35 days' average shipments (compared with customary stocks equal to about 75 days' shipments); and producers' stocks of refined zinc at the end of March 1965 (the latest date for which data on zinc stocks are available) were equal to 10 days' average shipments (compared with customary stocks equal to about 37 days' average shipments). U.S. prices have also increased, by stages. The latest price advance for lead (on Dec. 11, 1964) increased the price to 16 cents a pound, which is higher than any that has prevailed as far back as 1957. The latest advance for zinc (on Oct. 21, 1964) increased the price to 14.5 cents, the highest since 1952.

Domestic mines have responded to the strong market conditions by expanding production facilities and increasing output. In 1964 the mine output of recoverable lead totaled about 283,000 tons, an output larger than in any earlier year as far back as 1958. Mine production of recoverable zinc in 1964 was about 572,000 tons, the largest since 1952.

Profits of domestic lead and zinc producers in 1963 were approximately double those in 1961, both in absolute amount and as a percentage

of net sales. Although data on profit-and-loss experience in 1964 are not available, it is obvious that with continued price increases and the high rate of production in that year, profits were at least as high as in 1963, and probably higher.

In 1964, new U.S. supplies of lead and zinc from production and imports, even though augmented by the releases from the national stockpile, were still short of U.S. consumption plus small exports, by some 20,000 tons for lead and by nearly 60,000 tons for zinc. To relieve the tight domestic-supply situation in the last half of 1964, the release of 50,000 tons of lead metal and 75,000 tons of zinc metal from the national stockpile was authorized for U.S. consumption. And in April 1965, additional stockpile releases amounting to 200,000 tons of lead metal and about 230,000 tons of zinc metal (including about 30,000 tons in brass) were authorized for U.S. consumption; of these amounts, 50,000 tons of each metal was designated for direct use by U.S. Government agencies.

At the end of 1964, U.S. trade observers generally agreed with the conclusion reached by the International Lead and Zinc Study Group (at its meeting in October 1964) that strong markets and stringent supply conditions would continue for both metals at least through 1965. The Commission's analysis indicates that without substantial releases from the national stockpile new supplies of both lead and zinc in the United States in 1965 will be considerably smaller than U.S. consumption and exports. The outlook is significantly altered, however, with the

authorization in April 1965 of substantial additional releases of U.S. Government stocks of lead and zinc for U.S. consumption.

With the initial offering by the General Services Administration (GSA) of 60,000 tons of lead in April, new U.S. supplies of that metal in 1965 are likely to nearly balance U.S. disposition (consumption plus exports); and if the entire quantity of lead authorized for release to industrial consumers is distributed in 1965, new U.S. supplies of lead would be sufficient not only to balance U.S. disposition but also--by the end of the year--to replenish the depleted producers' stocks of lead metal and ores to about customary levels.

In April 1965 the GSA announced the initial release of 75,000 tons of zinc metal from the national stockpile for U.S. industrial consumption. This amount of zinc metal plus U.S. supplies from domestic production and imports probably will not be sufficient to meet U.S. requirements for consumption and exports during the year. However, if the total authorized amount of zinc is made available to U.S. industrial consumers in 1965, total new U.S. supplies will probably be sufficient not only to meet the needs for U.S. consumption and exports, but also to partly replenish the low producers' stocks of zinc metals and ores.

In the next 3 or 4 years, barring any serious business recession, both U.S. production and consumption of lead and zinc are expected to increase. In view of the expansion of production facilities underway or planned, U.S. production of lead is likely to increase more rapidly than that of zinc.

Termination of quotas would not likely have a detrimental effect on domestic lead and zinc producers unless world demand for these metals should subside substantially in relation to world supplies. Under present conditions, with overall free-world consumption exceeding output, it is the limited availability of foreign supplies, rather than quota restrictions, that discourages increased U.S. imports.

Termination of the quotas would be followed by some increase in imported supplies available to U.S. consumers. This would occur because U.S. smelters and importers would doubtless enter for consumption ores and metals they now hold in bond in excess of import quotas. By about 1968, free-world supplies may exceed consumption, in view of the planned expansion of production of lead and zinc and an anticipated slowing in the growth of consumption. Under these circumstances, sooner or later--notwithstanding expected increases in absolute consumption--additional supplies of lead and zinc may be seeking outlets in any available markets, including the large U.S. market.

Most domestic producers will probably be in a stronger position to meet future import competition without import quota restrictions than in the past, as their competitive position has improved substantially in the past 6 years. Production has been concentrated in larger, more highly mechanized and more efficient mines requiring less labor per unit of output. Owing mainly to technologic progress and increased productivity, total employment has declined moderately, although production has increased. Further improvements are being made at new mines, notably at lead mines in southeastern Missouri and at zinc mines in

Tennessee; although these mines are exploiting ore deposits of relatively low grade, the deposits are amenable to mechanization and have been, or are being, developed to take full advantage of modern large-capacity equipment designed for speed and mobility in the mass production of ores. The efficiency of lead and zinc smelting and refining has also improved, mostly through modernization of facilities, concentration of production in the more efficient plants, and near-capacity operation in recent years. Further modernization of facilities and the erection of at least one new modern smelter are being planned.

Both the extent to which world supplies might increase and the potential rapidity of such a possible future development would be significantly affected by whatever policy the U.S. follows with regard to the huge stocks of lead and zinc in the national stockpile (1,328,000 tons of lead and 1,500,000 tons of zinc at the end of March 1965). In July 1963 the Office of Emergency Planning declared these stocks to be surplus to requirement objectives for conventional war, without commitment as to what quantities, if any, might be held to meet the requirements of general nuclear war and reconstruction. If the United States adopts a program for the disposal of all, or a substantial portion, of these large stocks, such action would tend to discourage undertakings for the development of new free-world sources of lead and zinc and retard the completion of developments already underway in response to the stimulation of recent strong markets.

INFORMATION OBTAINED IN THE INVESTIGATION

Summary of Major Developments

The conditions of trade in lead and zinc in the United States have changed materially since import quotas were imposed in October 1958. The excess of production over consumption that was characteristic of the early quota years was reversed in 1964, and prices have increased sharply. A greatly improved demand and increased prices brought the industry increased profits but also threatened it with some loss of markets to substitute materials.

These changes have occurred very recently, primarily as a result of continuous annual increases in the consumption of lead and zinc. Consumption has outpaced the growth of new supplies--since 1961 for lead and since 1960 for zinc. New U.S. supplies of lead and zinc were not sufficiently reduced in relation to industrial consumption to stimulate a sustained rise in domestic prices until after mid-1962. U.S. producers' stocks of refined lead and zinc metals were not drawn down to customary levels until about mid-1963. Shortages in the new supplies of lead and zinc combined with very low producers' stocks and sharp price increases did not develop until 1964.

In its 1957-58 investigation the Commission found that unmanufactured lead and zinc were being imported into the United States in such increased quantities as to cause serious injury to the domestic industry. The accumulation of excessive supplies of lead and zinc in the mid-1950's had resulted in depressed market prices, under utilization of mining and smelting facilities, reduced employment, and declining profits. The

excessive supplies at the time the quotas were imposed were also attributable to the sharply reduced industrial consumption of lead and zinc and to the termination (shortly before the imposition of the quotas) of substantial purchases of these metals by the U.S. Government for stockpiling. During much of the period prior to 1962, imports under the quotas proved to be more than sufficient to fill the gap between domestic production and consumption. During those quota years, producers' stocks of both metals were at unusually high levels, the domestic price of lead continued to decline, and the domestic price of zinc failed to rise appreciably. The deterioration in the conditions of trade was more prolonged and more serious for lead than for zinc, as indicated by declining prices for lead in 1960-62 and the generally low mine and smelter output of lead during most of the quota years.

In 1964, however, U.S. consumption of lead and zinc (all forms) was the largest in nearly a decade. The consumption of lead in that year amounted to about 1,200,000 tons, which was larger than in any earlier year as far back as 1956; and the consumption of zinc, about 1,470,000 tons, was larger than in any earlier year as far back as 1955. By the close of 1964, the demand for lead and zinc had increased in relation to available supplies, and U.S. producers raised the price of lead to 16 cents a pound, which is the highest it had been at any time as far back as 1957. By November 1964, the domestic price of zinc had advanced to 14.5 cents, the highest as far back as 1952. Domestic producers have also rationed their available supplies of refined lead and zinc among their customers.

By the end of 1964, U.S. producers' stocks of both refined metals and raw materials were at virtually minimum working levels. Stocks of refined lead, at producers' plants and elsewhere, were equal to about 39 days' average shipments (compared with normal stocks equal to about 2-1/2 months' shipments); and producers' stocks of refined zinc were equal to about 17 days' average shipments (compared with a norm of a little more than 1 month's shipments).

In July 1964 the Congress enacted legislation, actively supported by both the metal producers and industrial consumers, authorizing the immediate release from the national stockpile of 50,000 tons of lead metal and 75,000 tons of zinc metal for U.S. consumption. In April 1965, legislation was enacted to further increase supplies of lead and zinc. This legislation, also supported by both domestic producers and consumers, authorizes the release from the national stockpile of an additional 200,000 tons of lead and 230,000 tons of zinc.

Domestic mines responded to the stimulus of higher prices by expanding production facilities and increasing production. In 1964 the mine output of recoverable lead totaled about 283,000 tons, an output larger than in any other year as far back as 1958. Mine production of recoverable zinc in 1964 was about 572,000 tons, the largest as far back as 1952. Nevertheless, the increases in mine output were insufficient to meet the increase in demand. The expansion of large mines or the development of new mines requires considerable time; hence, many of the projects had not been completed by early 1965.

Commercial imports of lead and zinc, being limited by quotas, could not relieve the U.S. shortages. Moreover, with the development in 1964 of prices in foreign markets more attractive than those in the United States, some of the import quotas were underfilled. There is a likelihood of further underfillment in 1965. Domestic smelters have been unable to renew contracts for foreign ore supplies from some countries for that year. However, most of the import quotas have generally been filled, even in recent quarters, despite the higher prices prevailing in foreign markets. The filling of the quotas reflects principally (a) the fulfillment of contracts negotiated before the recent disparity between U.S. and foreign prices developed, (b) U.S. purchases of some foreign ores and metals at prices approximating the higher foreign prices, and (c) the desire of foreign producers to preserve a share of the large U.S. market.

Since the quotas were imposed on lead and zinc, the efficiency of the domestic lead and zinc industry has increased considerably, and the industry as a whole is able to compete with imports more effectively than formerly. Production has been concentrated in larger, more highly mechanized, and more efficient mines requiring less labor per unit of output. Mechanization and other improvements in mining and milling operations were stimulated in part by the need to counter the effects of reduced metal prices and rising costs. Further improvements are being made at new mines, notably at lead mines in southeastern Missouri and at zinc mines in Tennessee. Although the ore deposits exploited by these mines are of lower grade than most of those mined elsewhere in

the United States, they are amenable to mechanization and have been, or are being, developed to take full advantage of modern large-capacity equipment designed for speed and mobility in the mass production of ores.

The efficiency of lead and zinc smelting and refining in the United States has also increased--mostly through modernization of facilities, concentration of production in the more efficient plants, and lately, through near-capacity operation. A shortage of concentrates preventing the most efficient utilization of facilities, however, has been, and continues to be, a problem for some smelters.

U.S. Industrial Consumption

Lead

The U.S. industrial consumption of lead (all forms) in the quota years, which was lowest in 1960, increased in each of the next 4 years (table 9). Consumption in 1964 is estimated to have been 1.20 million tons, which was 2 percent larger than the 1953-57 average (1.17 million tons) and close to the record high consumption of 1.24 million tons in 1950.

The growth in the consumption of lead during 1959-63 is attributable largely to the increased use of lead in storage batteries and in tetraethyl lead (TEL) for gasoline (table 3). These changes, in turn, stemmed primarily from the increased production and use of motor vehicles. 1/

1/ The lead in batteries is in large measure returned to supply through secondary production from reclaimed battery scrap. In recent years, nearly two-thirds of the requirements for battery lead has been supplied by secondary metal produced from reclaimed battery lead. On the other hand, the lead in antiknock additives is completely consumed with the gasoline.

The growth in the use of lead for batteries and TEL, together with smaller increases in several other uses, more than offset the decline in consumption in various construction uses and pigments. In fact, the consumption of lead in automotive uses increased from less than half the total consumption in 1953-57 to more than half in 1963. Data on the consumption of lead (all forms) during specified years are shown in the following tabulation (in thousands of short tons):

Use	Average 1953-57	1959	1963	Change 1959-63
Automotive uses:				
Storage batteries	363	381	439	+58
Tetraethyl lead	171	160	193	+33
Subtotal	534	541	632	+91
Construction (calking lead; pipes, traps, and bends; sheet lead; terne plate, and cable covering)	244	196	183	-13
Pigments	123	104	99	-5
Others	270	250	249	-1
Total consumption	1,171	1,091	1,163	+72

The growth in many uses of lead has been restricted in varying degree by substitution of other materials, by changes in market requirements, and by technological advances. For example, lead in cable coverings, which at the beginning of the current decade was one of the largest uses of lead, has been displaced considerably by aluminum in aboveground installations and by plastics in underground installations. In fuels for both military and commercial planes, leaded high-octane gasolines have been largely displaced by kerosene-base jet fuel. Similarly, in fuels for passenger automobiles, high-octane gasolines have been increasingly replaced by low-octane gasolines; these low-octane gasolines require

smaller quantities of TEL and meet the growing requirements of compacts and other cars with low compression engines. The growth in the use of lead for automotive batteries has slowed because of advances in design, extending the service life of the batteries and reducing the lead required per battery. Similar results have followed other technological advances--e.g., the development of miniaturization and printed circuitry has reduced the use of solder.

The outlook for the consumption of lead in the next few years is a probable moderate growth with small year-to-year fluctuations. Most of the growth will probably be, as it was in the past, in leaded gasoline and in replacement batteries for the increased number of automobiles in use. 1/ Because of the steady growth in these uses, fluctuations in consumption owing to short-term changes in automobile production and building construction are not likely to cause wide fluctuations in the total consumption of lead.

Zinc

The U.S. annual industrial consumption of zinc (all forms) ranged from 2 to 11 percent smaller in the years 1959-61 than the annual average of 1.31 million tons in 1953-57 (table 7). In 1962, however, it increased by 10 percent over the 1961 level, to 1.33 million tons, which was 2

1/ New uses of lead have been developed and old uses expanded partly as a result of research and promotion by the producers and their trade association. The new uses include lead-laminated wall paneling, lead-asbestos pads for buildings, and rechargeable batteries for industrial or service trucks, golf carts, and portable tools. These new uses still account for a small part of the total consumption of lead.

percent above the average in 1953-57. Further year-to-year increases of 6 percent for 1963 and 4 percent for 1964 brought the consumption of zinc up to about 1.47 million tons in 1964--12 percent above the average annual consumption in 1953-57 and about equal to the previous high in 1955.

The growth in the consumption of zinc after 1959 reflected principally a rise in the use of zinc-base alloys (used primarily in die castings) and of galvanized sheets. Most of the growth in consumption of zinc in die castings and a substantial portion of that in galvanized sheets is attributable to the increased production of motor vehicles. By 1963 the zinc used in zinc-base alloys and galvanized products constituted 64 percent of total industrial consumption of zinc, compared with 60 percent in 1959 and in 1953-57. Data on the consumption of zinc (all forms) 1/ during specified years are given below (in thousands of short tons):

Use	Average 1953-57	1959	1963	Change 1959-63
Zinc-base alloys, mostly in die castings	367	407	484	+77
Galvanized products	414	361	420	+59
Brass and bronze products	270	249	253	+4
Chemicals, compounds, and pigments	163	166	156	-10
Rolled zinc products	48	43	42	-1
Other uses, including light-metal alloys	47	52	59	+7
Total consumption	1,309	1,278	1,414	+136

The rate of growth in the consumption of zinc has slackened, however, in recent years. This slower growth probably reflects a similar

1/ Shown in detail in table 4.

slowdown in the growth of production of motor vehicles and an increase in the relative importance of smaller cars. The ratio of compacts to the total production of cars increased from 27 percent in 1960 to about 40 percent in 1964. The quantity of zinc consumed in a small car is generally much smaller than that in a standard-size car. To a lesser extent, the slower growth of zinc consumption resulted apparently from the substitution of plastics for zinc in some automotive uses; the use of plastics per car has doubled in the last 5 years, partly at the expense of zinc.

The industrial consumption of zinc will probably increase moderately in the near future, given the necessary supplies. Most of the increase will probably be accounted for by a larger consumption of zinc in the automotive industry, even though such consumption is likely to be affected by the continued substitution of other materials, especially plastics.

U.S. disposition versus new U.S. supplies

New supplies of unmanufactured lead were larger than "disposition" 1/ (i.e., consumption plus exports and additions to the U.S. Government stock-

1/ Data summarizing new U.S. supplies and "disposition" of unmanufactured lead and zinc (annual average for 1953-57 and annually during 1958-64) are shown in tables 9 and 10. In this analysis, new U.S. supplies include recoverable lead or zinc in ores produced by domestic mines, lead or zinc (all forms) recovered from domestic scrap, and aggregate imports for consumption (which include imports for the Government stockpile) of unmanufactured lead and zinc (with recoverable metal in imported ores estimated), and metals released for U.S. consumption from the U.S. Government stockpile; supplies drawn from commercial stocks (private) are not included. U.S. disposition includes aggregate industrial consumption of lead and zinc (all forms) as reported by U.S. consumers to the U.S. Bureau of Mines, domestic exports of unmanufactured lead and zinc (small in relation to consumption), and acquisitions of lead and zinc metals for U.S. Government stockpile.

pile) in the United States during 1953-57, 1958, 1960, and 1961, but they were smaller than disposition during 1959 and throughout 1962-64 (table 9). New U.S. supplies of unmanufactured zinc nearly balanced disposition during 1953-57 and in 1960, but were short of disposition in 1959 and throughout 1961-64 (table 10). A substantial part of the U.S. disposition of both lead and zinc during 1953-59 consisted of metal acquired by the Government for stockpiling, as did much of the disposition of lead in 1961 and 1962 (table 8). Such Government acquisitions were designed not only to build up the strategic stockpile, but also to reduce burdensome producers' stocks (partly foreign stocks).

Early quota years.--The import quotas were imposed in 1958, when the U.S. industrial consumption of both lead and zinc metals was lower than in any previous postwar year except 1949. Imports had increased just before quotas were imposed in anticipation thereof, with the result that commercial imports, especially those of lead, were larger during 1958 as a whole than the 1953-57 average. Mine output of each metal in 1958 was smaller than in any previous postwar year, while the output of lead and zinc smelters and refineries was about 85 percent of the annual averages for 1953-57. Producers' stocks of lead and zinc at the end of 1958 were larger than at the end of any previous postwar year. The reduced mine and smelter activity in the domestic lead and zinc industry, not only in 1958 but also in most of the other quota years, is attributable not only to the discontinuance, early in 1958, of large Government purchases of lead and zinc metals but also to reduced industrial consumption. These metals were smelted in the United States from both domestic and foreign ores.

In 1959, owing principally to an increase in consumption, new U.S. supplies of both metals fell short of U.S. disposition. As a result, U.S. producers' stocks of these metals declined. However, with low consumption of lead in 1960 and 1961, and low consumption of zinc in 1960, inventories increased to record high levels--larger than those at the end of 1958. The accumulation of stocks in those years, especially of lead, more than offset the declines in 1959. At the end of 1961, producers' stocks of refined lead (table 33) were equivalent to nearly 6 months' average shipments, compared with stocks customarily equal to about 2-1/2 months' shipments. At the end of 1960, producers' stocks of refined zinc (table 31) were equivalent to 3 months' shipments, compared with usual stocks equal to a little more than 1 month's shipments. The accumulation of excessive stocks was soon followed by unusually low market prices. By February 1962 the U.S. price of lead dropped to 9.5 cents a pound, the lowest price since 1946. In January 1961 the price of zinc declined to 11.5 cents, the lowest since September 1959. 1/

Recent years.--The transition from an abundance to a shortage of new U.S. supplies of lead and zinc was brought about principally by the continuous rise in U.S. consumption of these metals since 1960. The increased use of lead and zinc since 1960 reflects principally the sustained high level of industrial activity, especially in the automobile industry, and the increased use of automobiles; it is partly attributable to the low prices of these metals relative to prices of alternative materials and to various promotional efforts by producers.

1/ For a definition of U.S. prices of lead and zinc, see p. 24.

In 1962 and 1963, the first 2 years in which producers' stocks of lead declined, the U.S. disposition of unmanufactured lead exceeded new supplies by about 155,000 tons (table 9). As a result, aggregate commercial stocks of lead in the United States were reduced; available data show a reduction in stocks of about 118,000 tons during these 2 years. 1/ Inasmuch as the reported data on industrial consumption may not be complete, it is possible that the shortfall in new supplies may have been somewhat larger than indicated.

In the 3 years 1961-63, after producers' stocks of zinc had begun to decline, the U.S. disposition of unmanufactured zinc exceeded new U.S. supplies by about 219,000 tons (table 10). Meanwhile, aggregate U.S. commercial stocks of zinc were reduced by nearly an equal amount. 2/

In 1964 the consumption of lead and zinc was in excess of new supplies, both in the United States and in the rest of the free world. With the rise of foreign prices above U.S. prices during 1964, there was some underfilling of U.S. quotas as supplies were diverted to the more attractive foreign markets.

Despite substantial releases of both metals from the Government stockpile, data for 1964 3/ show that new U.S. supplies of lead and zinc were significantly smaller than commercial disposal. New supplies

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1/ Total producers' stocks of lead in ores (estimated recoverable) mattes, base bullion, and refined pig lead and antimonial lead (at producers' own plants and elsewhere) and consumers' and secondary smelter metal stocks (tables 6, 30, and 33).

2/ Total producers' stocks of zinc in ores and other zinciferous materials (after allowance for processing losses) and refined zinc metal, and consumers' stocks of refined zinc (tables 7, 31, and 32).

3/ With some of the data for December estimated.

of lead were about 22,000 tons short of consumption plus exports (table 9). Aggregate U.S. commercial stocks of lead (as previously defined) were reduced during the year by about 43,000 tons. The Government stockpile of lead was reduced during 1964 by 43,000 tons, although 50,000 tons was authorized for release. The difference is accounted for by quantities released and sold but not yet delivered to purchasers at the end of the year.

New U.S. supplies of zinc in 1964 were short of consumption plus exports by about 58,000 tons (table 10). Aggregate commercial stocks of zinc (as previously defined) were reduced during the year by about 48,000 tons. All of the 75,000 tons of zinc metal authorized for release from the Government stockpile in 1964 was delivered to purchasers by the end of the year.

As a result of deficits in the new supply in 1964, U.S. producers' stocks--not only of refined metals but also of raw materials--have dwindled to virtually minimum operational levels. By the end of 1964, stocks of refined lead (at producers' plants and elsewhere) had declined to 49,900 tons (table 33), when they were equivalent to about 39 days' average shipments. U.S. smelter stocks of lead in ores and mattes at the end of the year were about 15 percent below those at the end of 1963 and 29 percent below the large stocks at the end of 1960 (table 30). Similarly, by the end of 1964, producers' stocks of refined zinc metal (at smelters and elsewhere) had declined to 50,200 tons (table 31), which was equivalent to about 17 day's average shipments. Smelter stocks of zinc in ore and similar raw materials at the end of 1964 were 19

percent smaller than at the end of 1963, and 51 percent smaller than at the end of 1960 (table 32).

Recent Price Changes

Since mid-1962, the strong demand for lead and zinc and the concurrent dwindling of commercial stocks, both in the United States and elsewhere, have stimulated increases in the prices of these metals. Lead and zinc (in both ores and refined metals) are traded throughout the world. U.S. foreign prices of lead and zinc are interrelated and have generally exhibited a common trend. The United States, by far the world's largest importer and consumer of lead and zinc, imports a large part of its requirements for consumption. 1/

U.S. prices

In the United States, the producers' price 2/ of refined lead (Common grade), which was 9.5 cents a pound during 8 months of 1962, advanced in several steps to 16 cents on December 11, 1964 (table 11).

1/ During 1959-64, U.S. commercial imports of unmanufactured lead (in ores and metals) supplied about a third of the quantity of lead in all forms consumed in the United States, and U.S. commercial imports of unmanufactured zinc supplied almost two-fifths of the zinc in all forms consumed in the United States (table 5).

2/ Unless otherwise stated, the U.S. prices discussed in this report are those published by the E & MJ Metal and Mineral Markets. These prices are based on firsthand sales by primary U.S. producers (or their agents) of domestically refined lead or zinc to domestic consumers. The prices are converted to a cash basis (New York City or East St. Louis, Ill., as noted). The daily prices published by the above-mentioned source represent averages of sales on a fixed- or flat-price basis; when sales occur at different prices, a weighted average of the prices is published for that day--weighted by the quantities sold at each price. Monthly averages are arithmetical averages of the daily prices, and yearly averages are arithmetical averages of the monthly averages. The prices do not reflect sales of lead or zinc metals by importers, and they do not reflect sales by secondary metal producers or by metal dealers that do not produce any metal.

Similarly, the U.S. producers' price of refined zinc (Prime Western Grade) rose from 11.5 cents a pound in April 1962 to 14.5 cents on October 21, 1964 (table 12).

The U.S. producers' prices for higher grades of zinc, however, increased more rapidly than did the price of Prime Western Grade zinc. The prices of the higher grades of zinc include premiums above the price for the Prime Western Grade, but before mid-1963 the premiums were "nominal," i.e., wholly or partly discounted. 1/ Since mid-1963, however, the higher grades have been selling at prices including the full premiums. Moreover, the premiums were increased, effective April 1, 1964, from 1.00 cent to 1.25 cents a pound for Special High Grade zinc and from 0.85 cent to 1.10 cents for High Grade zinc. In the past decade, the premium grades of zinc have accounted for a large and increasing share of all zinc metal consumed in the United States. 2/

U.S. prices in relation to foreign prices

Before mid-1964, the prices of lead and zinc in the United States exceeded those for corresponding grades of these metals on the London

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1/ The premiums for grades of lead higher than Common Grade are not considered here because they are very small.

2/ The lead and zinc industry has also benefited from recent increases in prices of miscellaneous other metals contained in lead and zinc ores mined or smelted in the United States. Silver accounted for 8.5 percent and copper for 3.7 percent of the gross market value of all recoverable metals contained in the lead and zinc ores mined in 1962 (table 13). The New York price of refined silver increased from an average of 92.7 cents per troy ounce in 1961 to 129.3 cents at the end of 1964. The domestic refinery price of electrolytic copper advanced from 30.6 cents a pound on May 19, 1961, to 33.7 cents at the end of 1964. The U.S. price of cadmium metal, contained in some zinc ores, advanced from $1.50 a pound at the beginning of 1961 to $3.00 at the end of 1964.

Metal Exchange (LME); since then the prices on the LME have exceeded those in the United States. The recent rise in the LME prices above the U.S. prices reflected, in part, a growth in consumption of lead and zinc in relation to production that was more rapid in the rest of the free world than in the United States.

The quantities of lead and zinc metals traded on the LME account for a small portion of the total quantities of these metals traded in the free world. Nonetheless, throughout the quota years for lead, and until about mid-1964 for zinc, the LME price quotations were used as the basis for pricing the bulk of the lead and zinc traded in the free world outside the United States. After mid-1964, as noted below, use of the LME quotations in the international pricing of zinc diminished.

In 1959-64 the average of the U.S. prices for lead (Common Grade, New York) exceeded the average of the LME prices of comparable lead by 2.650 cents, which is 0.636 cent larger than the comparable spread in the prequota period 1953-57. Similarly, in 1959-64 the average of the U.S. prices of zinc (Prime Western Grade, East St. Louis) exceeded the average prices on the LME for comparable zinc by 1.537 cents; this is 0.382 cent larger than the spread in 1953-57. From time to time, however, the spread varied; it tended to increase when supplies in the United States became tighter than those in foreign markets and to decrease when the situation reversed.

Lead.--Most foreign prices of lead began to rise about mid-1962. The average price of refined lead on the IME, 1/ rose from the equivalent of 6.4 cents a pound in August 1962 to 17.3 cents in December 1964 (table 11). After November 1963 the IME price of lead advanced more rapidly than the U.S. price. During the latter half of 1964 the foreign prices of lead, particularly those in Europe and Japan, were above the U.S. price. By the middle of May 1965, however, the IME price of lead had declined to 13.3 cents.

In December 1964 the IME quotations for lead averaged 17.3 cents a pound, whereas the U.S. producers' average price of lead was 15.7 cents. While the U.S. price of lead remained at 16 cents throughout the first quarter of 1965, the average IME price of lead declined to 15.7 cents in January and then rose to 17.6 cents in February and 17.9 cents in March--a higher average than in any other month since the IME resumed operations in April 1953.

Zinc.--The foreign prices of refined zinc increased from about mid-1962 through July 1964 but afterward declined. The monthly average IME price of zinc rose from the equivalent of 8.0 cents a pound in September 1962 to a high of 17.5 cents in July 1964. From August 1963 through July 1964, the IME price advanced more rapidly than the U.S. price.

Before mid-July 1964 most sales of zinc concentrates and zinc metal in foreign markets were based on the IME price quotations for zinc metal.

1/ The "average price" on the London Metal Exchange refers to the monthly mean of bid and asked quotations, as reported in the E & MJ Metal and Mineral Markets.

Afterward, most major foreign producers abandoned the LME quotations as a basis for pricing zinc in favor of a lower foreign producers' "flat" price. This price, fixed at about 15.6 cents in mid-July, was reduced to 13.75 cents on September 4, at which level it has since remained. 1/ Thus, the foreign producers' price has been 0.75 cent below the U.S. producers' price (E. St. Louis) since October 1964.

Mining and Milling

During most of the period since 1958, the U.S. annual mine output of lead was considerably smaller than the average production during 1953-57 (table 6). The U.S. mine output of zinc, on the other hand, has increased each year since the import quotas were imposed. 2/ The largest annual increments in the mine production of zinc occurred in the more recent years; the annual output in 1963 and 1964 exceeded the average for 1953-57 (table 7). Mine output of each metal was larger in 1964 than in any previous quota year. Still larger production is

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1/ The foreign producers' price apparently helped to depress the LME zinc quotations. The LME price, which averaged 17.5 cents a pound in July 1964, averaged 15.5 cents in December 1964 and 14.6 cents in January 1965.

2/ In 1962, the latest year for which detailed statistics are available, 283 mines accounted for the total U.S. mine production of lead and zinc. Ores and concentrates valued chiefly for their lead-plus-zinc content were produced at 195 mines and associated mills; these operations accounted for 96 percent of total mine production of lead and for 90 percent of total mine output of zinc.

estimated for 1965, as indicated in the following tabulation (in short tons of recoverable lead or zinc):

Period	Mine output of lead	Mine output of zinc
1953-57 average	339,426	521,929
1959	255,586	425,303
1960	246,669	435,427
1961	261,921	464,390
1962	236,956	505,491
1963	253,369	529,254
1964 (preliminary)	283,000	572,000
1965 (estimated)	315,000	616,000

The changes in mine production reflect the influence of changes in U.S. prices and mine shutdowns owing to labor disputes. The price increases

since early 1962 have stimulated a rise in the mine output of both lead and zinc. 1/

Increased efficiency

U.S. lead and zinc mining and milling operations have undergone substantial changes in recent years. Many small producers have been eliminated, and production in general has been concentrated in larger, more highly mechanized, and more efficient mines and mills requiring less labor per unit of output. These changes were induced in part by the adverse conditions that led to the imposition of import quotas in

1/ The production of lead and zinc from small mines whose owners received "stabilization" payments was small and accounted for a minor part of the increase in total mine output of lead and zinc during 1962-64. During this 3-year period, the quantity of recoverable lead produced with the benefit of the stabilization payments amounted to about 21,000 tons, which was equivalent to about 3 percent of the total U.S. mine output of lead. During the same period the quantity of recoverable zinc produced under the program amounted to about 42,000 tons, or about 3 percent of the mine output of zinc. The small mines stabilization program does not expire until the end of 1965. However, no stabilization payments can be made under the law when the U.S. market prices of lead and zinc average 14 cents per pound or more. This level was reached on Sept. 1, 1964, for lead, and on Oct. 19, 1964, for zinc. The Lead-Zinc Small Producers Stabilization Act (75 Stat. 766), approved in Oct. 1961 provides stabilization payments to domestic producers of lead and zinc who can qualify under the terms of the law as small producers. The payments for lead are equal to 75 percent of the difference between 14.5 cents per pound and the average market price of lead. The payments for zinc are equal to 55 percent of the difference between 14.5 cents per pound and the average price of zinc. About $2.1 million was paid to small producers from mid-1962 (when the program got under way), through 1964. Payments were lower than originally anticipated because of increased domestic prices of lead and zinc and the passage of an amendment in July 1963 (77 Stat. 92) which eliminated several large producers from further participation in the program (because their lead and zinc production did not account for at least half the value of their total mineral production).

1958 and in part by similar conditions that persisted for several years under the quotas. Improvements in mining and milling techniques and greater mechanization of operations were especially encouraged by the need to counter the effects of low prices that prevailed in the early quota years and the upward trend in wage rates. Greater efficiency has been brought about in mining by improved planning and development of operations 1/ and by the increased use of high-speed, large-capacity mobile equipment. Improvements in milling (ore concentration) have included the more efficient elimination of waste materials in the ores treated and more complete recovery of metals in the concentrates produced; these changes have resulted in reduced labor requirements in milling.

The most outstanding improvements have occurred at mines in the States east of the Mississippi and in the West Central States, especially at certain zinc mines in Tennessee and the lead mines in southeastern Missouri. The ore bodies in these areas, although not of high grade, are massive and can be mined in large open stopes accessible through large passageways that require little added support. These ore bodies are amenable to extensive mechanization using the most efficient large-capacity equipment. The newer mines in these areas have been or are now being developed to take full advantage of these favorable

1/ Improvements include better planning and development of mines to take fuller advantage of gravity for transporting and loading ore and waste materials and for minimizing rehandling of materials; they also include the backfilling of mined-out stopes with sand readily placed where wanted through pipes or tubes.

conditions. Many of the mines are trackless, equipped with large-capacity loading and transporting equipment mounted on rubber tires. Some of the more advanced techniques include the use of mobile drill jumbos, ammonium nitrate explosives loaded pneumatically into long, small-diameter holes for efficient breaking of large blocks of ore, primary crushing underground, and automated skip loading and hoisting. Many mills are also equipped with modern, highly automated machinery.

A large part of the mine production of lead and zinc in the United States (as throughout the world) comes from large mines. The concentration of U.S. production in large mines has become more pronounced in recent years. Whereas the total mine output (895,200 tons of recoverable lead plus zinc) in 1956 was produced by more than 600 mines of all sizes, 1/ 73 percent of that total was accounted for by 37 mines, each of which produced 5,000 tons or more (and averaged about 18,000 tons). In 1960, 682,000 tons of lead and zinc were produced by somewhat more than 300 mines; 87 percent of that output was accounted for by 35 large mines (similarly defined). And in 1962, the latest year for which data are available, 87 percent of a total output of 742,400 tons was produced by 36 large mines, out of a total of less than 300. Large-scale plant modernization and mechanization is generally more practical at large than at small mines and mills. Moreover, the larger establishments are

1/ The number of producing mines (all sizes) cannot be indicated precisely because of different concepts of what constitutes a mine. Large mines producing 5,000 or more tons of recoverable metal are more easily identified, and the number of such mines is more readily determined.

usually better able to finance such improvements, and their costs can be spread over a larger number of production units and recovered more quickly.

Mine production

In 1962, 13.5 million short tons of crude ore and miscellaneous other materials, 1/ valued chiefly for their lead and zinc content, were "sold or treated" 2/ by U.S. lead- and zinc-mining companies. The recoverable metals contained in such crude ores and related materials had a gross market value of approximately $173 million in 1962, compared with gross market values of $175 million in 1960 and $158 million in 1958 (table 13). 3/ The mine value (f.o.b. mine or mill) of the ores and concentrates is about two-thirds of that of the gross market value.

The respective shares of the gross market value accounted for by the individual recoverable metals in lead-zinc ores 4/ mined in 1962

1/ Old tailings and mill cleanup materials.

2/ For all practical purposes, crude ores (and other miscellaneous materials) sold or treated represent crude ores mined. The term "sold" refers to ores sold to smelting companies or to custom mills for concentration. The term "treated" refers to ores that are concentrated in mills owned by the mining concerns.

3/ Computed by multiplying the recoverable content of each metal (lead, zinc, silver, gold, and copper) by the respective average yearly prices of the refined metals.

4/ Hereafter, for the purpose of brevity, crude ore and other primary materials valued chiefly for their lead and zinc content are referred to as "lead-zinc" ores.

in the United States and in the major producing areas are shown in the following tabulation:

Region	Gross market value	Percent of total gross market value accounted for by--				
		Lead	Zinc	Copper	Gold	Silver
	Thousand dollars					
United States, total	173,208	25	61	4	1	8
States east of the Mississippi River	50,769	3	97	1/	-	-
West Central States	18,626	67	21	9	-	3
Western States	103,813	29	51	4	2	14

1/ Less than 0.05 percent.

The shares of the total gross market value attributable to the individual metals varied widely among the major producing areas.

Grade of ore mined.--The crude lead-zinc ores mined in the United States as a whole in 1962 contained the following average content of recoverable metals: Lead, 1.7 percent; zinc, 3.4 percent; copper, 0.1 percent; silver, 1 fine ounce per ton of ore; and gold, 0.005 fine ounce per ton of ore. 1/ The Western States produce the richest ores in terms of recoverable content of lead and zinc and other metals. In 1962 the recoverable content per ton of ore mined in the Western States averaged 3.2 percent lead, 4.6 percent zinc, 0.2 percent copper, 2.65 ounces of silver, and 0.013 ounce of gold. By contrast, the West Central States produced the lowest grade ore; in 1962 the ore mined in these States

1/ Similar data are shown for selected years since 1939 in table 16.

yielded an average of 1.9 percent lead, 0.5 percent zinc, 0.14 ounce of silver, an infinitesimal amount of copper, and no gold. The ores from mines in the States east of the Mississippi River yielded an average of 0.1 percent lead, 4.2 percent zinc, a very minor amount of silver, and no gold or copper.

Lead and zinc ores much richer than those mined in the United States are exploited in Canada, Mexico, Peru, Australia, and South Africa--principal countries that supply the United States with lead and zinc from indigenous ores.

Lead.--Annual production of recoverable lead from U.S. mines during 1959-63 was substantially smaller than the annual average production of 339,000 tons during 1953-57 (table 6), even if the average of about 75,000 tons per year purchased during 1953-57 for Government stockpiling were deducted. Production was reduced substantially in 1962 and 1963 because of a prolonged strike at the lead mines in southeastern Missouri. 1/ Another factor contributing to the sharply reduced production of 237,000 tons of recoverable lead in 1962, the lowest in any year since 1900, was an unusually low price level for lead that averaged only 9.6 cents per pound during the year (table 6). The price increases for lead since 1962 have stimulated expansion of the capacity of lead mines. Although the mine output of lead in 1963 was still low (253,000

1/ The lead mines of the St. Joseph Lead Co. in southeastern Missouri were shut down from the beginning of August 1962 to the end of March 1963 with loss of production attributable to the shutdown estimated at about 44,000 tons of lead in 1962, and about 27,000 tons in 1963.

tons), reflecting the effects of labor difficulties, the production of 283,000 tons in 1964 was 12 percent larger than in 1963 and larger than in any other year under quotas. Major domestic producers estimate that in 1965, with the price at the current level of 16 cents per pound, the mine production of lead will amount to about 315,000 tons.

The mine output of lead toward the end of 1966 and in 1967 and beyond will probably be much larger, principally as a result of the additional production expected from new developments in southeastern Missouri. 1/

1/ Early in 1964, the St. Joseph Lead Co. announced that by the end of 1964, lead production from its new Viburnum mine and mill would have been expanded by about one-third, and by the end of 1966 it would have completed the development and construction, begun in mid-1963, of a new large lead mine and mill--the Fletcher. The annual pig lead capacity of the company's lead smelter at Herculaneum, Mo., is being increased by more than 90,000 tons to handle the increased tonnage of lead concentrates expected from its new Fletcher and other mines and mills.

On Feb. 8, 1965, the American Metal Climax Co., Inc., and the Homestake Mining Co. announced a new joint production project in southeastern Missouri. The plans call for mine development and mill construction that will begin production late in 1967 at the annual rate of 50,000 tons of lead and some zinc. On May 5, 1965, these companies also announced the award of a contract for the construction of a lead-zinc concentrator and a lead smelter in the area. The smelter will be used to process not only ores produced by these companies but also ores produced from other mines being developed in the area.

On Feb. 23, 1965, the Consolidated Mining & Smelting Co. of Canada, Ltd., and Dresser Industries Inc., announced that joint plans were well advanced to bring a property located near Bixby, Mo., into production by late 1967 or early 1968. The planned annual output of the mine, in terms of lead concentrates, will be about 70,000 tons (equivalent to about 52,000 tons of recoverable lead).

Several other large companies have announced discoveries of large ore deposits containing mostly lead in the southeastern Missouri region, although they have not yet announced specific plans for development and production. The National Lead Co. and the Bunker Hill Co. have indicated that they would bring into production a large zinc-lead ore body near Fredericktown, Mo., in a joint venture. Although not yet announced, trade reports indicate that large mine production capacity, and commensurate lead smelter capacity, will be constructed (probably after 1967) by the Kennecott Copper Co. and the American Smelting and Refining Co.

The U.S. mine output of lead in 1968 may total nearly 600,000 tons, or about double the output in 1964. This total may not be achieved, however, if in the meantime the conditions of trade change so as to result in a substantial price decline.

Lead has been mined regularly in 17 States during the last decade; 3 States--Missouri, Idaho, and Utah--have produced the bulk of mine output each year (table 14). During 1959-64 these States accounted for close to four-fifths of the total U.S. output.

Zinc.--U.S. mine production of zinc, unlike that of lead, has risen in each calendar year since the imposition of the import quotas--from 425,000 tons of recoverable zinc in 1959 to 572,000 tons in 1964 (table 7). Year-to-year increases during 1961-64 were larger than those in 1959 and 1960. Production in 1963 and 1964 exceeded the average annual output during 1953-57 (522,000 tons), when about 115,000 tons of the zinc from domestically mined ores was purchased annually for the U.S. Government stockpile. Output in 1964 was the largest since 1952.

In view of the prevailing strong demand and the highest price for zinc metal (14.5 cents) since mid-1952, further increases in mine production are anticipated in the near future. Mine output is likely to reach 616,000 tons in 1965 and about 645,000 tons in both 1967 and 1968. These levels of mine production of zinc (like those for lead) might not be attained if a business slump occurs and results in a substantial decline in the price of zinc.

Zinc has been mined in about 20 States during each of the past several years (table 15). During the past decade the relative importance

of the States east of the Mississippi has increased, while that of the West Central and Western States has declined. During 1959-64, four States--Tennessee, Idaho, New York, and Colorado--accounted for about 50 percent of the total U.S. output.

Employment, productivity, and unit labor costs

The average number of workers at lead and zinc mines and mills in the United States was substantially smaller during the quota years 1959-63 than in earlier postwar years (table 23). The number averaged about 17,000 in 1954 and 16,800 in 1956, but declined to about 9,900 in 1959 and 8,600 in both 1962 and 1963.

About two-thirds of the total reduction in the number of employees between 1956 and 1963 occurred in the Western States (table 27); most of the remaining reduction occurred in the West Central States. Employment in the Western States declined 53 percent; that in the West Central States, 64 percent; and that in the States east of the Mississippi River, 5 percent.

Most of the decline in the average number of employees during 1959-63, as compared with the number in previous years was caused by a lower annual rate of production. However, the decline also reflects a trend toward greater output per man in lead and zinc mining and milling in the United States. This trend is apparent from a comparison of the data for 1959-63 with those for earlier years on the average number of employees at lead and zinc mines and mills, together with the combined

output of recoverable lead plus zinc in the ores and concentrates produced, as reported in the following tabulation: 1/

Year	Average number of all employees	Total mine output of recoverable lead plus zinc
		Short tons
1952	24,282	1,056,200
1954	17,016	798,900
1956	16,845	895,200
1958	10,500	679,400
1959	9,893	680,900
1960	9,430	682,100
1961	9,312	726,300
1962	8,561	742,400
1963	8,598	782,600

Notwithstanding a continuous increase in the combined production of lead and zinc, especially after 1960, the average number of employees at lead and zinc mines declined in each year during 1959-62 and remained at about the 1962 level in 1963. 2/ A measure of declining labor requirements (in terms of man-hours worked by production and related workers) per unit

1/ Employment data (table 23) are for lead and zinc mines or mills that produced ores or concentrates valued chiefly for their lead-plus-zinc content. Data on production (tables 6 and 7) represent mine output of lead and zinc from all U.S. mines, including the relatively small production from mines and mills producing ores and concentrates valued chiefly for their content of metals other than lead plus zinc.

2/ For this analysis, data for lead and zinc are combined because the two metals are to a large extent contained in the same ores mined and milled (table 13). The most notable exceptions are in the States east of the Mississippi River, where zinc predominates, and in southeastern Missouri, where lead predominates. Data on employment at lead and zinc mines for selected years 1956-63 and available corresponding data on production are given, by principal producing regions and States, in table 27.

of output in U.S. lead and zinc mining and milling in recent years is presented in the following tabulation (from table 25):

Item	1956	1958	1960	1962	1963
Man-hours per ton of recoverable lead plus zinc:					
States east of the Mississippi River	24	20	16	16	1/
West Central States	38	36	33	26	1/
Western States	39	26	26	21	1/
United States average	36	26	24	20	2/ 20

1/ Not available.
2/ Production data partly estimated.

Changes in the average man-hours worked per unit of output in mining and milling reflect the following: The influence of year-to-year changes in the composition of mines with respect to grade, size, and character of the ores mined; changes in the share of total man-hours devoted to exploration, development, maintenance, and travel to and from working places; and the utilization of improved techniques and mechanization. During periods of low prices, there is a propensity to postpone exploration and development work and to confine mining operations to the highest grade ores. The low market prices in 1962 probably discouraged certain operations and thereby resulted in some increase in the average grade of ores mined in that year, and a correlative decline in the average number of man-hours worked per unit of output of lead and zinc. The downward trend in the average man-hours worked per unit of output in recent years is probably attributable mainly to further

concentration of production in the most efficient mines and to more effective planning and mechanization of operations.

Regional differences in the character of lead-zinc ore bodies require varying mining techniques utilizing differing amounts of labor. According to data reported to the Commission, the number of man-hours utilized at mines and mills per ton of crude ore mined in the major producing regions in specified years was as follows:

Region	1956	1958	1960	1962
States east of the Mississippi River	0.97	0.84	0.67	0.68
West Central States	.67	.66	.66	.61
Western States	2.68	2.26	2.09	1.67
United States average	1.33	1.11	1.00	1.03

In the Western States the ore bodies are generally found in small veins (bands or lenses, often of irregular shape), which are exploited with the expenditure of considerable labor to reach the ore, as well as to extract it and to prevent cave-ins of stopes and passageways. A large amount of labor is needed in the removal of barren rock, timbering, backfilling, and other maintenance functions. In both the West Central States and those east of the Mississippi River, the ore bodies are generally large, the mine openings require little support, and they are amenable to large scale labor-saving mechanization previously described. The more labor-intensive mining techniques adapted to the Western States, however, are generally applied to ore bodies that yield higher metal content than those exploited elsewhere in the United States; as a result,

the number of man-hours worked per ton of recoverable metal content in Western lead-zinc mines approximates that of other U.S. mines.

The reduced labor requirements per unit of output at lead and zinc mines and mills have been accompanied by generally declining unit labor costs, notwithstanding increasing hourly wage payments. This is shown in the following tabulation for specified years 1956 to 1963:

Item	1956	1958	1960	1962	1963
Labor cost per ton of recoverable lead-plus-zinc produced:					
States east of the Mississippi River	$48.04	$42.47	$37.76	$36.52	1/
West Central States	82.25	80.68	77.14	58.60	1/
Western States	88.60	63.17	67.01	61.54	1/
United States average	78.83	60.97	58.45	53.10	2/ $51.64

1/ Not available.
2/ Data on production on which this calculation is based are partly estimated.

While the average unit labor cost of production and related workers at U.S. lead and zinc mines and mills declined from about $79 per ton of recoverable lead-plus-zinc produced in 1956 to an average of $52 in 1962-63, average hourly wages paid 1/ for hours actually worked by

1/ The data on average hourly wage payments should not be confused with hourly wage rates. The average hourly wage payments to production and related workers were computed by dividing total wages paid to production and related workers by the total man-hours of such workers at mines and mills; the annual averages reflect changes in wage rates paid to workers in various occupations at the mines and mills covered, as well as changes in the relative importance of occupations subject to different rates of pay, and variations in the wage rates among mines.

production and related workers increased from $2.19 in 1956 to $2.63 in 1962, and then declined somewhat to $2.58 in 1963 (table 24). 1/

The average labor cost per unit of output in 1962, the last year for which data are available by regions, was by far the lowest in the States east of the Mississippi River, and the highest in the Western States. Production in the States east of the Mississippi, consisting predominantly of zinc, has risen to record levels (table 15). Tennessee, the largest producer among these States, is likely to become a much larger producer in the next several years. Production in the West Central States consists predominantly of lead from Missouri (table 14). Since the settlement of the labor dispute in that State in April 1963, production has risen rapidly; it is expected to rise to much higher levels in the near future. The new mines under development in areas from which the largest increases in production are anticipated, are expected to be among the most highly mechanized and efficient in the United States. As a result, the trend toward lower unit labor costs is likely to continue.

Smelting and Refining

Lead and zinc metals are produced in the United States by primary and secondary plants. The primary plants for lead include both smelters and refineries. The smelters produce lead bullion from ores, and the

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1/ Although data on total costs are not available, the U.S. Census of Mineral Industries indicates that the total wages paid to production and related workers is the largest single operating expense in lead and zinc mining. In 1958, wages paid to production and related workers were equal to about 38 percent of the mine or mill value of products.

refineries recover lead, precious metals, and other products from lead bullion. The primary-lead plants also produce some secondary lead from scrap. The bulk of the secondary lead, however, is produced at a large number of secondary plants from lead scrap and other nonferrous scrap.

The primary-zinc plants include electrolytic reduction plants and thermal distillation plants; both produce refined zinc metal from zinc ores and other primary raw materials. The primary-zinc plants also produce refined zinc metal from scrap; in recent years primary plants accounted for most of the output of refined zinc from scrap. The remainder of the refined zinc is produced from nonferrous scrap by eight secondary plants.

Producers and plant capacity

At the end of 1964, 11 companies and their subsidiaries were engaged in primary smelting and refining of lead and zinc; 1 produced primary lead, 4 produced both primary lead and zinc, and 6 produced primary zinc. At the end of 1963, 4 of the 11 concerns controlled about 90 percent of the primary-lead-refining capacity then in operation and about half the primary-zinc-reduction capacity. In 1962, these 4 concerns, together with 4 others engaged in primary-zinc smelting and refining, owned or controlled 41 mines that accounted for about 73 percent of the output of recoverable lead-plus-zinc from lead and zinc mines.

Five firms (and their subsidiaries) were engaged in primary-lead smelting and refining in the United States. These firms operated eight primary-lead plants, including three smelters, three combination smelter-

refineries, and two refineries (table 17). The products of the primary-lead plants include not only refined unalloyed lead and antimonial lead, but also other metals, such as gold, silver, and copper, obtained from ores, and small quantities of secondary lead produced from scrap. In addition to the 8 primary-lead plants, more than 200 secondary plants recovered lead in several forms (mainly refined lead and antimonial lead), as well as other metals and alloys and miscellaneous products. Some of the more important producers of secondary lead are subsidiaries of producers of primary lead.

On December 31, 1963, the lead-refining capacity 1/ of the five active refineries was about 512,000 tons annually, 37 percent below that on December 31, 1957. The refining capacity of another plant, not in operation but in standby status, was 96,000 tons (table 17). The decline in refining capacity of active plants from 1957 to 1963 is accounted for by the closure of the standby plant mentioned above and of one refinery and one smelter-refinery now dismantled. One lead smelter has also been closed and dismantled since 1957. 2/ The shut-down of lead refining and smelting plants (all before 1962) resulted in part from a decrease in demand, including both Government demand for stockpiling and industrial demand for consumption.

1/ As rated by the producers.

2/ The facilities of the plants referred to were obsolescent. The closures adversely affected some mines, especially in Colorado and the Tri-State area, the ores from which had been processed by those plants. The cost of transporting ores to other smelters was so high that these mines could not continue to operate.

Since February 1964, 10 U.S. firms (and their subsidiaries) have been engaged in primary domestic smelting and refining of zinc. Four of them are among the aforementioned 5 that operate primary-lead plants. The 10 firms currently operate 13 zinc plants, including 4 electrolytic plants and 9 thermal distillation plants (table 19). In addition to primary-zinc metal, the products of primary plants include zinc dust, cadmium, sulfuric acid, zinc residues, and some primary lead, as well as secondary slab zinc produced from scrap. Eight plants recover secondary slab zinc from scrap; one of them is a subsidiary of a primary producer. About 200 other secondary plants recover zinc in such forms as alloys, chemicals, and pigments. Some of the plants in this group are also among those that recover secondary lead.

At the end of 1963 the capacity 1/ for producing primary slab zinc at active plants, 1.14 million tons, 2/ was about 2 percent smaller than in 1957. The reduced net capacity reflects mainly the shutdown of three plants having a combined capacity of 128,500 tons (two of which are now on standby status) and an increase in capacity of about 105,000 tons. All but one of the shutdowns are attributable principally to a shortage of concentrates.

Domestic production

The annual average production of primary and secondary lead and zinc was substantially smaller during 1959-63 than during 1953-57. The

1/ As rated by the producers.
2/ Including the capacity of about 29,000 tons at one plant which was shut down in February 1964.

largest declines were in the production of primary metals, as shown in the following tabulation 1/ (in thousands of short tons):

Item	Average 1953-57	Average 1959-63	Decrease
Lead:			
Primary production (from ores)	518	409	109
Secondary production (from scrap)	493	462	31
Total	1,011	871	140
Zinc:			
Primary production (from ores)	930	843	87
Secondary production (from scrap)	283	262	21
Total	1,213	1,105	108

The average annual production of primary and secondary lead in 1959-63 was nearly 14 percent lower than that in 1953-57. 2/ Production reached a peak of 927,300 tons in 1961 but declined in the next 2 years (table 18), owing to a prolonged labor dispute at a large producing plant. Total production in 1964, estimated at 980,000 tons, was larger than in any other quota year; nevertheless, it was smaller than the average production of 1,011,000 tons during 1953-57.

1/ Summarized from tables 18 and 20; these tables supply data on the production of unalloyed refined lead and zinc metals, as well as the lead or zinc content of various lead- or zinc-base and other alloys (and for zinc, the zinc content of chemical compounds).

2/ Of the total production of lead in 1959-63, refined lead accounted for 60 percent; the lead content of antimonial lead, for 27 percent; and the lead content of other lead alloys and copper- and tin-base alloys, for the remaining 13 percent. The composition of total production in 1953-57 was similar to that in 1959-63.

For all practical purposes, the primary production of lead may be regarded as the total production by primary-lead smelters and refineries. Although some of the output by these plants is derived from scrap, it rarely amounts to more than 1 to 2 percent of the total.

Although the U.S. output of primary and secondary zinc was about 9 percent smaller in 1959-63 than in 1953-57, 1/ the annual trend has been upward since 1960 (table 20). The estimated production in 1964, 1,260,000 tons, was substantially larger than in any other quota year, and exceeded the average annual output (1,214,000 tons) in 1953-57. Six grades of zinc metal are generally produced; prior to about 1960, Prime Western zinc, used primarily for galvanizing, had been the principal grade produced. In 1960 and 1962-64, however, the principal grade produced was Special High Grade--that having the highest purity, which is used largely by die casters for the production of automobile parts.

1/ In 1959-63, slab zinc accounted for 82 percent of total production; the remaining 18 percent consisted of the zinc content of such zinc-bearing products as zinc dust, brass and bronze, other zinc-containing alloys, pigments, and chemicals. The composition of the production in 1953-57 was similar.

Producers' stocks of metal and ores

Stocks of refined lead and zinc metals held by U.S. producers at the end of 1958 and each quota year are shown in the following tabulation (in thousands of short tons): 1/

Date	Stocks of refined lead and antimonial lead at primary smelters and refineries and elsewhere	Stocks of slab zinc at primary and secondary smelters and refineries and elsewhere
At the end of--		
1958	199	208
1959	120	184
1960	160	213
1961	218	173
1962	157	182
1963	73	74
1964	50	50

The producers' stocks of refined metal have been greatly reduced in recent years, especially since the end of 1962. The depletion of these stocks after 1962 reflects, as previously noted, the fact that U.S. industrial consumption of lead and zinc substantially exceeded new U.S. supplies (tables 9 and 10).

Smelter stocks of lead in ores, which had risen to a peak of about 90,000 tons at the end of 1960, declined to a low of 62,000 tons at the end of 1962, rose to 75,000 tons at the end of 1963, and then declined

1/ From tables 30, 31, 33, and 34. Data for antimonial lead stocks included in the total are in terms of their gross weight rather than their lead content. Stocks of lead shown for 1961-64 are those at refineries, from table 30, and "elsewhere" stocks, from table 33. Data on stocks of lead in 1958-60 are those held at smelters and refineries only.

to 64,000 tons at the end of 1964 (table 30). The low stocks of lead ore at the end of 1962 reflect the unusually low mine production in that year. The decline in the lead ore stocks during 1964, however, occurred when mine output was larger than in any other year under quotas. Smelter stocks of zinc in ores and other primary materials also reached a peak in 1960 and have declined annually since then (table 31); the decline for zinc was much larger than for lead. Smelter stocks of zinc in ores and similar materials decreased by 39 percent from the end of 1962 to the end of 1964 (table 32). 1/

The drawdown of smelter stocks of lead ores in 1964 and that of zinc ores in 1963 and 1964 made possible some of the increase in the domestic production of refined lead and zinc metals in that year. However, such smelter stocks are at practically minimum working levels and thus are insufficient to meet the current high demand for lead and zinc metals. Moreover, as noted later, lead and zinc metals in stocks of foreign ores currently held in bond are not available for consumption in the United States except as permitted by the quotas.

Smelter supplies of ores

The annual new supply of recoverable lead in ores and concentrates available to U.S. smelters of lead averaged about 387,000 tons in 1959-63--123,000 tons less than in 1953-57. Of the 123,000 tons, 88,000

1/ Data on actual quantities of the stocks of zinc in ores are confidential. * * *

tons reflected the reduced U.S. mine output of lead ores (table 9); the remaining 35,000 tons resulted from smaller imports of lead ores (table 40).

The lead content of ores and concentrates received by domestic smelters totaled about 417,000 tons in 1963 (table 21). Three-fifths of this quantity came from domestic sources and the rest from foreign sources. About half of the receipts from domestic sources and 7 percent of those from abroad originated in mines owned or controlled by the smelting companies.

The average annual new supply of recoverable zinc in ores and concentrates (and zinc fume) available to U.S. zinc smelters declined from 876,000 tons in 1953-57 to 786,000 tons in 1959-63; the annual average in 1959-63 was thus 89,000 tons less than in the earlier period. 1/ The average annual U.S. mine output of recoverable zinc available to U.S. smelters was 38,000 tons less, and the annual imports of recoverable zinc in ores and fume were 51,000 tons less, in 1959-63 than in 1953-57.

In 1963, U.S. zinc smelters received 854,500 tons of zinc in domestic and foreign ores and concentrates; about 56 percent of this total was from domestic mines and 44 percent from foreign mines. About

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1/ The new supply of zinc in primary raw materials available to U.S. zinc smelters considered here consists of (a) the recoverable zinc content of zinc-bearing ores mined in the United States minus the zinc in ores consumed directly in making chemical compounds and pigments, and (b) the zinc content of imported zinc ores and zinc fume minus 10 percent of their zinc content to allow for processing losses in the period prior to Aug. 31, 1963, the effective date of the Tariff Schedules of the United States (after which official import statistics of the Department of Commerce for zinc ore gave their approximate recoverable zinc content).

60 percent of the receipts from domestic sources and 15 percent of those from foreign sources came from mines owned or controlled by the smelting companies.

Foreign ores held in bond

U.S. smelters have long processed ores imported in bond (free of duty) and exported the metal produced. 1/ Such imports are not restricted by quotas and have continued to be substantial. The ores held in bond were reduced materially just before the quotas were imposed; in anticipation of quota restrictions, large quantities of ores held in bond were entered for consumption and duties paid thereon. After the quotas were imposed, the quantities of foreign ores held in bond were increased (table 22). Lead in ores and concentrates held in bond increased each year--from 8,700 tons at the end of 1958 to 60,600 tons at the end of 1963, when the total was equivalent to 180 percent of the quarterly ore quota. The quantity of such material held in bond varied from a fraction

1/ The import quotas apply to lead or zinc ores or concentrates entered for U.S. consumption or withdrawn from warehouse for U.S. consumption. They do not apply to any article imported by or for the account of the U.S. Government or any article which is not subject to duty, such as lead or zinc ores entered into any customs bonded warehouse. The bonds for lead or zinc ores entered into a customs warehouse may be canceled (1) by payment of duties thereon and withdrawal for U.S. consumption of metal produced or producible therefrom, or (2) by exportation of metal produced or producible therefrom, in which case no duties are assessed thereon. The customs regulations also permit cancellation of bonds on metal in ores entered into a customs warehouse by substitution of an equivalent quantity of metal produced from domestic ores; the withdrawals from customs warehouses for U.S. consumption, of course, are limited by the import quotas, whereas the cancellation of bonds by exportation of metal produced or producible from the ores is limited only by the amount of recoverable metal in the ores held in bond.

of the quarterly quota for "all other" countries combined to more than three times the quarterly quota for South Africa.

* * * * * * *

Zinc in ores held in bond increased annually from 9,700 tons at the end of 1958 to 97,800 tons at the end of 1962 (table 22). By the end of 1963, however, smelter stocks of zinc in ores (from all countries) held in bond were drawn down to 79,000 tons--equal to 83 percent of the quarterly quantity permitted entry under quotas. The amount of zinc in ores held in bond for each country except Canada was less than the quarterly amount permitted entry under the respective quotas. The material from Canada held in bond, however, was almost double the amount permitted entry per quarter.

* * * * * * *

Foreign ores in bond in excess of the quotas have been accumulated partly to assure the owners of a large share of each quarterly quota. The quotas are filled on a first-come, first-served basis; if at the opening of the quota, the aggregate amount in the entry applications exceeds the quota, the amount allowed entry for each applicant is reduced proportionately. Some ores, principally zinc ores, have been imported under bond for processing with the intent of exporting the metal produced. The importation of ores for this purpose has enabled certain smelters to operate at a higher, and hence more efficient, rate of capacity utilization. Since the third quarter of 1964, several U.S. zinc-smelting concerns have signed long-term contracts for the supply of ores from certain countries, notably Canada, in excess of quarterly

quota limits. Underlying these contracts was the expectation by some of the concerns that the U.S. quotas would be relaxed or suspended; however, the aggregate amount involved in these contracts was not fully known to the individual concerns. If the quotas are not relaxed or suspended, the metal produced from at least some of these ores may have to be exported.

Competition for foreign concentrates

As previously noted, U.S. lead and zinc smelters are dependent on foreign sources for a large part of their supplies of ores and concentrates. In 1963 all but 2 of the 6 active lead smelters and all but 1 of the 14 active zinc smelters used significant quantities of foreign concentrates * * *. Several U.S. smelters are completely or almost completely dependent on foreign supplies.

The competition among smelters in principal importing countries for available concentrates has been greatly intensified during the past 2 years. The supply of concentrates available for export from some of the major supplying countries (such as the Republic of South Africa and Mexico) has been reduced with the installation of new or expanded smelting and refining facilities in those countries. 1/ Foreign producers,

1/ For example, a large new lead smelter (at Tsumeb) in the Republic of South Africa, erected in 1963, began utilizing in 1965 virtually all the lead ores produced in that country. Ores from that country accounted for 22 percent (29,760 tons of lead content) of the total U.S. lead ore quota, and for half of the lead in concentrates consumed annually by the lead smelter at El Paso, Tex. With the cancellation, at the end of 1964, of the contract for the supply of these ores to a domestic smelting company, virtually all new supplies of lead ore from South Africa will be terminated in 1965. The import quotas for lead ore from South Africa will be filled in 1965, however; accumulated stocks held in bond are sufficient to fill the quotas.

especially those in Mexico and Peru, that customarily supply ore to the United States are now exporting larger quantities to countries in Europe and to Japan. Poland has apparently been able to get larger imports of zinc ores by outbidding its free-world competitors. Japan, which has maintained high internal prices of lead and zinc, has also attracted increased supplies of ores. To meet this competition, U.S. smelting companies have offered various inducements (reduced smelting charges, unusual payments for certain additional metals in the ores, freight payments, etc.). U.S. smelters have also increased their prices, contending that the increased prices were needed to enable them to bid more successfully for foreign concentrates. 1/

Many foreign importing countries encourage or protect their producers of primary lead and zinc metals in various ways. All of the major foreign ore-importing countries allow imports of lead and zinc ores and concentrates to enter free of duty. The United States is the only major importing country that imposes import duties on lead and

1/ In 1964, when foreign prices exceeded U.S. prices, foreign smelters were willing to pay more than U.S. concerns for concentrates because they could obtain in the foreign markets more for the metals produced from them than domestic smelters received in the U.S. market. Lead and zinc concentrates shipped to the United States are generally sold on the basis of U.S. producers' prices at which the refined metals are sold in this country. Lead concentrates shipped to Europe or Japan are generally sold on the basis of LME lead prices, which exceeded the U.S. prices most of the time from July 1964 through March 1965. During the same period, sales of zinc concentrates shipped to Europe and Japan have generally been based on the foreign producers' flat prices of zinc. In a few instances (as in sales to Poland prior to 1965), the zinc concentrates have been sold on the basis of the higher LME zinc prices. The refined metals produced from concentrates shipped to foreign countries are generally sold at or near the prices used as the basis for pricing the concentrates.

zinc ores. 1/ Among the major ore-importing countries, however, only the United States and Japan are large producers of such raw materials, as well as the refined metals. Some of the large importing countries, however, provide higher tariff protection for their smelters and refiners than that provided for U.S. smelters and refiners. 2/ The tariff protection afforded U.S. smelters and refiners (the difference between the duty on refined metal and that on the recoverable metal in ore) amounts to about 0.3 cent per pound for lead and 0.03 cent per pound for zinc, the latter being nominal.

Employment

The average number of employees at primary lead and zinc smelters and refineries in designated recent years, together with the average

1/ The current duties are 0.75 cent per pound on the lead content and 0.67 cent per pound on the zinc content.

2/ Since mid-1963, for example, Belgium, the Netherlands, and the Federal Republic of Germany, all members of the European Economic Community (EEC), have had a common external tariff on lead and zinc metals (applicable to nonmember countries) equivalent to about 0.36 cent per pound on each metal. An increase in the rate in several stages to 0.6 cent per pound is scheduled to take effect by the end of 1969; recently, however, the EEC Commission proposed that this rate be applied by Jan. 1, 1966. Since lead and zinc ores and concentrates imported by these EEC countries are free of duty, the entire duty on metals is protective of the smelters and refiners in these countries, which compete for raw materials with U.S. concerns. In addition, in mid-1964 Belgium imposed an "import transmission" tax of 5 percent ad valorem on all imports of lead and zinc metal, apparently to enhance the position of its smelters in the competition for raw materials.

number of employees at U.S. lead and zinc mines, is shown in the following tabulation: 1/

Year	At primary smelters and refineries			At lead and zinc mines and mills
	Total	Lead	Zinc	
1956	17,156	4,853	12,303	16,845
1958	13,641	3,778	9,863	10,500
1959	13,308	2,844	10,464	9,893
1960	13,303	3,030	10,273	9,430
1961	13,335	2,946	10,389	9,312
1962	12,020	2,672	9,348	8,561
1963	11,893	2,660	9,233	8,598

Employment at primary lead and zinc smelters and refineries declined at a rapid rate during 1956-58 and at a much more moderate rate during the quota years 1959-63. The number of employees in 1958 averaged 3,515 below the average in 1956. In 1963, the last year for which data are available, the number averaged 1,748 below the average in 1958 and 1,415 below that in 1959.

The lower levels of employment in the quota years, compared with the level in 1956, are attributable primarily to the decrease in production that stemmed from the discontinuance after 1957 of the production of lead and zinc for the Government stockpile and the reduction in industrial demand for those metals. The decline in employment during

1/ Based on data in table 23. Employment at secondary lead and zinc smelters--those using scrap as their principal raw material--is not available.

the quota years resulted principally from the concentration of production in more efficient plants (as the less efficient ones were shut down) and an increase in output per employee. The rise in output per employee resulted in part from more extensive application of mechanization and advanced techniques of production. In 1962 and 1963, the output per man at zinc plants also increased through fuller utilization of plant capacity. The changes in employment in some years reflected in part the shutdown of plants caused by management-labor disputes; in 1959, for example, the reduction in employment at lead plants was attributable in part to the temporary shutdown of most of the primary-lead plants. The effect of the quotas on employment varied among the plants; the plants most dependent on imports of ores experienced the largest relative decline in employment (table 28).

Employment at U.S. primary-zinc plants has been substantially larger than that at U.S. primary-lead plants, because of the much larger amount of primary smelting and refining of zinc. The volume of employment at U.S. lead and zinc smelting and refining plants, which process substantial quantities of foreign as well as domestic ores, generally exceeds that at the mines and mills.

Profit-and-Loss Experience of Primary Producers

Data on profit-and-loss experience in 1961, 1962, and 1963 were received by the Tariff Commission from 61 U.S. producers of lead-zinc ores and primary lead and zinc metals. In 1962 these producers accounted for about 95 percent of the U.S. mine output of recoverable

lead-plus-zinc 1/ and all of the U.S. output of refined lead and zinc by primary smelters and refineries.

The ratio of net profit to net sales for these producers in the aggregate increased from 6.3 percent in 1961 to 7.3 percent in 1962, and to 11.2 percent in 1963 (table 35). The profit-and-loss experience varied widely among individual producers, and not all of them operated profitably each year (tables 36 and 37) * * *. Total profits of the 61 producers as a group increased after 1961, principally as a result of increased volume of business and increased prices, especially after mid-1962. Prices increased not only for lead and zinc but also for other metals (such as silver and cadmium) derived from the lead and zinc ores mined and processed. The larger production contributed to reduced unit costs, especially in smelting operations.

Profit-and-loss data for 1964 are not available; however, the U.S. lead and zinc industry as a whole was probably as profitable in 1964 as in 1963, if not more so. Prices continued to rise in 1964, and smelting operations were maintained at a high rate of capacity.

The accounting records of certain important companies did not permit the segregation of data for mining and milling from those on smelting and refining. Data were compiled, therefore, for three groups of concerns: (1) those engaged solely in mining and milling lead and zinc ores, (2) those engaged solely in smelting and refining zinc ores, and (3) the integrated concerns, those engaged both in operating lead

1/ In ores valued chiefly for their content of lead-plus-zinc.

or zinc mines and in smelting and refining lead or zinc ores. Table 35 summarizes the profit-and-loss experience for U.S. primary lead and zinc operations as a whole (including mining, milling, smelting, and refining operations). Profit-and-loss data on the integrated companies are not available separately for either their mining and milling operations (as distinguished from smelting and refining operations) or for their lead operations as distinguished from their zinc operations.

Table 36 shows the profit-and-loss experience of 49 nonintegrated lead and zinc mining and milling companies. * * *

Nonintegrated mines

Usable financial data for nonintegrated mines and mills were received from 49 producers (table 36); 32 of them operated mines in 1961, 42 did so in 1962, and 46 in 1963. Thirty of the 49 producers operated mines throughout 1961-63 (table 37). 1/ Of the 49, 10 were engaged primarily in mining lead in 1961; 12 were so engaged in both 1962 and 1963. The rest, primarily producers of zinc ores, accounted for

1/ Table 36 shows earnings by the 49 companies before and after the subsidy payments to small mine producers by the General Services Administration under Public Law 87-347. If these payments were added to sales, the number of operators reporting a profit would be 32 for 1962 and 34 for 1963. Subsidies were not paid in 1961.

approximately 90 percent of the sales by the 49 companies in all years. The aggregate sales of the 30 producers that operated mines in all 3 years covered were higher in 1962 than in 1961 and still higher in 1963. Ten of the 30 were engaged primarily in mining lead and 20 in mining zinc. The ratio of their net profit to net sales declined from 7.4 percent in 1961 to 7.3 percent in 1962, and rose to 8.8 percent in 1963. Their aggregate net profit, which was about the same in 1961 and 1962, rose by approximately $0.5 million, or 32.2 percent, from 1961 to 1963. Their net sales increased by 11.8 percent from $19.5 million in 1961 to $21.8 million in 1963.

Nonintegrated smelters and refineries

In 1962 the nonintegrated zinc smelters accounted for 18 percent of the refined zinc metal produced by primary zinc smelters and refineries. The aggregate net profits from these zinc smelters were $2 million in 1961, $1.7 million in 1962, and $3.4 million in 1963 * * *. Their net sales totaled $46 million in 1961, $39.8 million in 1962, and $42.5 million in 1963. The ratio of their net profits to net sales was 4.4 percent in 1961, 4.2 percent in 1962, and 8.1 percent in 1963.

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Integrated operations

Usable profit-and-loss data were obtained from eight integrated companies, which in 1962 accounted for 71 percent of the lead and 74 percent of the zinc recoverable from all lead-zinc ores produced in the country. These eight firms also accounted for all of the refined lead and antimonial lead produced by primary lead plants and 82 percent of the refined zinc produced by primary zinc plants. Seven of these companies produced and processed both lead and zinc ores; one produced and processed zinc ores only. Both aggregate sales and aggregate profits of these eight companies from their lead and zinc operations were a little greater in 1962 than in 1961 and substantially greater in 1963 than in 1962. Sales in 1963 were $27.1 million larger than those in 1961 * * *. Annual net profits increased from $17.4 million in 1961 to $34.9 million in 1963. The ratio of net profit to net sales increased from 6.5 percent in 1961 to 7.8 percent in 1962 and to 11.8 percent in 1963. Five of the eight companies operated at a profit in 1961, six operated profitably in 1962, and seven of them did so in 1963.

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Imports

U.S. imports for consumption of unmanufactured lead and zinc 1/ have consisted of two major categories: (1) Imports restricted by quotas (referred to below as commercial imports), which are

1/ Data for imports of zinc fume are not included in the import statistics discussed here; although zinc fume is an unmanufactured zinc article, it is not subject to import quotas.

dutiable, 1/ and (2) imports for U.S. Government account together with imports under bond for smelting, refining, and exportation, both of which are free of duty and not restricted by quotas.

Total annual imports 2/ of both unmanufactured lead and zinc during the quota years 1959-64 averaged somewhat less than 80 percent of the average in 1953-57. The smaller average annual imports during 1959-64 reflect principally the quantities allowable under the import quotas, which limit commercial imports to 80 percent of the average rate of such imports during 1953-57. More than 90 percent of the imports

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1/ The terms "commercial imports" (or "imports under quota") and "dutiable imports" refer to virtually the same imports throughout 1959-64, except for zinc ores. Throughout 1959-64 for commercial imports, and up to Aug. 31, 1963, for dutiable imports, the data refer to (a) the total zinc content of ores destined for first treatment at a zinc plant, which accounts for the bulk of imports, and (b) the recoverable zinc content of all other ores. Beginning Aug. 31, 1963, however, data on dutiable imports of zinc ores refer to (a) the total zinc content minus specific deductions for processing losses of zinc ores to be initially treated at zinc plants, and (b) the recoverable content of all other zinc ores. Zinc ores for initial treatment at zinc plants constitute the bulk of the imports of zinc-bearing ores. Even before the above change, the data on imports for consumption under quotas (obtained from reports of the U.S. Department of the Treasury) and those on dutiable imports for consumption (obtained from reports of the U.S. Department of Commerce) do not always agree, although differences are small. In this report the basic data on U.S. imports under quotas (based on data from the Treasury Department) are summarized in table 38 for lead and table 44 for zinc; such data for 1959-64, referred to as commercial imports, are also shown in table 5. Import data for lead as compiled from official statistics of the U.S. Department of Commerce are shown in tables 39-42, and those for zinc in tables 45-48.

2/ These are the aggregate of the two categories referred to above. As used in the remainder of this report, the term "imports" refers to imports for consumption unless otherwise stated.

of unmanufactured lead and zinc in both 1953-57 and 1959-64 consisted of commercial imports. Year-to-year changes in total imports during the quota years were small in relation to such changes previously.

During 1959-64, annual commercial imports of lead (in ores and metal) in each year equaled 96 to 100 percent of the aggregate quotas for that metal, while the commercial imports of zinc in each year equaled 92 to 99 percent of the quotas for that metal. The near filling of the quotas, even when foreign prices were more attractive, is probably attributable to the following factors: (1) The desire of foreign producers to preserve a share of the large U.S. market, 1/ with the expectation that the customary relationship between foreign and domestic prices would be reestablished in the near future, (2) the fulfillment of contracts, particularly for ores, negotiated before the recent changes in foreign and U.S. prices, and (3) the ability of some U.S. smelters and consumers to meet the price competition of foreign smelters and consumers.

The underfilling of some quotas resulted from various causes, including shutdowns of mines or other production facilities in the supplying countries; transportation difficulties; and the rapid growth in the demand for lead or zinc ores or metals, not only in the producing countries but also in other markets. Because of the rigidity of the quotas,

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1/ Exporters in some of the countries reportedly expect that unless they fill the U.S. quota assigned to their country, the quota might be reduced or eliminated in the event that the quota allocations are revised.

a shortfall in imports from one country could not be made up by imports from another, nor could a shortfall in one quarter be made up in another.

Unmanufactured lead

U.S. imports of unmanufactured lead declined from 403,000 tons (lead content) in 1962 to 377,000 tons in 1963, and to 348,000 tons in 1964, when they were smaller than in any other quota year (table 6). Much of the decline reflects a decrease in duty-free imports, which are not restricted by quotas. Duty-free imports decreased from 44,000 tons in 1962 to 14,000 tons in 1963, and to 8,000 tons in 1964. 1/

Commercial imports of unmanufactured lead (in both ores and metals) amounted to 340,000 tons in 1962, 342,000 tons in 1963, and 342,000 tons in 1964 (table 38). The maximum amount of lead permitted entry per year under quotas is 354,720 tons (134,600 tons in lead-bearing ores and related materials and 220,120 tons in metallic forms). 2/

1/ Most of the duty-free imports in 1962 consisted of metal for the U.S. Government stockpile acquired under the barter program, but most of the duty-free imports in 1963 and 1964 consisted of lead in ore imported for Government use after smelting and refining by a private concern.

2/ With the implementation of the Tariff Schedules of the United States, effective Aug. 31, 1963, the classification of lead dross was changed from the "lead metal quota" to the quota for lead-bearing ores and materials. As a result, the annual equivalent of the so-called lead-ore quota was changed from 132,320 tons in 1962 to 133,080 tons in the transition year 1963 and to 134,600 tons in 1964. The annual equivalent of the lead metal quota was changed accordingly--from 222,400 tons in 1962 to 221,640 tons in 1963 and to 220,120 tons in 1964. The change in classification did not affect the overall quota for lead.

The lead-ore quotas were underfilled by 2,600 tons in 1962, 11,700 tons in 1963, 12,100 tons in 1964, and 3,470 tons in the first quarter of 1965. Almost all of the shortfall in 1962 is accounted for by reduced ore-quota entries from Bolivia. Reduced ore-quota entries from Canada accounted for almost all (10,400 tons) of the shortfall in 1963 and about half (5,700 tons) of that in 1964. 1/ The remainder of the underfillment in the ore quota in 1964 resulted from reduced entries from the "all other" category of countries. More than half of the shortfall in the entries of lead ore in the first quarter of 1965 was in the quota for Bolivia.

Entries of lead metal in 1962 were 11,900 tons short of the quotas; this shortfall, larger than in any other quota year, was accounted for principally by the following underfillments of quotas: Peru, 2,700 tons; Australia, 2,500 tons; and "all other" countries combined, 5,700 tons. The lead-metal quotas in the first quarter of 1965 were underfilled by 6,734 tons; the LME price of lead exceeded the U.S. price in that quarter by a larger amount than in any other quarter under quotas.

Commercial imports of lead in ores and metal were equal to 31 percent of industrial consumption in 1962, to 29 percent of that in 1963, and to 28 percent of that in 1964 (table 5). In 1953-57 the much

1/ Duty-free imports of lead in ore from Canada, however, were about equal to the underfillment of the quota for lead ore from Canada in 1963 and 1964; the ore was entered for U.S. Government use and thereby it was not subject to quota limitations. The ore was smelted and refined in the United States by a private firm, and the refined metal was used by the Government for defense production. However, the quota for lead ore from Canada was filled in the first quarter of 1965 as some lead ore from the newly developed Pine Point mine in that country became available to a U.S. smelting concern.

larger average annual commercial imports were equal to about 38 percent of industrial consumption in those years.

Unmanufactured zinc

U.S. imports of unmanufactured zinc, like those of unmanufactured lead, declined in the past 2 years--from 593,000 tons (zinc content) in 1962 to 550,000 tons in 1963 and to 511,000 tons in 1964. 1/ The decline in total imports in 1963 reflects largely a decrease in duty-free imports, but the decline in 1964 reflects largely a decrease of dutiable imports (table 7).

Commercial imports of unmanufactured zinc amounted to about 510,000 tons in each of the years 1962 and 1963, but such imports declined to 488,000 tons in 1964 (table 44). The maximum quantity of zinc permitted entry per year under quotas is 520,960 tons (379,840 tons in ores and 141,120 tons in metallic forms). The zinc-ore quotas were underfilled by about 3,900 tons of zinc content in 1962, 2,800 tons in 1963, and 25,600 tons in 1964. Reduced entries from Peru accounted for most of the shortfall in 1962 and all of that in 1963. Mexico accounted for 23,200 tons and Peru for 2,400 tons of the total underfillment of the

1/ To assure comparability with data compiled for previous years, the data on imports in 1963 and 1964 presented here include the total estimated zinc content of imported ores (one of the components of total imports). This adjustment of the data was necessitated by a change in the basis of calculating the quantity of zinc in imported ores that resulted from the implementation of the Tariff Schedules of the United States (TSUS), which went into effect on Aug. 31, 1963. As noted in table 7, prior to that date the total zinc content of imported ores was reported, whereas since that date certain deductions have been made from the total zinc content, as provided in the TSUS to take account of processing losses. Import quotas apply to the total zinc content of zinc ores initially treated at zinc plants; the ores treated at such plants account for the bulk of the zinc ores entered under quotas.

zinc-ore quotas in 1964; in the first quarter of 1965, however, these countries, as well as others, managed to fill the zinc-ore quotas, reportedly from recently increased production.

The underfillment of the zinc-metal quotas amounted to about 7,000 tons in 1962, 7,400 tons in 1963, 7,800 tons in 1964, and 4,200 tons in the first quarter of 1965. Almost all of these shortfalls are accounted for by the fact that the 7,200-ton quota for metal from Italy was only partly filled in 1962 and was unfilled in 1963 and 1964, because of shortages of zinc in Italy. At the beginning of 1965, however, shipment of Italian zinc metal to the United States was resumed; the Italian quota for the first quarter was almost half filled by the end of January and remained so at the end of the quarter.

The share of U.S. industrial consumption of unmanufactured zinc supplied by commercial imports declined from 38 percent in 1962 to 36 percent in 1963 and to 33 percent in 1964 (table 5). This decline reflected principally the increase in the consumption of zinc, and in 1964 it also reflected reduced imports. Annual commercial imports of zinc in 1953-57, however, were substantially larger and were equal to about 50 percent of the industrial consumption in those years.

Manufactured lead and zinc articles

The protection which the quota restrictions afford the domestic producers of unmanufactured lead and zinc could be impaired by substantially increased imports of manufactured articles made wholly or largely of lead or zinc, which are not restricted by quotas. However,

imports of such articles since 1958, though larger than in 1953-57, have been small in relation to imports of unmanufactured lead and zinc. During 1959-64 the lead content of the imports of manufactured lead was equal to not more than 7 percent of the lead content of imports of lead in both unmanufactured and manufactured forms (table 43). Comparably, the zinc content of the imports during 1959-64 of manufactured zinc articles and zinc fume equaled about 10 percent of the zinc content of the imports of both unmanufactured and manufactured zinc articles (table 49). The lead content of lead pigments, especially litharge, made up the bulk of the imports of the manufactured lead articles. The zinc content of zinc fume, and to a lesser extent, of zinc oxide, constituted the bulk of the imports of zinc articles not restricted by import quotas. The imports of zinc fume have shown a downward trend since 1959.

Imports under the quota system

Partly because of the magnitude of the quotas themselves and partly because of market conditions prevailing in the years during which the quotas have been in effect, it is virtually impossible to measure the extent to which they have restricted imports. The quotas probably have been only moderately restrictive of imports of unmanufactured lead and zinc during the 6-1/2 years they have been in effect. Their effectiveness in this regard has varied not only from year to year (table 5) but also with respect to individual quota limitations for ores or metals by country (tables 38 and 44). Under the conditions of low demand that prevailed during the early quota years, the quotas allowed more than enough imports to fill the gap between U.S. production and consumption;

hence during those years the quotas generally did not operate to reduce burdensome stocks and raise U.S. prices. In 1964, on the other hand, commercial imports were restricted by a short world supply which caused foreign prices to be higher than domestic prices; these factors were more important than the quotas in restricting imports. Indeed, had it not been for contractual obligations of foreign exporters with U.S. purchasers and the desire of such exporters to retain a share of the large U.S. market, the quotas probably would have been less nearly filled in 1964 than they were. Since the quotas as a whole have generally been almost completely filled, commercial imports have remained fairly constant notwithstanding changes in U.S. production and consumption. In the 5 years 1960-64, for example, commercial imports entered quarterly (limited by quotas) have varied from 26 to 37 percent of the quantities of lead consumed in the United States; the ratios for zinc have varied from 32 to 48 percent.

U.S. market prices of lead and zinc have been significantly related to foreign prices; hence U.S. and foreign prices have exhibited similar trends. The import quotas, however, have served at times to widen the spread between the generally higher domestic market prices and the lower foreign market prices of the two metals. 1/ The portion of the price spread attributable to the import quotas alone cannot be determined; the spread reflects numerous other, and generally more important, factors

1/ See also testimony at the Commission hearings on June 23, 1964, by Mr. Jean Vuillequez (Transcript, pp. 153-154), and on June 24 by Mr. Simon Strauss (Transcript, p. 253).

conditioning supply and demand. 1/ To the extent that the quotas widened the spread between U.S. and foreign prices, they enabled exporters to obtain higher prices in the U.S. market. 2/ Moreover, to the extent that the quotas raised U.S. prices, they enabled domestic producers to obtain somewhat higher prices than they could have obtained without such restrictions. The wider spread between the U.S. and foreign prices that occasionally resulted from the operation of the quotas also aided U.S. smelters in bargaining for foreign ores.

The U.S. import quotas have been in effect without change for more than 6 years. Not only have they rigidly fixed the total quantities of lead and zinc permitted entry each quarter, but also, for each metal, the quantities permitted entry in ores or in unwrought metallic forms, and the amounts that could be entered in each of these forms from specified countries. The allocations of the quotas by ores and metals and by countries of origin are based on the historical pattern of commercial imports during 1953-57. In view of changes that have occurred

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1/ The amount of the spread has varied from time to time--increasing when supplies became shorter in the United States than in foreign markets and decreasing when supplies became shorter in foreign markets than in the United States. Short-term scantness of supplies in this country (as in others) has been caused by work stoppages owing to labor disputes or other difficulties, like mine floodings and cave-ins, transportation difficulties, and inclement weather; or by short-term buying spurts by industrial consumers (either for increased consumption requirements or for building up inventories in anticipation of impending supply difficulties).

2/ Unlike increased prices attributable to higher import duties, those attributable to quantitative restrictions are not offset by higher duty costs.

since 1958, i.e., in export capability of countries supplying the United States, the allocations applied to present day conditions are sometimes unrealistic. Canada, for example, has become a much larger producer of zinc ore, and its mine production potential for both lead and zinc has been growing rapidly. Mine output of lead and zinc in Mexico, on the other hand, has declined in recent years. Major foreign suppliers of ores and concentrates would rather export refined metals than ore, and they are expanding their smelting and refining capacity for this purpose. For this reason, imports of lead and zinc in the form of ores rather than in the form of refined metals are becoming increasingly difficult to obtain at prices attractive to U.S. buyers.

The inflexibility of the quota system, particularly the lack of provision for shifting quotas from countries that cannot or do not fill them to countries that could and would fill them has, to some extent, increased their restrictiveness. In 1964, for example, when U.S. smelters were seeking more zinc ore to meet their requirements, the zinc-ore quotas were underfilled to the extent of about 25,000 tons of zinc content; this underfillment was equal to almost 60 percent of the increase in the U.S. mine output of zinc in that year. 1/

1/ On two previous occasions--in reports to the Congress in March 1960 and in May 1962--the Commission stated that while the import quotas have placed a ceiling on allowable commercial imports of lead and zinc, they have also created many problems and "have not proved a satisfactory means of curtailing excessive imports of these metals" (p. 109, March 1960 report).

While the domestic lead and zinc industry has become accustomed to the quotas and has generally adapted itself to them, as indicated above, the quotas continue to pose supply problems for U.S. smelters dependent largely upon purchased ores and concentrates, especially from foreign sources. 1/ With the advent of import quotas on ores, the supply of ore concentrates to nonintegrated or "custom" smelters was greatly reduced. First, operators of the integrated smelters, sensing a probable short supply of concentrates, largely discontinued selling domestic concentrates from their mines to other smelters, a common practice before quotas were imposed. Second, the integrated U.S. smelting companies contracted for a larger part of the concentrates produced by independent (nonintegrated) mining companies in the United States and in foreign countries. The integrated smelting companies were able to outbid the smaller U.S. custom smelters that are largely dependent on purchased ores; with a large part of their ores supplied by their own mines, the integrated companies could offset all or most of the higher cost of purchased ores by savings accruing from a fuller utilization of smelting facilities. With the recent expansion of smelting capacity in foreign countries, and especially as market prices in foreign countries became more attractive, the problems of U.S. custom smelters in obtaining foreign concentrates at advantageous prices increased greatly.

1/ Foreign producers exporting lead and zinc to U.S. consumers have adapted their operations to the U.S. quotas. For example, the U.S. quotas have been allocated among producers in some leading foreign countries--by Government action in Peru and Mexico, and by voluntary agreement among the producers in Canada.

Exports

Exports of unmanufactured lead and zinc in the past 6 years, 1959-64, have been small in comparison with either domestic consumption or commercial imports (table 5). In these years, exports of lead averaged about 8,800 tons annually--the equivalent of less than 1 percent of average annual domestic consumption of lead and about 2.5 percent of average annual commercial imports. In 1964, however, exports of lead amounted to about 20,000 tons--almost six times the quantity exported in 1963 and about three times the average exports in 1959-63. More than half of the exports of lead in 1964 consisted of lead scrap which was exported near the end of the year to take advantage of the higher foreign prices.

Annual exports of unmanufactured zinc during 1959-64 averaged 46,600 tons, which is equivalent to 3.6 percent of average annual U.S. consumption of zinc and about 9.5 percent of average annual commercial imports. In 1964, zinc exports of about 32,000 tons were 10 percent smaller than the exports in 1963 but about 35 percent smaller than the average exports in 1959-63.

A small portion (7 percent) of the lead and more than 75 percent of the zinc exported in 1959-64 consisted of metal derived from ores imported free of duty under bond for smelting, refining, and export.

Exports of manufactured lead and zinc articles during 1959-64 consisted in part of articles made from imported lead and zinc on which duties had been paid. Some of the articles were exported with benefit of drawback of the duties paid on the imported lead and zinc used; the

lead and zinc content of such exported articles constituted a very small part of the imported unmanufactured lead and zinc. The lead content of exports on which duty drawbacks were paid ranged from 12,000 tons in 1959 to 21,000 tons in 1963 (table 50); the bulk of that content was in gasoline antiknock compounds.

The zinc content of exports with benefit of drawback of duties paid--exports that include a variety of products--averaged 11,000 tons annually in 1959-62 (table 51). In 1963, however, the quantity of imported zinc in articles exported with drawback of zinc duties paid increased sharply to 48,000 tons; most such articles consisted of zinc metal products.

Consumption and Production in the Free World 1/

Lead

Consumption of refined lead metal in the free world has increased each year since 1958. Consumption rose from about 2.4 million short tons in 1959 to about 2.9 million in 1964--a total increase of 20

1/ The statistics (in short tons) on the consumption and production of lead and zinc in the free world used in this section were compiled (in metric tons) by the International Lead and Zinc Study Group as published in its Monthly Bulletin for March 1965. The free-world totals exclude data relating to Bulgaria, mainland China, Czechoslovakia, East Germany, Poland, Rumania, North Korea, and the Union of Soviet Socialist Republics; these countries are referred to by the study group as "centrally planned economies." The study group, organized in 1960 under the sponsorship of the United Nations, now consists of the representatives of the governments of 26 countries; it provides opportunities for international consultations on the world supply and demand situation and continuing statistical information thereon.

percent in 5 years (table 52). 1/ U.S. consumption of refined lead metal during this period increased 11 percent, while that in the rest of the free world increased 28 percent.

The U.S. share of the total consumption of lead metal in the free world is several times as large as that of any other free-world country; in 1964 the United States accounted for about 37 percent of the total quantity of lead metal consumed in the free world. Other major consuming countries, in order of magnitude, were the United Kingdom, West Germany, France, and Japan; in 1964, these countries, together with the United States, consumed more than 70 percent of the free-world total. 2/ The most rapid increase was in Japan, where consumption in 1964 was double that in 1959.

Production of refined lead metal in the free world also increased during 1959-64. The record high production of about 2.8 million short tons in 1964 was 17 percent larger than the production in 1959. Production of lead metal, however, did not increase as much as did consumption and, beginning with 1962, consumption has been larger than production. The gap between consumption and production in the free world was filled partly by net imports of lead metal from the centrally

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1/ The first year for which data for the free world were compiled by the study group was 1958. This comparison begins with 1959 rather than with 1958, the first half of which was a recession period in the United States.

2/ Data compiled by the American Bureau of Metal Statistics (ABMS) for the whole world in 1963 indicate that the United States accounted for about 29 percent of the total consumption of primary lead metal. The consumption by the U.S.S.R. in that year, as estimated by the ABMS, was second to that of the United States.

planned economies, by releases of lead metal from Government stockpiles, and by a drawdown of commercial stocks. Producers' stocks of refined lead (unalloyed and in antimonial lead) in the free world decreased by about 63 percent from the end of 1961 to the end of 1964 (table 33). Producers' stocks in the United States during this period declined 76 percent, while those in the rest of the free world declined by about 51 percent.

Mine production of lead in the free world increased slowly and irregularly during 1959-64. The production in 1964 of about 2 million tons of lead content (partly estimated) 1/ was only about 3 percent larger than in 1959 and about the same as in 1962 and 1963. Mine production of lead in the United States was about 13 percent larger in 1964 than in 1959, whereas the aggregate mine output in the other free-world countries in 1964 was only 1 percent larger than in 1959.

The mine output of lead in the United States in 1964 was equal to about 15 percent of the free-world production. The five largest producers in 1963 and 1964, in order of magnitude, were Australia, the United States, Canada, Mexico, and Peru; in both years, their combined production was equal to about 61 percent of the free-world total. 2/

1/ The data on mine output of lead and zinc presented here were compiled by the International Lead and Zinc Study Group; the quantities are in terms of the total lead or zinc content of ores produced, rather than of recoverable lead or zinc content as discussed elsewhere in this report in connection with U.S. mine output.

2/ Data compiled by the U.S. Bureau of Mines on mine output of lead in the whole world in 1963 indicate that the U.S. share of the total amounted to nearly 9 percent; according to these data, the U.S.S.R. was the second largest producer (after Australia) and the United States ranked third.

Production in Australia was 22 percent and in Peru, 12 percent larger in 1964 than in 1959; production in Canada in 1964 was about the same as in the earlier year, and that in Mexico, 16 percent smaller.

Zinc

In the past 5 years, 1960-64, consumption of refined zinc metal in the free world increased more rapidly than that of refined lead. Consumption of zinc metal has established new record levels each year since 1959, rising from 2.6 million short tons in 1959 to about 3.5 million in 1964--representing an increase of 36 percent (table 53). During 1959-64, consumption of zinc metal increased 24 percent in the United States and 42 percent in the rest of the free world. In 1964, U.S. consumption of zinc metal, much larger than that in any other country, was equal to about a third of the free-world total. In that year U.S. consumption, together with that of the four next largest consumers--Japan, West Germany, the United Kingdom, and France--equaled about 70 percent of the total quantity of refined zinc metal consumed in the free world. Consumption of zinc metal by Japan was 133 percent larger in 1964 than in 1959; the comparable increases for the other three foreign countries named above ranged from 15 to 19 percent. 1/

Production of refined zinc metal in the free world also increased in each year after 1959. The record high production of about 3.3 million

1/ According to data from the ABMS relating to the consumption of primary zinc metal in the whole world in 1963, consumption in the United States accounted for about 25 percent of the world total. The second largest consumer, the U.S.S.R., accounted for about 11 percent of the total.

short tons in 1964 was 27 percent larger than the output in 1959. Production in each year during 1959-61 was nearly as large as consumption. Beginning with 1962, however, consumption increased more rapidly than production; as a result, consumption exceeded production as follows: by about 60,000 tons in 1962, 185,000 tons in 1963, and 248,000 tons in 1964. These shortfalls in new free-world supplies of refined zinc metal were offset, as were those of refined lead, by supplies from the centrally planned economies, from Government stockpiles, and from commercial stocks. From the end of 1961 to the end of 1964, producers' stocks of refined zinc metal in the free world declined about 44 percent (table 34). During this period, producers' stocks of refined zinc in the United States decreased 71 percent, while those in the rest of the free world were reduced by only 15 percent.

The mine output of zinc in the free world during 1959-64, in sharp contrast with the mine output of lead, increased continuously and substantially. In 1964 the record high production of about 3.5 million short tons of zinc content was 27 percent larger than production of 1959. Between these years, mine output in the United States increased about 34 percent, while that in the rest of the free world increased 26 percent.

In 1964 the United States accounted for about 18 percent of the total mine production of zinc in the free world. The five countries with the largest mine output of zinc in that year, in order of magnitude, were Canada, the United States, Peru, Mexico, and Japan. Canada, the second largest producer in each year throughout 1959-63, became

the largest in 1964, when its production was about 71 percent larger than in 1959. During 1959-64, annual mine output of zinc increased 73 percent in Peru and 50 percent in Japan, while estimates for Mexico indicate virtually no change. 1/

Outlook

Lead and zinc in both the United States and the rest of the free world continued in short supply during the first quarter of 1965. This shortage was reflected by a continuation of a low level of producers' stocks and high prices in both the United States and the rest of the free world.

Definitive data on production and consumption in the first quarter of 1965, however, are not yet available. U.S. commercial imports of lead in this quarter--equal to about 88 percent of the quota--were smaller than in any previous quarter under the quotas. Commercial imports of zinc--equal to about 97 percent of the quota--were larger than the quarterly average entries in either 1960, 1961, or 1964, but somewhat smaller than the quarterly averages for other quota years. U.S. producers' stocks of refined lead at smelters, refineries, and elsewhere at the end of February 1965 (the last date for which such data are available) totaled 45,000 short tons--equal to about 35 days' average shipments. U.S. producers' stocks of slab zinc at smelters and

1/ Data on mine output of zinc in 1963 for the whole world, as compiled by the U.S. Bureau of Mines, indicate that U.S. production accounted for 13 percent of the world total. The data also indicate that the U.S.S.R. was probably the third largest producer in 1963.

elsewhere at the end of March 1965 (the last date for which data are available for that metal) amounted to about 31,000 short tons--equal to only about 10 days' average shipments.

The immediate future

At its meeting in Madrid in October 1964, the International Lead and Zinc Study Group concluded that lead and zinc were likely to continue in short supply in the free world at least through 1965 if no substantial quantities of these metals were released from U.S. Government stocks and if no substantial change occurred in the rate of imports by the free world from the centrally planned economies. The study group observed that if there were no release of zinc from U.S. Government stocks, and if U.S. import quotas remained unchanged, a shortfall in the supply of zinc would occur--mainly in the United States. Near the end of 1964 the consensus of U.S. observers was that new U.S. supplies of both metals from domestic production and imports in 1965 would fall substantially short of U.S. industrial consumption.

The outlook has changed considerably, however, since 1964. Legislation (79 Stat. 26) approved April 2, 1965, authorized the immediate release of Government stocks for U.S. consumption; provision was made for the release of 150,000 tons of lead metal and 150,000 tons of zinc metal for U.S. industrial consumption, as well as 50,000 tons of each metal for direct use by U.S. Government agencies. The authorized release of about 100,000 tons of copper will also augment zinc supplies, inasmuch as most of this copper is contained in brass which also contains

about 30,000 tons of zinc; this release will diminish the need for zinc for use in making brass.

The lead and zinc to be released from stockpile are to be distributed by the General Services Administration (GSA) through customary commercial channels. The metals are to be sold only for domestic consumption at prices to be determined by the GSA on the basis of U.S. market prices, and with no profit to the distributors. The GSA announced that the first release of lead metal would total 60,000 tons, and that of zinc metal, 75,000 tons. 1/ Upon completion of the sale of these quantities, the GSA would consider the disposal of the remaining authorized tonnage, after consultation with appropriate Government agencies and industrial interests. Presumably, if new U.S. supplies of either metal are deemed adequate, the release of the remaining tonnage would be postponed. The recent act does not specify the period within which the total quantities of the metals were to be released from stockpile.

1/ For details of terms and conditions for the initial distribution of 60,000 tons of lead metal and 75,000 tons of zinc metal from the national stockpile, see General Service Administration's Solicitations of offers for lead (DMS-MET-93), and Solicitations of offers for zinc (DMS-MET-94).

Offers to purchase lead and zinc had to be in the hands of the GSA by Apr. 16, 1965. In answer to an inquiry on Apr. 19, an official of the GSA indicated that offers to purchase received by noon of that date were insufficient to take up the 60,000 tons of lead offered for sale, whereas offers for the purchase of zinc were far in excess of the 75,000 tons of that metal offered for sale. The metals purchased are to be delivered within 60 days from date of purchase and consumed within 90 days from date of delivery.

The Commission's analysis indicates that without substantial releases from the stockpile, and with no change in the import quotas, prospective new supplies of both lead and zinc in 1965 would be insufficient to sustain the anticipated U.S. consumption and exports. In 1964, new U.S. supplies, augmented by the release of 43,000 tons of lead metal from stockpile, were still some 20,000 tons smaller than U.S. disposition (table 9). The combined increase in production anticipated in 1965 from domestic ores (about 32,000 tons) and from scrap (about 12,000 tons) is likely to be partly offset by a decline in imports (of 28,000 tons). 1/ However, with the 60,000 tons being initially released from stockpile (plus a 7,000-ton carryover into 1965 of part of the lead released from stockpile in 1964), new U.S. supplies of lead in 1965 are likely to be in near balance with U.S. disposition. If the entire 150,000 tons of lead authorized is released from stockpile, supplies for 1965 would exceed disposition by about 80,000 tons. However, with producers' stocks currently at low levels, the additional metal would serve to replenish stocks to about customary levels by the end of 1965.

New U.S. supplies of zinc in 1964, including 75,000 tons from the Government stockpile, were smaller than U.S. disposition by nearly 60,000 tons (table 10). In 1965, new supplies of zinc from domestic production and imports are likely to rise by 66,000 tons (44,000 from

1/ The estimated decline in imports is based on the assumption that commercial imports in 1965 as a whole will continue at the same rate as in the first quarter of the year.

mines, 8,000 from scrap, and about 14,000 from imports 1/). With a probable increase in the consumption of zinc by an amount ranging from 40,000 to 90,000 tons in 1965, the deficit in new supplies from domestic ores, scrap, and imports may range between 95,000 and 143,000 tons. In view of the magnitude of this deficit, the initial release of 75,000 tons of zinc from the national stockpile would not provide enough zinc to meet consumer requirements for the year. If the entire authorized amount of 180,000 tons of zinc metal is released from the national stockpile, new supplies of zinc in 1965 may be sufficient to meet requirements for industrial consumption and exports, but without releases of such magnitude supplies would be insufficient to replenish the low levels of producers' stocks; the replenishment of stocks to customary levels would require about 80,000 tons of zinc metal and additional quantities of zinc in ores.

Before any of the lead and zinc (authorized in April 1965) had been released, U.S. Government stocks of these metals, all determined to be in excess of established stockpile objectives, totaled about 1,328,000 tons of lead and 1,500,000 tons of zinc. By comparison, in 1964 U.S. consumption of lead (all forms) amounted to about 1,200,000 tons, and the consumption of zinc (all forms), to about 1,470,000 tons.

U.S. annual consumption of lead and zinc, the rate of growth of which has slackened since 1962, is expected to be higher in 1965 than

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1/ This estimated increase in imports would be realized if the rate of zinc imports under quotas in the first quarter of 1965 is sustained throughout the rest of the year.

in 1964--by about 2 percent for lead and by about 6 percent for zinc. It seems likely that recent gains in industrial production and sales by the U.S. economy in general will continue, at least through the first half of 1965 and probably beyond; such growth stimulates larger consumption of lead and zinc. Perhaps the most significant indicator of probable future growth in the consumption of these metals, especially of zinc, is the anticipated output of automobiles and trucks. U.S. production of automobiles and trucks totaled 9.3 million units in 1964 and may amount to 10.6 million in 1965--constituting an increase of about 14 percent. It is estimated that U.S. consumption of lead in 1965 will reach about 1,228,000 tons. The aggregate consumption of zinc in 1965 may amount to about 1,580,000 tons.

The longer term

Barring any serious business recession, both new U.S. supplies (from domestic production and imports) and U.S. consumption will probably continue to increase in the next several years.

Most new additions to U.S. and world supplies of lead and zinc in 1965-68 will come from new mines already under development or planned. These developments were partly stimulated by the sharply increased prices of lead and zinc, particularly since mid-1962. Inasmuch as the development of new mines generally requires 3 to 5 years, much of the new production from these mines is still to come. Although estimates of the future growth of mine output vary widely, all indicated that

production in the United States and elsewhere will expand substantially in the next several years.

In October 1964 the International Lead and Zinc Study Group prepared estimates of probable mine production in 1965-67 on the basis of forecasts provided by member governments. These estimates were revised and extended through 1968 on the basis of more recent information. 1/ The revised estimates indicate that U.S. mine production of lead in 1968 may be about double that in 1964. More than half of the estimated increase of about 300,000 tons during 1965-68 is expected to occur in 1968. The anticipated average annual rate of increase of production in the United States over the 4 years is about 19 percent, compared with an average annual rate of increase of 6 percent in the rest of the free world. Most of the future growth in U.S. mine output will come from developments in southeastern Missouri. The largest increase outside the United States will probably be in Canada, Ireland, and Australia.

U.S. mine output of zinc is likely to increase during 1965-68 by about 75,000 tons, or 13 percent--an annual rate of increase of 3 percent. Mine output in the rest of the free world is expected to increase by 820,000 tons, or 32 percent; the indicated annual rate of increase is thus about 7 percent, which is more than twice that in the United States. The greatest growth will probably occur in Canada, continuing the

1/ Data derived from a paper entitled Free World Lead and Zinc Supply and Its Relation to Demand presented at the joint session of the Lead Industries Association and the American Zinc Institute at Chicago on Apr. 29, 1965.

expansion which made that country the world's largest producer in 1964. Other major free-world sources of increased supplies of zinc in the next several years will be Australia, Ireland (beginning in 1965), Japan, and Peru.

In October 1964 the study group concluded that the rate of growth of consumption in the free world was slowing down. Forecasts for 1965, based on data supplied by member governments, indicated that the consumption of lead metal would increase by 3 percent (compared with a rise of about 7 percent in 1964) and that the consumption of zinc metal would increase by 3.5 percent (compared with about 9 percent in 1964). If the anticipated growth of mine output of lead and zinc, especially the latter, outside the United States is realized, and if consumption continues to increase at reduced rates, by 1967 significant quantities of foreign lead and zinc may be seeking outlets in world markets, including the U.S. market.

* * * * * * *

APPENDIX

C O N T E N T S

Tables

Market prices

11. Lead metal: Monthly average prices at New York City and at London, in specified months, 1959-65
12. Prime Western zinc: Monthly average market prices in the United States and at London, in specified months, 1959-65

Mining and milling operations

13. Quantity and gross market value (at average market prices) of recoverable metals contained in material valued chiefly for its lead-plus-zinc content sold or treated by lead- and zinc-mining companies in the United States, by regions, 1958, 1960, and 1962
14. Lead: Mine production in the United States, by regions and States, average 1953-57, annual 1958-64
15. Zinc: Mine production in the United States, by regions and States, average 1953-57, annual 1958-64
16. Lead and zinc ores: Grade of ore mined in the United States in terms of recoverable metal content, by regions, specified years 1939 to 1962

Smelting and refining operations

17. Primary lead smelters and refineries in the United States, and their capacity, Dec. 31, 1963, and Dec. 31, 1957
18. Lead: Smelter and refinery production in the United States from primary and secondary sources, average 1953-57, annual 1958-63, and January-September 1964
19. Primary zinc smelters in the United States, by types and capacity, Dec. 31, 1963, and Dec. 31, 1957
20. Zinc: Production of primary slab zinc and secondary zinc in the United States, by sources, average 1953-57, annual 1958-63
21. Lead and zinc ores and concentrates: Receipts by lead and zinc smelters in the United States from domestic and foreign sources, classified by whether or not the materials originated in mines owned or controlled by the smelting companies or their subsidiaries, quarterly averages, for specified periods, 1958 to 1963

21a. *

21b. *

22. Lead and zinc ores and concentrates: U.S. receipts and U.S. imports for consumption under import quotas and not under import quotas, by country of origin, quarterly averages for specified periods, 1958 to 1963, and ores and concentrates held in bond by lead and zinc smelters in the United States, as of Dec. 31 of specified years 1958 to 1963

Employment and wages

23. Lead and zinc: Average number of all employees at lead and zinc mines and mills, and at primary lead and zinc smelters and refineries in the United States, specified years 1952 to 1963
24. Lead and zinc mining and milling: Average number of production and related workers, wages paid, and man-hours worked in the United States, specified years 1952 to 1963
25. Lead and zinc mining and milling: Production of crude ore and recoverable lead and zinc; man-hours worked by, and wages paid to, production and related workers; and average man-hours worked, and wages paid, per unit of output at lead and zinc mines in the United States, specified years 1952-63
26. Lead and zinc mining and milling: U.S. production and average number of all employees in the United States, by principal metal in ores produced, specified years, 1952 to 1963
27. Lead and zinc mining and milling: Production, and average number of all employees in the United States, by principal producing regions and States, specified years 1956 to 1963
28. Lead and zinc smelting and refining: Average number of all employees at primary lead and zinc smelters and refineries in the United States classified by plants processing mostly domestic materials and plants processing mostly imported materials, specified years 1952 to 1963
29. Lead and zinc smelting and refining: Employment, wages, and man-hours worked at primary lead and zinc smelters and refineries in the United States, specified years 1952 to 1963

Lead and zinc stocks

30. Lead: Producers' stocks at primary smelters and refineries in the United States, by kinds, average of yearend stocks, 1953-57, at the end of each year, 1958-64, and at the end of each month in 1964
31. Slab zinc: Primary and secondary U.S. producers' stocks, by standard grades, averages of yearend stocks, 1953-57, at the end of each year, 1958-64, at the end of each month in 1964
32. Zinc in ore and other zinciferous materials: Indexes of stocks held at zinc smelters in the United States at the end of each year, 1958-64, and at the end of each month in 1964

Lead and zinc stocks--Continued

33. Refined lead: Commercial stocks of pig lead and lead content of antimonial lead held by producers in the United States and in certain other free-world areas, indicating stocks located both at smelters or refineries and elsewhere, at the end of specified periods, 1961 to 1964
34. Slab zinc: Commercial stocks held by producers in the United States and in certain other free-world areas, indicating stocks located both at smelters or refineries and elsewhere, at the end of specified periods, 1961 to 1964

Profit or loss in U.S. lead and zinc industry

35. Lead and zinc mining, milling, refining, and smelting: Consolidated profit-and-loss experience of 61 domestic producers of lead and zinc, 1961-63
36. Lead and zinc mining and milling: Profit-and-loss experience of 49 nonintegrated domestic producers of lead and zinc, 1961-63
37. Lead and zinc mining and milling: Profit-and-loss experience of 30 nonintegrated domestic producers of lead and zinc, 1961-63
37a. *
37b. *

Imports of lead

38. Unmanufactured lead: Annual equivalent of quarterly import quotas established on Oct. 1, 1958 (as modified by the TSUS, effective Aug. 31, 1963), and actual U.S. imports under the quotas, by countries, 1959-64
39. Unmanufactured lead: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64
40. Lead-bearing ores, flue dust and mattes: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64
41. Lead metal: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64
42. Unmanufactured lead: U.S. imports for consumption, by kinds of material and by customs treatment, average 1953-57, annual 1958-64
43. Lead articles, unmanufactured and other: U.S. imports for consumption, average 1953-57, annual 1958-63, and January-June 1964

Imports of zinc

Drawback of duties paid on lead and zinc

World production and consumption

Table 1.--Unmanufactured lead and zinc: Absolute U.S. import quotas effective Oct. 1, 1958, as modified by the Tariff Schedules of the United States (TSUS), 1/ effective Aug. 31, 1963, by countries

(In short tons)

Country of origin	Quarterly quotas			
	Item 925.01 - Lead-bearing ores and materials 2/	Item 925.03 - Unwrought lead and lead waste and scrap 3/	Item 925.02 - Zinc-bearing ores and materials 4/	Item 925.04 - Unwrought zinc and zinc waste and scrap 5/
	Dutiable lead content	Dutiable lead content	Zinc content 6/	Gross weight
Australia	5,610	11,270	7/	7/
Belgium and Luxembourg (total)	7/	7/	7/	3,760
Bolivia	2,520	7/	7/	7/
Canada	6,720	7,960	33,240	18,920
Italy	7/	7/	7/	1,800
Mexico	7/	18,440	35,240	3,160
Peru	8,080	6,440	17,560	1,880
Republic of the Congo (formerly Belgian Congo)	7/	7/	7/	2,720
Union of South Africa	7,440	7/	7/	7/
Yugoslavia	7/	7,880	7/	7/
All other (total)	3,280	3,040	8,920	3,040
Total	33,650	55,030	94,960	35,280

1/ As provided for in part 2, appendix to the TSUS; see TSUS headnote relating to lead and zinc quotas in subpart A and items 925.01, 925.02, 925.03, and 925.04. The TSUS which became effective on Aug. 31, 1963, provide for the same total quantities of lead and zinc subject to quotas as provided for in Presidential Proclamation No. 3257, dated Sept. 22, 1958; however, the quarterly lead quota under TSUS item number 925.01 for lead-bearing ores and materials from Australia is 570 tons larger than that for lead-bearing ores, flue dust, and mattes of all kinds as provided for in Presidential Proclamation No. 3257; also, the quarterly lead quota under TSUS item number 925.03 for unwrought lead and lead waste and scrap from Australia is 570 tons smaller than the quota provided for Australia in Presidential Proclamation No. 3257 for "lead bullion or base bullion, lead in pigs and bars, lead dross, * * *". This difference of 570 tons (which represents 80 percent of the lead content of lead dross imported from Australia during the base period 1953-57) results from the classification of lead dross under TSUS among "other materials" included with lead-bearing ores.

The quotas are applicable to specified articles from the specified countries entered, or withdrawn from warehouse, for consumption in each 3-month period beginning Jan. 1, Apr. 1, July 1, and Oct. 1; they do not apply to any article imported by or for the account of the U.S. Government or any article which is not subject to duty.

2/ For lead-bearing ores and materials provided for in part 1, schedule 6, of TSUS.

3/ For unwrought lead and lead waste and scrap provided for in part 2G of schedule 6, of TSUS (except babbitt metal, solder, and type metal).

4/ For zinc-bearing ores and materials provided for in part 1, of schedule 6, of TSUS (except zinc fume).

5/ For unwrought zinc (except alloys of zinc and zinc dust) and zinc waste and scrap provided for in part 2H, schedule 6, of TSUS.

6/ Total zinc content of ores and materials to be initially treated at zinc plants (as defined in headnote 2(e) of part 1, schedule 6, of TSUS) and the dutiable zinc content of all other zinc-bearing ores and materials.

7/ Included in "All other (total)".

Table 2.--Unmanufactured lead and zinc articles: Rates of duty under the Tariff Schedules of the United States (TSUS), effective Aug. 31, 1963 1/

TSUS item number and article description	Trade-agreement rate 2/ 3/	Statutory rate 3/ 4/
602.10 - All lead-bearing ores	0.75¢ per lb. on lead content.	1.5¢ per lb. on lead content.
602.20 - All zinc-bearing ores	0.67¢ per lb. on zinc content.	1.67¢ per lb. on zinc content.
603.25 - Lead dross	1.0625¢ per lb. on lead content.	2.125¢ per lb. on lead content.
603.30 - Zinc dross and skimmings	0.75¢ per lb.	1.5¢ per lb.
Materials, other than the foregoing:		
603.50 - Containing, by weight, over 10 percent of any one of the metals copper, lead, or zinc, and to be initially treated at a copper, lead, or zinc plant.	1.7¢ per lb. on copper content + 0.75¢ per lb. on lead content + 0.67¢ per lb. on zinc content.	4¢ per lb. on copper content + 1.5¢ per lb. on lead content + 1.67¢ per lb. on zinc content.
603.55 - Containing, by weight, over 5 troy ounces of gold per short ton, or over 100 troy ounces of precious metals per short ton.	----------do----------	Do.
624.02 - Lead bullion	1.0625¢ per lb. on 99.6% of the lead content.	2.125¢ per lb. on 99.6% of the lead content.
624.03 - Unwrought lead, other than lead bullion	1.0625¢ per lb. on lead content.	2.125¢ per lb. on lead content.
624.04 - Lead waste and scrap	1.0625¢ per lb. on 99.6% of the lead content.	2.125¢ per lb. on 99.6% of the lead content.
626.02 - Unwrought zinc, other than alloys of zinc	0.7¢ per lb.	1.75¢ per lb.
626.10 - Zinc waste and scrap	0.75¢ per lb.	1.5¢ per lb.

1/ All of the articles listed are subject to absolute import quotas pursuant to escape-clause proclamation No. 3257 except for zinc fume (classifiable under item 603.50), and babbitt metal, solder, and type metal (classifiable under item 624.03). For quotas imposed on imports of lead and zinc, see table 1.

2/ These rates, reduced by trade agreements, apply to articles of all countries except Cuba and those under Communist domination or control as designated by the President, and except Philippine articles, which receive preferential treatment.

3/ The specific rates of duty on lead and zinc in the ores (items 602.10 and 602.20) and on copper, lead, and zinc in certain other materials (items 603.50 and 603.55), and the duty on lead in lead dross (item 603.25) are applicable to the respective quantities of each of such metal contents as are determined by chemical analysis after certain deductions for losses as provided for in headnote 4 of part 1 of schedule 6.

4/ These rates apply to products of Cuba (designated by the Congress as Communist dominated or controlled) and to products of countries or areas which have been designated by the President as being under Communist domination or control. See sec. 401 of the Tariff Classification Act of 1962 and sec. 231 and 257(e) of the Trade Expansion Act of 1962.

Table 3.--Lead: U.S. industrial consumption, 1/ by uses, average 1953-57, annual 1958-63, and January-September 1964

(In short tons)

Use	Average 1953-57	1958	1959	1960	1961	1962	1963 2/	Jan.-Sept. 1964 2/
Total consumption	1,171,390	986,387	1,091,149	1,021,172	1,027,216	1,109,635	1,163,358	876,938
Metal products, total	838,877	695,547	788,252	722,927	727,300	800,529	835,878	599,555
Ammunition	43,823	40,215	45,328	43,577	45,837	47,779	49,894	42,299
Bearing metals	31,128	18,980	23,298	20,717	17,757	16,472	21,713	16,685
Brass and bronze	24,389	20,379	24,264	20,485	20,114	20,607	21,943	17,489
Cable covering	127,647	74,981	61,626	60,350	57,458	56,676	57,707	42,263
Calking lead	57,620	70,807	80,091	66,527	67,379	72,648	76,308	54,860
Casting metals	12,924	8,674	8,395	7,023	6,873	7,355	7,856	3,628
Collapsible tubes	10,943	8,432	9,442	8,705	11,220	11,972	14,832	10,620
Foil	4,695	4,586	3,745	3,684	2,968	3,720	3,952	2,843
Pipes, traps and bends	27,610	23,044	24,825	22,119	19,098	19,819	20,100	14,464
Sheet lead	28,936	25,104	28,158	26,607	28,102	28,540	26,495	21,207
Solder	76,918	59,653	68,871	60,013	54,838	66,873	67,945	50,290
Storage batteries (antimonial lead)	187,834	159,795	187,284	175,458	186,028	217,525	222,286	153,926
Storage batteries (oxides)	175,499	152,930	193,448	177,738	181,970	202,381	216,795	149,651
Terne metal	2,044	1,227	1,511	1,765	965	1,402	1,983	1,366
Type metal	26,867	26,740	27,966	28,159	26,693	26,760	26,069	17,964
Pigments, total	122,633	95,901	103,671	98,541	95,293	102,968	99,075	76,860
White lead	17,336	13,589	10,955	8,432	7,615	11,091	8,846	7,068
Red lead and litharge	82,029	64,892	74,116	74,901	72,022	76,325	70,649	55,607
Pigment colors	13,647	11,853	13,827	11,445	11,273	11,660	11,767	8,995
Other 3/	9,621	5,567	4,773	3,763	4,383	3,892	7,813	5,190
Chemicals, total	176,584	162,645	164,505	166,632	171,921	171,641	193,443	162,946
Tetraethyl lead	171,400	159,412	160,020	163,826	169,802	168,926	192,811	162,946
Miscellaneous chemicals	5,184	3,233	4,485	2,806	2,119	2,715	632	4/
Miscellaneous uses, total	15,935	14,355	15,363	15,799	15,643	17,018	18,905	10,934
Annealing	5,442	5,114	5,129	5,153	5,066	5,306	4,847	3,386
Galvanizing	2,017	1,226	1,184	1,383	1,444	1,146	1,631	933
Lead plating	859	438	302	218	243	236	220	6
Weights and ballast	7,617	7,577	8,748	9,045	8,890	10,330	12,207	6,609
Other uses, unclassified	17,361	17,939	19,358	17,273	17,059	17,479	16,057	5/ 26,643

1/ Represents all unmanufactured lead from primary and secondary sources consumed (put into process by industrial consumers) as reported to the U.S. Bureau of Mines, including lead in lead-containing alloys, lead in ores consumed directly in the manufacture of lead pigments and salts, and lead that went directly (without remelting) from scrap to fabricated products. These data do not include withdrawals for the Government stockpiles.

2/ Preliminary.

3/ Includes lead content of leaded zinc oxide production.

4/ Included in "Other uses."

5/ Includes an estimated 14,700 tons of undistributed consumption.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 4.--Zinc: 1/ U.S. industrial consumption, average 1953-57, annual 1958-63, and January-September 1964

(In short tons of zinc content)

Item	1953-57 average	1958	1959	1960	1961	1962	1963	Jan.-Sept. 1964
Total consumption	1,309,347	1,142,165	1,278,376	1,158,938	1,207,469	1,333,311	1,414,216	1,099,773
Slab zinc consumed, total 2/	986,889	868,327	956,197	877,884	931,213	1,031,821	1,105,113	875,773
Galvanizing, total 3/	413,699	381,229	361,027	371,589	382,077	388,570	420,287	319,186
Sheet and strip	183,699	194,196	175,691	196,057	211,300	213,970	238,919	187,949
Wire and wire rope	43,312	35,638	35,602	35,262	37,608	38,203	39,466	28,746
Tubes and pipe	84,053	67,318	59,830	56,680	54,957	54,003	56,563	43,628
Fittings	10,409	8,904	10,239	9,258	6,540	8,039	7,787	5,475
Other	92,226	75,173	79,665	74,332	71,672	74,355	77,552	53,388
Brass products, total	133,817	101,375	129,278	99,023	128,523	129,805	128,237	100,785
Sheet, strip, and plate	64,748	46,967	61,234	45,870	60,018	61,210	61,462	48,660
Rod and wire	39,633	32,568	40,286	29,971	41,018	41,875	43,517	36,234
Tube	14,235	9,645	11,808	8,504	10,168	10,627	10,786	7,977
Castings and billets	6,663	4,423	4,967	4,699	4,061	4,923	3,969	1,817
Copper-base ingots	7,360	7,094	10,276	9,412	12,874	10,884	7,784	5,895
Other copper-base products	1,178	678	707	567	384	286	719	202
Zinc-base alloy, total	353,129	316,830	389,331	338,373	341,766	423,608	468,619	349,798
Die castings	341,464	309,408	383,358	331,112	337,227	419,042	462,543	346,932
Alloy dies and rod	9,444	5,400	3,745	3,442	1,629	850	720	171
Slush and sand castings	2,221	2,022	2,228	3,819	2,910	3,716	5,356	2,695
Rolled zinc, total	48,471	40,616	42,949	38,696	41,204	42,233	42,166	30,184
Zinc oxide, total	20,279	13,331	18,248	15,593	18,137	18,517	16,037	15,606
Other uses, total	17,494	14,946	15,364	14,610	19,506	29,088	29,767	4/ 60,214
Wet batteries	1,354	846	1,244	1,152	1,058	1,133	1,216	5/
Desilverizing lead	2,718	2,521	1,949	2,521	2,630	2,302	2,095	5/
Light-metal alloys	4,748	3,657	3,363	3,181	4,347	4,920	5,660	5/
Other 6/	8,674	7,922	8,808	7,756	11,471	20,733	20,796	5/
Zinc ores consumed directly in the manufacture of chemicals and pigments, total	111,858	94,938	108,070	88,275	97,251	101,582	104,705	73,200
Estimated zinc contained in new and old scrap consumed in the form of alloys, dust, or chemicals, total	210,600	178,900	214,109	192,779	179,005	199,908	204,398	150,800
In zinc-base alloys	14,085	17,683	17,611	13,738	14,400	15,183	14,940	5/
In brass and bronze alloys	136,089	99,641	120,032	107,422	102,624	118,487	125,087	5/
In aluminum-base alloys	4,517	2,941	3,964	3,277	3,789	5,256	5,543	5/
In magnesium-base alloys	184	143	179	191	126	154	201	5/
In zinc dust	24,972	26,010	32,119	30,144	22,427	24,497	23,417	5/
In chemical products	30,753	32,482	40,204	38,007	35,639	36,331	35,210	5/
Recapitulation:								
Total consumption in all forms, by uses	1,309,347	1,142,165	1,278,376	1,158,938	1,207,469	1,333,311	1,414,216	1,099,773
Galvanizing	413,699	381,229	361,027	371,589	382,077	388,570	420,287	5/
Brass and bronze	269,906	201,016	249,310	206,445	231,147	248,292	253,324	5/
Zinc-base alloys	367,214	334,513	406,942	352,111	356,166	438,791	483,559	5/
Rolled zinc	48,471	40,616	42,949	38,696	41,204	42,233	42,166	5/
Light-metal alloys	9,449	6,741	7,506	6,649	8,262	10,330	11,404	5/
Chemicals, compounds, and pigments	162,890	140,751	166,522	141,875	151,027	156,430	155,952	5/
Other uses	37,718	37,299	44,120	41,573	37,586	48,665	47,524	5/

1/ Unmanufactured primary and secondary zinc consumed (put into process by industrial consumers), including slab zinc, zinc in ores consumed directly in the manufacture of zinc pigments and chemicals, and the recoverable zinc content in old and new scrap that went directly into fabricated products and chemicals.

2/ Excludes zinc used by some small consumers, probably not more than 4 percent of the total consumption of slab zinc shown. Includes remelt zinc.

3/ Includes zinc used in electrogalvanizing and electroplating, but excludes that used in sherardizing.

4/ Includes an estimated 40,500 short tons undistributed consumption.

5/ Not available.

6/ Includes zinc used in making zinc dust, bronze powder, alloys, chemicals, and castings, and that employed in miscellaneous uses not elsewhere mentioned.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 5.--Unmanufactured lead and zinc: U.S. production, commercial imports for consumption, domestic exports, and industrial consumption, average 1953-57, annual 1958-64

(In thousands of short tons, except as otherwise indicated)

Item	Average 1953-57	1958	1959	1960	1961	1962	1963	1964 1/
	Lead (lead content)							
U.S. production 2/	832.6	669.2	707.0	716.6	714.7	681.2	746.8	807
Commercial imports 3/	443.4	529.2	347.1	354.2	354.7	340.2	342.2	342
Domestic exports	5.9	3.4	4.1	5.8	11.7	7.5	3.5	20
Industrial consumption	1,171.4	986.4	1,091.1	1,021.2	1,027.2	1,109.6	1,163.4	1,200
Ratio (percent) of commercial imports to industrial consumption	37.9	53.6	31.8	34.7	34.5	30.7	29.4	28
	Zinc (zinc content)							
U.S. production 4/	805.3	642.3	701.6	701.2	702.4	767.5	797.5	872
Commercial imports 3/	651.3	661.2	514.1	501.6	479.8	510.1	510.8	488
Domestic exports	28.3	7.4	23.0	87.3	57.6	44.2	35.7	32
Industrial consumption	1,309.4	1,142.2	1,278.4	1,158.9	1,207.5	1,333.3	1,414.2	1,470
Ratio (percent) of commercial imports to industrial consumption	49.7	57.9	40.2	43.3	39.7	38.3	36.1	33

1/ Data are estimated for last quarter of 1964, except for commercial imports.

2/ Mine output of recoverable lead plus lead recovered from all types of old and new scrap (including dross and skimmings).

3/ Dutiable imports (adjusted for 1953-58) and from U.S. Treasury Department data (tables 38 and 44) thereafter.

4/ Mine output of recoverable zinc plus zinc recovered in all forms from old and new scrap (including dross and skimmings).

Source: For lead, compiled from data on production, exports, and consumption given in table 6, except as noted; for zinc, compiled from data on production, exports, and consumption given in table 7, except as noted.

Table 6.--Unmanufactured lead: U.S. production, stocks, imports, exports, consumption, and market prices, average 1953-57, annual 1958-64, and by quarters, January 1962-September 1964

(In short tons of lead content, except as otherwise indicated)

Period	Production			Stocks at end of period		Imports for consumption 5/			Domestic exports 6/	Industrial consumption 7/	Average price per pound 8/
	Primary (mine output) 1/	Secondary 2/	Total	Producers' 3/	Consumers' 4/	Dutiable	Free	Total			
											Cents
Average 1953-57	339,426	493,139	832,565	183,237	121,833	445,182	46,262	491,444	5,915	1,171,390	14.670
Annual:											
1958	267,377	401,787	669,164	303,316	122,900	561,263	46,632	607,895	3,386	986,387	12.109
1959	255,586	451,387	706,973	230,328	126,496	368,449	44,810	413,259	4,121	1,091,149	12.211
1960	246,669	469,903	716,572	305,841	97,268	357,541	3,214	360,755	5,843	1,021,172	11.948
1961	261,921	452,792	714,713	312,402	99,140	354,408	40,335	394,743	11,733	1,027,216	10.871
1962	236,956	444,202	681,158	236,547	93,496	358,916	43,609	402,525	7,468	1,109,635	9.631
1963 9/	253,369	493,471	746,840	168,113	119,930	362,975	14,344	377,319	3,514	1,163,358	11.137
1964 9/ 10/	283,000	524,000	807,000	138,182	111,053	339,690	8,073	347,763	20,000	1,200,000	13.596
1962:											
January-March	68,395	109,995	178,390	297,938	104,331	88,803	25,798	114,601	610	276,716	9.706
April-June	72,882	110,339	183,221	283,643	106,015	92,923	15,586	108,509	2,644	270,349	9.500
July-September	51,752	104,560	156,312	268,335	91,973	90,714	675	91,389	979	266,448	9.500
October-December	43,927	119,308	163,235	236,547	93,496	86,476	1,550	88,026	3,235	296,122	9.817
1963: 9/											
January-March	43,428	117,940	161,368	195,437	98,977	96,037	2,600	98,637	646	288,949	10.432
April-June	67,191	121,394	188,585	192,770	95,726	86,416	3,391	89,936	992	287,436	10.571
July-September	70,580	118,926	189,506	186,823	109,355	92,278	4,686	96,964	1,054	273,327	11.350
October-December	72,170	135,211	207,381	168,113	119,930	88,244	3,667	91,911	822	313,646	12.194
1964: 9/											
January-March	71,812	122,085	193,897	158,015	118,576	87,049	961	88,010	1,332	291,200	12.994
April-June	71,173	130,418	201,591	127,146	127,472	90,219	2,596	92,815	2,369	294,700	13.000
July-September	69,003	129,101	198,104	130,074	120,497	80,044	2,290	84,334	7,789	290,600	13,337

1/ Recoverable lead content from ores and concentrates produced, and from old tailings, mine dumps, and smelter slag dumps reclaimed.
2/ Lead recovered scrap.
3/ Lead in ore and matte and in process at smelters; lead in base bullion at smelters and refineries, in transit to, and in process at refineries; refined in pig lead; and antimonial lead. Data for 1953-57 represent average of yearend stocks. For U.S. producers' stocks of refined lead held elsewhere than at smelters and refineries, see table 33.
4/ Lead in refined soft lead, antimonial lead and other alloys. Data for 1953-57 represent average of yearend stocks. Beginning with January 1956, data also include secondary smelter metal stocks.
5/ Lead content of lead-bearing ores and concentrates, flue dust, and mattes; lead bullion or base bullion; lead pigs and bars; type metal and antimonial lead; and reclaimed lead, lead scrap, and lead dross. Data for type metal not available for 1963 and 1964.
6/ Lead content of lead ores, concentrates, mattes, and base bullion; and the gross weight of lead pigs, bars, anodes, lead scrap, and type metal and antimonial lead prior to 1958. Beginning in 1958, exports of type metal and antimonial lead are not separately available and are not included.
7/ See footnote 1, table 3.
8/ Average price of common lead at New York.
9/ Data are preliminary except for those on stocks and prices.
10/ Data on production, exports, and industrial consumption include estimates for part of the fourth quarter.

Source: Production, consumers' stocks, and consumption, from official statistics of the U.S. Bureau of Mines, except as noted; producers' stocks, from the American Bureau of Metal Statistics; imports and exports, compiled from official statistics of the U.S. Department of Commerce; prices, from E & MJ Metal and Mineral Markets.

Table 7.--Unmanufactured zinc: U.S. production, stocks of slab zinc, imports, exports, consumption, and market prices, average 1953-57, annual 1958-64, and by quarters, January 1962-September 1964

(In short tons of zinc content, except as noted)

Period	Production			Stocks of slab zinc at end of period		Imports for consumption 5/			Domestic exports 6/	Industrial consumption 7/	Average price per pound 8/
	Primary (mine output) 1/	Secondary 2/	Total	Producers' 3/	Consumers' 4/	Dutiable	Free	Total			
											Cents
Average 1953-57	521,929	283,337	805,266	116,276	101,076	672,597	56,932	729,529	28,325	1,309,347	11.746
Annual:											
1958	412,005	230,332	642,337	190,237	93,609	687,189	40,891	728,080	7,378	1,142,165	10.309
1959	425,303	276,254	701,557	154,419	102,428	558,993	43,868	602,861	22,962	1,278,376	11.448
1960	435,427	265,820	701,247	190,810	68,871	504,323	65,911	570,234	87,326	1,158,938	12.946
1961	464,390	237,967	702,357	151,189	95,869	482,149	39,446	521,595	57,625	1,207,469	11.542
1962	505,491	262,017	767,508	149,554	79,934	525,678	67,187	592,865	44,178	1,333,311	11.625
1963 9/	529,254	268,255	797,509	55,064	96,607	505,970	31,786	537,756	35,664	1,414,216	11.997
1964 9/ 10/	572,000	300,000	872,000	32,007	108,000	447,927	25,808	473,735	32,000	1,470,000	13.568
1962:											
January-March	117,948	69,437	187,385	138,686	86,273	130,923	16,577	147,500	10,690	342,661	12.000
April-June	128,535	68,216	196,751	147,068	72,501	139,943	6,150	146,093	12,018	349,327	11.500
July-September	125,074	59,607	184,681	168,943	61,605	127,224	7,428	134,652	12,492	303,995	11.500
October-December	133,934	64,757	198,691	149,554	79,934	127,588	37,032	164,620	8,978	337,328	11.500
1963:											
January-March	130,175	64,503	194,678	154,158	66,352	128,717	6,478	135,195	7,397	333,931	11.500
April-June	133,057	66,808	199,865	105,870	69,483	126,513	11,236	137,749	10,922	369,770	11.500
July-September	127,484	66,595	194,079	55,356	90,082	127,491	9,358	136,849	11,161	350,019	12.342
October-December	138,538	70,349	208,887	55,064	96,607	123,249	4,714	127,963	6,184	360,496	12.648
1964:											
January-March	142,234	74,512	216,746	45,975	93,942	115,978	3,856	119,834	5,202	347,910	13.001
April-June	139,927	76,226	216,153	30,420	87,156	113,590	8,360	121,950	10,909	373,518	13.441
July-September	143,193	74,597	217,790	30,611	99,976	107,453	10,411	117,864	13,100	378,245	13.500

1/ Recoverable zinc content of ores and concentrates produced, and of old tailings, mine dumps, and smelter slag dumps reclaimed.

2/ Zinc recovered in all forms from all types of scrap. The final totals for 1962-63 were distributed by quarters on the basis of preliminary monthly data for the aggregate quantity of secondary slab zinc produced and recoverable zinc content of zinc-base, copper-base, aluminum-base, and magnesium-base scrap consumed. Quarterly data for 1964 were estimated as equivalent to 114.0 percent of the quarterly aggregates of the preliminary monthly data.

3/ Represents gross weight of zinc blocks, pigs, and slabs held at primary and secondary U.S. smelters and refineries; for stocks held elsewhere, see table 31. Data for 1953-57 represent average of yearend stocks.

4/ Data for 1953-57 represent average of yearend stocks.

5/ Zinc content of zinc-bearing ores and concentrates (except as noted) and gross weight of zinc blocks, pigs, slabs, scrap, dross, and skimmings. Imports of zinc fume are not included. Data on imports for 1963 and 1964 are not strictly comparable with data on imports for previous years because of a change in the method of reporting the zinc content of ores (one of the components of total imports) introduced in the Tariff Schedules of the United States (TSUS), effective Aug. 31, 1963. If the data on zinc in imported ore were reported during all of 1963 and 1964 on the same basis as in previous years, it is estimated that total imports of unmanufactured zinc would have been 550,000 tons in 1963 and 511,000 tons in 1964.

6/ Zinc content of zinc ores, concentrates, scrap, dross, and skimmings, and the gross weight of zinc blocks, pigs, and slabs.

7/ See footnote 1, table 4.

8/ Average price of Prime Western Zinc at East St. Louis.

9/ Preliminary.

10/ Data on production, exports, and industrial consumption include estimates for part of the fourth quarter.

Source: Production, consumers' stocks, and consumption, from official statistics of the U.S. Bureau of Mines; producers' stocks, from the American Zinc Institute; imports and exports, compiled from official statistics of the U.S. Department of Commerce; prices, from E & MJ Metal and Mineral Markets.

Table 8.--Lead and zinc metal: Increase or decrease in U.S. Government stockpiles and total quantities in Government stockpiles 1/ at the end of each year, 1946-64

(In short tons)

Year	Lead		Zinc	
	Increase or decrease (-)	End of period inventory	Increase or decrease (-)	End of period inventory
1946	2/	1,213	2/	69,223
1947	-	1,213	24,158	93,381
1948	12,268	13,481	397,214	490,595
1949	215,284	228,765	104,062	594,657
1950	175,384	404,149	49,489	644,146
1951	24,635	428,784	5,017	649,163
1952	206,764	635,548	12,551	661,714
1953	71,450	706,998	38,606	700,320
1954	62,281	769,279	128,143	828,463
1955	101,146	870,425	138,088	966,551
1956	99,272	969,697	181,159	1,147,710
1957	163,946	1,133,643	314,322	1,462,032
1958	90,055	1,223,698	86,203	1,548,235
1959	55,860	1,279,558	27,792	3/ 1,576,027
1960	575	1,280,133	2,692	1,578,719
1961	21,985	1,302,118	897	1,579,616
1962	83,513	1,385,631	291	1,579,907
1963	-4,700	1,380,931	834	1,580,741
1964 4/	-42,801	1,338,130	-75,507	1,505,234

1/ Mostly in the strategic stockpile, but also includes metal in Defense Production Act inventories, and that in stocks of the Commodity Credit Corporation and the supplemental stockpile (both of which represent metal stocks acquired through the barter program).

2/ Not available.

3/ Adjusted to correct a bookkeeping error.

4/ Actual inventory; includes some lead metal released and sold but not yet delivered to purchasers.

Source: General Services Administration.

Table 9.--Unmanufactured lead: U.S. supply and disposition, average 1953-57, annual 1958-64

(In thousands of short tons of lead content)

Item	Average 1953-57	1958	1959	1960	1961	1962	1963 1/	1964 1/2/
New U.S. supply:								
Mine output	339.4	267.4	255.6	246.7	261.9	237.0	253.4	283
Secondary output	493.1	401.8	451.4	469.9	452.8	444.2	493.5	524
Imports for consumption	491.5	607.9	413.3	360.8	394.7	402.5	377.3	348
Sales from Government stockpile 3/	-	-	-	-	-	-	4.7	43
Total	1,324.0	1,277.1	1,120.3	1,077.4	1,109.4	1,083.7	1,128.9	1,198
U.S. disposition:								
Industrial consumption	1,171.4	986.4	1,091.1	1,021.2	1,027.2	1,109.6	1,163.4	1,200
Exports	5.9	3.4	4.1	5.8	11.7	7.5	3.5	20
Government-stockpile purchases 3/	99.7	90.1	55.9	.1	22.0	83.5	-	-
Total	1,277.0	1,079.9	1,151.1	1,027.1	1,060.9	1,200.6	1,166.9	1,220
New supply minus disposition 4/	47.0	197.2	-30.8	50.3	48.5	-116.9	-38.0	-22
Net change in commercial stocks--								
Held by primary producers:								
Lead in ores, mattes, base bullion	-	-11.5	5.5	35.4	-42.9	-11.8	19.2	-12
Refined pig lead and antimonial lead 5/	11.6	106.9	-78.5	40.1	58.4	-61.1	-84.5	-22
Held by consumers and secondary producers: refined metal	1.4	-6.4	3.6	-29.2	1.8	-5.6	26.4	-9
Total	13.0	89.0	-69.4	46.3	17.3	-78.5	-38.9	-43
Not accounted for 6/	34.0	108.2	-38.6	4.0	31.2	-38.4	-.9	-21

1/ Data for imports for consumption and exports are preliminary.

2/ Data for last quarter are partly estimated.

3/ Based on U.S. Government inventories at the end of each period, as reported by the General Services Administration. Small reductions are accounted for by withdrawals from Defense Production Act inventories for use by Government establishments; data on such consumption by these establishments are included in the U.S. Bureau of Mines statistics on industrial consumption shown in this table. The larger reductions in 1964 reflect releases for use by U.S. consumers.

4/ Except net changes in commercial stocks.

5/ Prior to 1961, stocks at primary producers' plants only; thereafter, at their plants and elsewhere.

6/ This amount may reflect one or both of the following: (1) Understatement in available statistics on lead consumed by industry; (2) net increase in commercial stocks of lead in all forms not accounted for by the available statistics, such as stocks held by dealers, importers, and other private concerns in the United States.

Source: Tables 6, 8, 30, and 33, except as noted.

Table 10.--Unmanufactured zinc, including zinc fume: U.S. supplies and disposition, average 1953-57, annual 1958-64

(In thousands of short tons of zinc content)

Item	Average 1953-57	1958	1959	1960	1961	1962	1963 1/	1964 1/2/
New U.S. supplies:								
Mine output	521.9	412.0	425.3	435.4	464.4	505.5	529.3	572
Secondary output	283.3	230.3	276.3	265.8	238.0	262.0	268.3	300
Imports for consumption, including zinc fume 3/	686.9	706.3	613.2	540.3	508.1	570.4	529.1	497
Sales from Government stockpile 4/	-	-	-	-	-	-	-	75
Total	1,492.1	1,348.6	1,314.8	1,241.5	1,210.5	1,337.9	1,326.7	1,444
U.S. disposition:								
Industrial consumption	1,309.3	1,142.2	1,278.4	1,158.9	1,207.5	1,333.3	1,414.2	1,470
Exports	28.3	7.4	23.0	87.3	57.6	44.2	35.7	32
Government stockpile purchases 4/	160.1	86.2	27.8	2.7	.9	.3	.8	-
Total	1,497.7	1,235.8	1,329.2	1,248.9	1,266.0	1,377.8	1,450.7	1,502
New supply minus disposition 5/	-5.6	112.8	-14.4	-7.4	-55.5	-39.9	-124.0	-58
Net changes in commercial stocks:								
Slab zinc--								
Held by producers at plants and elsewhere 6/	15.9	23.5	-23.4	28.9	-40.6	9.0	-107.1	-24
Held by consumers	-.9	5.3	8.8	-33.6	27.0	-15.9	16.7	12
Total	15.0	28.8	-14.6	-4.7	-13.6	-6.9	-90.4	-12
Not accounted for 7/	-20.6	84.0	-.2	-2.7	-41.9	-33.0	-33.6	-46

1/ Data for imports and exports are preliminary.
2/ Data for last quarter were partly estimated.
3/ Data included for zinc ores and fume represent the recoverable zinc content--as estimated for the period prior to Aug. 31, 1963 (the effective date of the Tariff Schedules of the United States), and as reported thereafter; the recoverable content of zinc in imported ores and fume prior to Aug. 31, 1963, was estimated by deducting 10 percent from the total reported zinc content of these articles.
4/ Based on U.S. Government inventories at the end of each period, as reported by the General Services Administration. Small reductions are accounted for by withdrawals from Defense Production Act inventories for use by Government establishments; data on such consumption are included in the U.S. Bureau of Mines statistics on industrial consumption shown in this table. The large reductions in 1964 reflect releases for use by U.S. consumers.
5/ Except changes in commercial stocks.
6/ Prior to 1959, stocks at producers' plants only; thereafter, at their plants and elsewhere.
7/ Much of the amount not accounted for in recent years represents declines in producers' stocks of zinc in ores and other zinciferous materials (these data are confidential). See also footnote 7, table 9.

Source: Data on imports of zinc fume through 1961, from reports of individual importers to the U.S. Tariff Commission; for 1961-63 as compiled by the U.S. Bureau of Mines; and for 1964, as reported by the U.S. Department of Commerce, and tables 7, 8, 31, and 49.

Table 11.--Lead metal: Monthly average prices at New York City and at London, in specified months, 1959-65 1/

(In cents per pound)

Year and month	New York price of Common lead	London Metal Exchange price 2/	Difference, New York price minus London price
1959:			
January	12.667	8.981	3.686
February	11.560	8.746	2.814
March	11.412	8.689	2.723
April	11.189	8.631	2.558
May	11.897	8.850	3.047
June	12.000	8.708	3.292
July	12.000	8.781	3.219
August	12.286	9.180	3.106
September	13.000	8.840	4.160
October	13.000	8.827	4.173
November	13.000	9.018	3.982
December	12.523	9.087	3.436
1960:			
January	12.000	9.348	2.652
February	12.000	9.233	2.767
March	12.000	9.533	2.467
April	12.000	9.690	2.310
May	12.000	9.676	2.324
June	12.000	9.172	2.828
July	12.000	8.905	3.095
August	12.000	8.869	3.131
September	12.000	8.743	3.257
October	12.000	8.406	3.594
November	12.000	8.522	3.478
December	11.381	8.122	3.259
1961:			
January	11.000	7.975	3.025
February	11.000	8.167	2.833
March	11.000	8.242	2.758
April	11.000	8.384	2.616
May	11.000	8.330	2.670
June	11.000	8.087	2.913
July	11.000	8.107	2.893
August	11.000	8.086	2.914
September	11.000	7.999	3.001
October	11.000	7.828	3.172
November	10.203	7.548	2.655
December	10.250	7.559	2.691
1962:			
January	10.034	7.388	2.646
February	9.583	7.335	2.248
March	9.500	7.576	1.924
April	9.500	7.559	1.941
May	9.500	7.477	2.023
June	9.500	7.215	2.285
July	9.500	6.726	2.774
August	9.500	6.381	3.119
September	9.500	6.488	3.012
October	9.500	6.619	2.881
November	9.951	6.789	3.162
December	10.000	6.929	3.071
1963:			
January	10.296	6.781	3.515
February	10.500	6.835	3.665
March	10.500	6.968	3.532
April	10.500	7.233	3.267
May	10.500	7.576	2.924
June	10.713	8.122	2.591
July	11.068	8.140	2.928
August	11.354	8.382	2.972
September	11.628	8.477	3.151
October	11.935	8.708	3.227
November	12.147	8.636	3.511
December	12.500	9.290	3.210
1964:			
January	12.982	9.874	3.108
February	13.000	10.117	2.883
March	13.000	10.147	2.853
April	13.000	10.289	2.711
May	13.000	11.056	1.944
June	13.000	11.172	1.828
July	13.000	12.292	.708
August	13.011	13.648	-.637
September	14.000	13.948	.052
October	14.500	15.048	-.548
November	15.000	16.563	-1.563
December	15.657	17.342	-1.685
1965:			
January	16.000	15.734	.266
February	16.000	17.640	-1.640
March	16.000	17.880	-1.880
April	16.000	15.990	.010

1/ Changes in the average daily prices, in cents per pound, at New York City since Jan. 1, 1959, were as follows:

Date of change	New price	Date of change	New price	Date of change	New price	Date of change	New price
1959:		1959--Con.		1962:		1963--Con.	
Jan. 22	12.000	Dec. 14	12.500	Jan. 5	10.000	Aug. 20	11.500
Feb. 11	11.500	Dec. 21	12.000	Feb. 1	9.750	Sept. 16	11.750
Feb. 24	11.000	1960:		Feb. 9	9.500	Oct. 9	12.000
Mar. 6	11.500	Dec. 13	11.000	Nov. 5	10.000	Nov. 21	12.500
Apr. 1	11.000	1961:		1963:		1964:	
Apr. 21	11.500	Nov. 1	10.500	Jan. 15	10.500	Jan. 3	13.000
May 8	12.000	Nov. 13	10.000	June 6	10.750	Sept. 1	14.000
Aug. 24	13.000	Nov. 28	10.250	July 2	11.000	Oct. 16	15.000
				July 24	11.250	Dec. 11	16.000

2/ Average of daily mean of bid and ask quotations for prompt lead at the morning session of the London Metal Exchange. Prior to December 1964, quotations in pounds sterling per long ton were converted to U.S. cents per pound at the rate of 1 pound sterling=$2.80; because of fluctuations in the exchange rates beginning in December 1964, the average rates prevailing in each month were used.

Source: E & MJ Metal and Mineral Markets.

Note.--The daily quotations are based on sales on a flat-price basis of domestically refined lead sold to domestic consumers. The daily averages are weighted by the quantity of such sales. The price quotations reflect sales of all grades of lead sold converted to the basis of Common lead at New York.

Table 12.--Prime Western zinc: Monthly average market prices in the United States and at London, in specified months, 1959-65 1/

(In cents per pound)

Year and month	F.o.b. East St. Louis 2/	Delivered New York City	London Metal Exchange price 3/	Difference, New York price minus London price	Year and month	F.o.b. East St. Louis 2/	Delivered New York City	London Metal Exchange price 3/	Difference, New York price minus London price
1959:					1962:				
January	11.500	12.000	9.360	2.640	January	12.000	12.500	8.777	3.723
February	11.417	11.917	9.210	2.707	February	12.000	12.500	8.598	3.902
March	11.000	11.500	9.390	2.110	March	12.000	12.500	8.669	3.831
April	11.000	11.500	9.086	2.414	April	11.500	12.000	8.678	3.322
May	11.000	11.500	9.669	1.831	May	11.500	12.000	8.555	3.445
June	11.000	11.500	9.801	1.699	June	11.500	12.000	8.374	3.626
July	11.000	11.500	10.066	1.434	July	11.500	12.000	8.263	3.737
August	11.000	11.500	10.662	.838	August	11.500	12.000	8.073	3.927
September	11.334	11.834	10.759	1.075	September	11.500	12.000	8.011	3.989
October	12.129	12.629	11.421	1.208	October	11.500	12.000	8.254	3.746
November	12.500	13.000	11.867	1.133	November	11.500	12.000	8.555	3.445
December	12.500	13.000	11.899	1.101	December	11.500	12.000	8.378	3.622
1960:					1963:				
January	12.877	13.377	11.822	1.555	January	11.500	12.000	8.448	3.552
February	13.000	13.500	11.107	2.393	February	11.500	12.000	8.694	3.306
March	13.000	13.500	11.270	2.230	March	11.500	12.000	8.957	3.043
April	13.000	13.500	11.554	1.946	April	11.500	12.000	9.273	2.727
May	13.000	13.500	11.512	1.988	May	11.500	12.000	9.502	2.498
June	13.000	13.500	11.324	2.176	June	11.500	12.000	9.492	2.508
July	13.000	13.500	11.279	2.221	July	12.025	12.525	9.292	3.233
August	13.000	13.500	10.929	2.571	August	12.500	13.000	9.545	3.455
September	13.000	13.500	10.892	2.608	September	12.500	13.000	9.580	3.420
October	13.000	13.500	10.989	2.511	October	12.500	13.000	10.017	2.983
November	13.000	13.500	10.954	2.546	November	12.500	13.000	10.510	2.490
December	12.476	12.976	10.345	2.631	December	12.943	13.443	11.839	1.604
1961:					1964:				
January	11.529	12.029	9.904	2.125	January	13.002	13.502	11.977	1.525
February	11.500	12.000	10.345	1.655	February	13.000	13.500	12.271	1.229
March	11.500	12.000	10.572	1.428	March	13.000	13.500	12.572	0.928
April	11.500	12.000	10.489	1.511	April	13.324	13.824	13.546	0.278
May	11.500	12.000	10.299	1.701	May	13.500	14.000	15.561	-1.561
June	11.500	12.000	9.880	2.120	June	13.500	14.000	16.202	-2.202
July	11.500	12.000	9.737	2.263	July	13.500	14.000	17.474	-3.474
August	11.500	12.000	9.559	2.441	August	13.500	14.000	15.659	-1.659
September	11.500	12.000	9.243	2.757	September	13.500	14.000	15.200	-1.200
October	11.500	12.000	8.986	3.014	October	13.991	14.491	15.161	- .670
November	11.500	12.000	8.696	3.304	November	14.500	15.000	15.633	- .633
December	11.975	12.475	8.920	3.555	December	14.500	15.000	15.510	- .510
					1965:				
					January	14.500	15.000	14.572	.428
					February	14.500	15.000	14.507	.493
					March	14.500	15.000	14.288	.712
					April	14.500	15.000	14.312	.688

1/ Changes in the daily average prices in cents per pound, f.o.b. East St. Louis since Jan. 1, 1959, were as follows:

Date of change	New price	Date of change	New price	Date of change	New price	Date of change	New price
1959:		1960:		1961:		1963:	
Feb. 25	11.000	Jan. 8	12.532	Jan. 10	11.500	July 2	12.000
Oct. 26	12.500	Jan. 11	13.000	Dec. 4	12.000	July 30	12.500
Oct. 29	12.612	Dec. 13	12.500	1962:		Dec. 5	13.000
Nov. 2	12.500	Dec. 19	12.000	Apr. 2	11.500	1964:	
						Apr. 14	13.500
						Oct. 21	14.500

2/ Prime Western zinc is also sold on a delivered basis (as well as f.o.b. East St. Louis); the delivered price ranges from 1/4 to 1/2 cent per pound above the East St. Louis price. The delivered price is 1/2 cent above the East St. Louis price where freight from East St. Louis exceeds 1/2 cent per pound (freight from East St. Louis to New York City exceeds 1/2 cent per pound).

3/ Average of daily mean of bid and ask quotations for Good Ordinary brands (equivalent to U.S. Prime Western grade) per pound for prompt delivery at morning session of London Metal Exchange. Prior to Dec. 1964, quotations in pounds sterling per long ton were converted to U.S. cents per pound at the rate of 1 pound sterling=$2.80; because of fluctuations in the exchange rates beginning in Dec. 1964 the average rates prevailing in each month were used.

Source: E & MJ Metal and Mineral Markets.

Note.--The daily quotations are prices at which slab zinc was sold on a flat-price basis by primary producers in the United States, weighted by quantities sold. The price quotations reflect sales of all grades of zinc sold, converted to the basis of Prime Western zinc f.o.b. East St. Louis. Effective April 1, 1964, other grades of zinc command the following premiums over the Prime Western grade (in cents per pound): High grade (sold on contract delivered to consumers' plants), 1.25 cent and Special High grade (sold on contract delivered to consumers' plants), 1.1 cent. During various periods covered by this table, however, premiums have been nominal.

Table 13.--Quantity and gross market value (at average market prices) of recoverable metals contained in material valued chiefly for its lead-plus-zinc content sold or treated by lead- and zinc-mining companies in the United States, by regions, 1958, 1960, and 1962 1/

Item	United States, total			States east of the Mississippi River			West Central States			Western States		
	1958	1960	1962	1958	1960	1962	1958	1960	1962	1958	1960	1962
Crude ore and other material sold or treated----1,000 short tons--	15,394	15,275	13,458	4,135	5,507	5,087	7,038	5,951	3,474	4,221	3,817	4,897
Recoverable metal content: 2/												
Lead----------short tons--	259,443	239,807	226,978	5,283	5,337	7,353	118,088	113,602	64,662	136,072	120,868	154,963
Zinc----------do------	380,369	398,289	456,395	168,822	222,674	212,090	10,050	7,320	16,959	201,497	168,295	227,346
Silver-------1,000 fine ounces--	11,948	9,683	13,508	69	49	19	251	16	491	11,628	9,618	12,998
Gold----------do----------	93	72	64	-	-	-	-	-	-	93	72	64
Copper----------short tons--	10,331	7,932	7,549	-	-	-	1,429	1,087	1	8,902	6,845	7,548
Gross market value: 3/												
Lead----------1,000 dollars--	60,710	56,115	43,734	1,236	1,249	1,416	27,633	26,583	12,454	31,841	28,283	29,864
Zinc----------do---------	77,595	102,759	106,165	34,440	57,450	49,332	2,050	1,889	3,944	41,105	43,420	52,889
Silver----------do---------	10,814	8,764	14,680	62	44	21	227	14	533	10,525	8,706	14,126
Gold----------do---------	3,253	2,523	2,212	-	-	-	-	-	-	3,253	2,523	2,212
Copper----------do---------	5,434	5,093	6,417	-	-	-	751	698	1,695	4,683	4,395	4,722
Total----------do---------	157,806	175,254	173,208	35,738	58,743	50,769	30,661	29,184	18,626	91,407	87,327	103,813
Percent of total gross market value derived from--												
Lead----------	38.5	32.0	25.2	3.4	2.1	2.8	90.1	91.1	66.9	34.8	32.4	28.8
Zinc----------	49.2	58.7	61.3	96.4	97.8	97.2	6.7	6.5	21.2	45.0	49.7	51.0
Silver----------	6.8	5.0	8.5	.2	.1	4/	.7	4/	2.8	11.5	10.0	13.6
Gold----------	2.1	1.4	1.3	-	-	-	-	-	-	3.6	2.9	2.1
Copper----------	3.4	2.9	3.7	-	-	-	2.5	2.4	9.1	5.1	5.0	4.5

1/ Data are for operations that were engaged during 1958, 1960, or 1962 in producing ores or concentrates (including newly mined ore, old tailings, and material reclaimed from mine dumps and mill sites) valued chiefly for their lead-plus-zinc content (that is, material in which the value of the lead content plus the value of the zinc content was greater than the value of any other single metal contained).

2/ Represents metal content of ore mined (including old tailings and material reclaimed from mine dumps and mill sites) after deduction of estimated metal losses in milling, smelting, and refining.

3/ Computed by multiplying the quantities of recoverable metals by the following average yearly prices:

	Lead (per pound)	Zinc (per pound)	Silver (per fine ounce)	Gold (per fine ounce)	Copper (per pound)
1958-------	$0.117	$0.102	$0.905	$35.00	$0.263
1960-------	.117	.129	.905	35.00	.321
1962-------	.096	.116	1.08	35.00	.308

4/ Less than 0.05 percent.

Source: Compiled from data supplied to the U.S. Tariff Commission by the U.S. Bureau of Mines.

Note: The prices for lead, zinc, and copper represent the average weighted market prices of all grades of such primary metal sold by producers, as computed by the U.S. Bureau of Mines.

Table 14.--Lead: Mine production in the United States, by regions and States, average 1953-57, annual 1958-64

(In short tons of recoverable lead)

Region and State	Average 1953-57	1958	1959	1960	1961	1962	1963	1964 1/
States east of the Mississippi River:								
Wisconsin	1,958	800	745	1,165	680	1,394	1,116	1,700
Illinois	3,594	1,610	2,570	3,000	3,430	3,610	2,901	1,770
Kentucky	154	516	409	558	656	743	831	2/
New York	1,387	579	481	775	879	1,063	1,009	789
Virginia	3,256	2,934	2,770	2,152	3,733	4,059	3,500	3,745
North Carolina	5	-	-	424	318	219	62	2/
Total	10,354	6,439	6,975	8,074	9,696	11,088	9,419	8,004
West Central States:								
Kansas	4,954	1,299	481	781	1,449	970	1,027	1,580
Missouri	125,337	113,123	105,165	111,948	98,785	60,982	79,844	118,680
Oklahoma	11,433	3,692	601	936	980	2,710	3,192	2,780
Total	141,724	118,114	106,247	113,665	101,214	64,662	84,063	123,040
Western States and Alaska:								
Alaska	4	2	-	23	-	-	-	-
Arizona	10,414	11,890	9,999	8,495	5,937	6,966	5,815	6,240
California	6,471	140	227	440	103	455	823	1,600
Colorado	19,248	14,112	12,907	18,080	17,755	17,411	19,918	19,750
Idaho	68,807	53,603	62,395	42,907	71,476	84,058	75,759	71,642
Montana	16,748	8,434	7,672	4,879	2,643	6,121	5,000	4,487
Nevada	4,613	4,150	1,357	987	1,791	771	1,126	680
New Mexico	3,692	1,117	829	1,996	2,332	1,134	1,014	1,600
Utah	46,194	40,355	36,630	39,398	40,894	38,199	45,028	39,100
Washington	11,147	9,020	10,310	7,725	8,053	6,033	5,374	6,327
Total	187,338	142,823	142,326	124,930	150,984	161,148	159,857	151,426
United States, total 3/	339,426	267,377	255,586	246,669	261,921	236,956	253,369	283,274

1/ Preliminary.
2/ Not reported separately, but included in the United States total.
3/ Includes small tonnages mined in States other than those shown.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 15.--Zinc: Mine production in the United States, by regions and States, average 1953-57, annual 1958-64

(In short tons of recoverable zinc)

Region and State	Average 1953-57	1958	1959	1960	1961	1962	1963	1964 1/
States east of the Mississippi River:								
Illinois	19,381	24,940	26,815	29,550	26,795	27,413	20,337	13,585
Kentucky	440	1,258	673	869	1,147	1,172	1,461	1,556
New Jersey	22,391	607	-	-	112	15,309	32,738	33,605
New York	56,303	53,014	43,464	66,364	54,763	53,654	53,495	59,072
Pennsylvania	-	10,812	16,718	13,746	23,428	24,308	27,389	31,021
Tennessee	42,619	59,130	89,932	91,394	81,734	71,548	95,847	110,538
Virginia	18,804	18,472	20,334	19,885	29,163	26,479	23,988	20,242
Wisconsin	19,231	12,140	11,635	18,410	13,865	13,292	15,114	27,000
Total	179,169	180,373	209,571	240,218	231,007	233,175	2/ 270,382	296,619
West Central States:								
Arkansas	-	-	49	50	37	211	-	-
Kansas	21,352	4,421	1,017	2,117	2,446	3,943	3,508	5,950
Missouri	5,400	362	92	2,821	5,847	2,792	321	1,140
Oklahoma	32,118	5,267	1,049	2,332	3,148	10,013	13,245	12,100
Total	58,870	10,050	2,207	7,320	11,478	16,959	17,074	19,190
Western States:								
Arizona	26,232	28,532	37,325	35,811	29,585	32,888	25,419	25,450
California	4,925	51	78	465	304	322	101	150
Colorado	39,111	37,132	35,388	31,278	42,647	43,351	48,109	51,530
Idaho	58,878	49,725	55,699	36,801	58,295	62,865	63,267	60,684
Montana	66,170	33,238	27,848	12,551	10,262	37,678	32,941	31,017
Nevada	4,460	91	217	420	453	281	571	270
New Mexico	19,269	9,034	4,636	13,770	22,900	22,015	12,938	29,600
Oregon	-	-	-	-	3	-	3	2
Utah	37,998	44,982	35,223	35,476	37,239	34,313	36,179	32,000
Washington	26,847	18,797	17,111	21,317	20,217	21,644	22,270	25,867
Total	283,890	221,582	213,525	187,889	221,905	255,357	241,798	256,570
United States, total	521,929	412,005	425,303	435,427	464,390	505,491	2/ 529,254	572,379

1/ Preliminary.
2/ Includes 13 tons mined in North Carolina.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 16.--Lead and zinc ores: Grade of ore mined in the United States in terms of recoverable metal content, by regions, specified years 1939 to 1962

Region and year	Crude ore sold or treated	Recoverable metal content per ton				
		Lead	Zinc	Silver	Gold	Copper
	1,000 short tons	Percent	Percent	Fine ounces	Fine ounces	Percent
United States, total:						
1939	16,315	2.2	2.8	0.71	0.004	1/
1942	25,464	1.8	2.8	.71	.004	1/
1952	25,086	1.4	2.5	.73	.006	0.1
1954	18,624	1.6	2.3	.84	.006	.1
1956	21,403	1.5	2.4	.73	.005	.1
1958	14,898	1.7	2.5	.80	.006	.1
1960	15,270	1.6	2.6	.63	.005	.1
1962	13,452	1.7	3.4	1.00	.005	.1
States east of the Mississippi River:						
1939	2,893	.2	6.5	.02	-	-
1942	3,600	.2	6.0	.01	1/	1/
1952	3,963	.2	4.5	.01	-	-
1954	3,469	.2	3.1	2/	-	-
1956	4,199	.2	3.9	.02	-	-
1958	4,135	.1	4.1	.02	-	-
1960	5,505	.1	4.0	2/	-	-
1962	5,087	.1	4.2	2/	-	-
West Central States:						
1939	10,630	1.8	1.4	-	-	-
1942	16,452	1.4	1.3	2/	-	1/
1952	12,289	1.1	.7	.04	-	1/
1954	10,201	1.3	.6	.03	-	1/
1956	10,426	1.3	.6	.03	-	1/
1958	6,558	1.8	.1	.04	-	1/
1960	5,951	1.9	.1	2/	-	1/
1962	3,474	1.9	.5	.14	-	1/
Western States:						
1939	2,792	6.0	4.5	4.10	.022	.2
1942	5,412	4.3	5.1	3.30	.020	.1
1952	8,834	2.4	4.1	2.02	.016	.2
1954	4,954	3.3	4.3	3.07	.023	.2
1956	6,778	2.7	4.2	2.25	.017	.2
1958	4,205	3.2	4.8	2.75	.022	.2
1960	3,814	3.2	4.4	2.52	.019	.2
1962	4,891	3.2	4.6	2.65	.013	.2

1/ Less than 0.05 percent.
2/ Less than 0.005 fine ounce.

Source: Data for 1939 and 1954, from the Census of Mineral Industries (after small adjustments by the Tariff Commission to exclude materials other than crude ore); data for 1942, 1952, 1956, 1958, 1960, and 1962, compiled from data supplied by the U.S. Bureau of Mines.

Table 17.--Primary lead smelters and refineries in the United States, and their capacity, Dec. 31, 1963, and Dec. 31, 1957

Company	Location of plant	Capacity			
		Smelter 1/		Refinery 2/	
		Dec. 31, 1963	Dec. 31, 1957	Dec. 31, 1963	Dec. 31, 1957
		Tons of charge	Tons of charge	Tons of refined lead	Tons of refined lead
American Smelting & Refining Co-----	East Helena, Mont--	360,000	360,000	-	-
	El Paso, Tex-------	360,000	360,000	-	-
	Leadville, Colo----	-	3/ 180,000	-	-
	Selby, Calif-------	192,000	192,000	72,000	72,000
	Perth Amboy, N.J---	-	-	4/ 96,000	96,000
	Omaha, Nebr--------	-	-	180,000	180,000
	Federal, Ill-------	-	-	5/	128,000
Bunker Hill Co------	Kellogg, Idaho-----	300,000	300,000	100,000	100,000
International Smelting & Refining Co. 6/--------	Tooele, Utah-------	300,000	300,000	-	-
U.S.S. Lead Refinery, Inc. 7/------	East Chicago, Ind--	-	-	40,000	40,000
St. Joseph Lead Co---	Herculaneum, Mo----	8/	8/	120,000	120,000
U.S. Smelting, Refining & Mining Co-----------	Midvale, Utah------	9/	250,000	9/	72,000
Total----------	----------	10/ 1,512,000	10/ 1,942,000	11/ 608,000	808,000

1/ Nominal estimates by proprietors. A plant of a certain blast-furnace capacity may not have the ore available with which to run it. Even with adequate ore, roasting and sintering capacity may be the governing factor, rather than blast-furnace capacity. For such reasons some of the estimates would have to be reduced to 80 percent of those shown. Smelters are rated according to tons of charge, that is, ore plus flux but not including fuel. Production of base bullion, the product of all smelters (except the 3 for which smelter capacity data are not given) varies according to the lead in the charge.

2/ Most of this refining is done by the Parkes process, but the electrolytic process is used by the U.S.S. Lead Refinery, Inc.

3/ Plant permanently closed Jan. 1, 1961.

4/ Operations discontinued June 1961, but plant has been maintained on a standby basis.

5/ Operations discontinued July 31, 1959, and plant subsequently dismantled.

6/ Subsidiary of the Anaconda Co.

7/ Subsidiary of U.S. Smelting, Refining & Mining Co.

8/ Smelting and refining is done in the same plant. The smelting is of a high grade of galena concentrate which is generally low in silver content.

9/ Operations discontinued June 27, 1958, and plant subsequently dismantled.

10/ Exclusive of smelter at Herculaneum, Mo. which is also a refinery.

11/ Includes 96,000 tons for inactive Perth Amboy plant.

Source: American Bureau of Metal Statistics; information on plant closures from individual reports of lead smelting and refining companies.

Table 18.--Lead: Smelter and refinery production in the United States from primary and secondary sources, average 1953-57, annual 1958-63, and January-September 1964

(In short tons of lead content)

Item	Average 1953-57	1958	1959	1960	1961	1962	1963	Jan.-Sept. 1964
Primary production:								
Refined lead:								
From domestic ores and base bullion	333,655	269,082	225,270	228,899	288,078	245,645	239,660	1/
From foreign ores and base bullion	168,265	201,074	115,661	153,537	161,487	130,418	155,072	1/
Subtotal of primary refined lead	501,920	470,156	340,931	382,436	449,565	376,063	394,732	340,565
Antimonial lead:								
From domestic ores	7,554	8,256	6,447	1,216	12,988	14,838	16,350	1/
From foreign ores	8,845	8,190	5,955	1,169	11,978	12,545	15,165	1/
Subtotal of primary antimonial lead	16,399	16,446	12,402	2,385	24,966	27,383	31,515	13,219
Refined lead and antimonial lead:								
From domestic ores and base bullion	341,209	277,338	231,717	230,115	301,066	260,483	256,010	1/
From foreign ores and base bullion	177,110	209,264	121,616	154,706	173,465	142,963	170,237	1/
Total from primary sources	518,319	486,602	353,333	384,821	474,531	403,446	426,247	353,784
Secondary production:								
From new scrap	57,075	58,518	58,625	61,506	62,254	50,918	66,282	) 381,604
From old scrap	436,064	343,269	392,762	408,397	390,538	393,284	427,189	)
From old and new scrap:								
As refined lead	126,973	116,057	125,379	148,219	140,669	118,468	134,529	76,269
In antimonial lead	243,166	182,953	204,346	205,487	205,569	229,392	244,797	2/ 178,574
In other lead alloys	97,112	90,059	96,282	101,258	94,276	87,243	92,203	)
In copper-base alloys	25,655	12,673	25,342	14,897	12,221	9,019	21,878	) 126,761
In tin-base alloys	233	45	38	42	57	80	64	)
Total from secondary sources	493,139	401,787	451,387	469,903	452,792	444,202	493,471	381,604
Total primary and secondary production	1,011,459	888,389	804,720	854,724	927,323	847,648	919,718	735,388

1/ Not available.

2/ This figure is understated, perhaps as much as 5 to 10 percent, because data on some of the refined lead and antimonial lead produced from scrap are not reported until after the end of the year.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 19.--Primary zinc smelters in the United States, by types and capacity, Dec. 31, 1963, and Dec. 31, 1957

Type of smelter and company	Location of plant	Capacity 1/	
		Dec. 31, 1963	Dec. 31, 1957
Electrolytic plants:			
American Smelting & Refining Co	Corpus Christi, Tex	108,000	100,000
American Zinc Co. of Illinois 2/	Monsanto, Ill	64,000	58,000
Anaconda Co. 3/	Great Falls, Mont	162,000	162,000
	Anaconda, Mont	4/ 86,500	86,500
Bunker Hill Co	Kellogg, Idaho	92,000	73,800
Total, electrolytic		512,500	480,300
Distillation plants:			
Horizontal retort: 5/			
American Metal Climax, Inc., Blackwell Zinc Div	Blackwell, Okla	94,900	94,900
American Smelting & Refining Co	Amarillo, Tex	58,400	58,400
American Zinc Co. of Illinois 2/	Dumas, Tex	54,750	50,005
American Zinc Co. of Illinois 2/	East St. Louis, Ill	6/	12,775
Athletic Mining & Smelting Co	Fort Smith, Ark	7/ 29,200	31,025
Eagle-Picher Co	Henryetta, Okla	58,400	50,005
Matthiessen & Hegeler Zinc Co	La Salle, Ill	8/ 29,200	32,850
National Zinc Co. Inc. 9/	Bartlesville, Okla	41,610	41,610
Total, horizontal retort		366,460	371,570
Vertical retort:			
Matthiessen & Hegeler Zinc Co., Meadowbrook Div	Spelter, W. Va	10/	10/
New Jersey Zinc Co	Depue, Ill	10/	10/
New Jersey Zinc Co. of Pa	Palmerton, Pa	10/	10/
St. Joseph Lead Co	Josephtown, Pa	10/	10/
Total, vertical retort 11/		372,540	307,030
Total, distillation		739,000	678,600
Total, electrolytic and distillation 12/		13/ 1,251,500	1,158,900

1/ Partly estimated. Capacities are based on current operations and represent usable capacity of zinc producing plants with allowance for normal interruptions for the rebuilding and repair but not including idle plants that are unusable without large capital expenditures. Production of primary slab zinc was 1,057,450 tons in 1957 and 953,496 tons in 1963.

2/ Subsidiary of American Zinc, Lead and Smelting Co.

3/ Parent company of International Smelting & Refining Co., a lead smelting firm (see table 17).

4/ The facilities for the recovery of zinc metal were shut down in February 1961, but have been maintained on a standby basis. Roasting and sintering operations, however, are currently in operation.

5/ Annual capacities shown were computed by multiplying the daily capacities reported by the American Bureau of Metal Statistics by 365.

6/ Smelting operations at this plant were shut down in 1959 and the facilities are no longer available for the distillation of zinc; the roasting and sintering facilities, however, are currently in operation.

7/ Plant shut down in February 1964.

8/ Smelting facilities were inactive during 1962 and 1963; only roasting and sintering operations were active.

9/ Wholly owned subsidiary of International Minerals and Metals Corp.

10/ Not available.

11/ Derived by subtraction of the estimated horizontal retort capacity from total capacity by distillation processes.

12/ The U.S. Bureau of Mines reported a total primary-slab-zinc capacity of 1,162,000 tons at the end of 1957 and 1,226,300 tons at the end of 1963.

13/ This total includes annual capacity of 115,700 tons in a standby status.

Source: American Bureau of Metal Statistics, except as noted.

Table 20.--Zinc: Production of primary slab zinc and secondary zinc in the United States, by sources, average 1953-57, annual 1958-63

(In short tons of zinc content)

Item	Average 1953-57	1958	1959	1960	1961	1962	1963
Primary production, slab zinc: 1/							
From domestic ores	2/ 493,689	346,240	348,443	334,101	413,282	448,095	474,007
From foreign ores	2/ 436,599	435,006	450,223	465,415	433,513	431,300	418,577
Total primary	2/ 930,288	3/ 781,246	3/ 798,666	3/ 799,516	3/ 846,795	3/ 879,395	3/ 892,584
Secondary production:							
From new scrap	209,142	160,406	202,406	197,451	178,560	200,264	205,691
From old scrap	74,195	69,926	73,848	68,369	59,407	61,753	62,564
Total secondary	283,337	230,332	276,254	265,820	237,967	262,017	268,255
Grand total, primary and secondary	1,213,625	1,011,578	1,074,920	1,065,336	1,084,762	1,141,412	1,160,839
Recapitulation of secondary:							
As metal:							
By distillation:							
Slab zinc	4/ 65,272	4/ 46,150	4/ 57,227	4/ 68,010	4/ 54,610	4/ 58,217	4/ 59,540
Zinc dust	24,972	5/ 26,010	5/ 32,119	5/ 30,144	22,427	24,497	23,417
By remelting	7,465	5,282	4,918	5,031	4,352	3,892	4,317
In zinc-base alloys	14,085	17,683	17,611	13,738	14,400	15,183	14,940
In brass and bronze	136,089	99,641	120,032	107,422	102,624	118,487	125,087
In aluminum-base alloys	4,517	2,941	3,964	3,277	3,789	5,256	5,543
In magnesium-base alloys	184	143	179	191	126	154	201
In chemical products	30,753	32,482	40,204	38,007	35,639	36,331	35,210
Total secondary	283,337	230,332	276,254	265,820	237,967	262,017	268,255

1/ Annual production (in short tons of zinc content) of secondary slab zinc was as follows:

1953-57 average	66,308	1961	55,237
1958	46,605	1962	58,880
1959	57,818	1963	60,303
1960	68,731		

2/ Includes a small tonnage of slab zinc further refined into high-grade metal.
3/ Includes production of zinc used directly in alloying operations.
4/ Includes zinc content of redistilled slab zinc made from remelt die-cast slab.
5/ Includes zinc content of dust made from other than scrap.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 21.--Lead and zinc ores and concentrates: Receipts by lead and zinc smelters in the United States from domestic and foreign sources, classified by whether or not the materials originated in mines owned or controlled by the smelting companies or their subsidiaries, quarterly averages for specified periods, 1958 to 1963

(In short tons of lead or zinc content)

Item	Quarterly average			
	Jan.-Sept. 1958	Jan.-Sept. 1959	1961	1963
Receipts of lead ores and concentrates 1/				
From domestic sources:				
Originating in mines owned or controlled by smelting companies or their subsidiaries	34,114	34,630	37,869	32,550
Originating in mines not owned or controlled by smelting companies or their subsidiaries	33,635	28,223	30,277	30,615
Total from domestic sources	67,749	62,853	68,146	63,165
From foreign sources:				
Originating in mines owned or controlled by smelting companies or their subsidiaries	1,820	1,757	638	2,983
Originating in mines not owned or controlled by smelting companies or their subsidiaries	48,225	32,598	39,402	38,127
Total from foreign sources	50,045	34,355	40,040	41,110
Grand total from domestic and foreign sources	117,794	97,208	108,186	104,275
Receipts of zinc ores and concentrates 2/				
From domestic sources:				
Originating in mines owned or controlled by smelting companies or their subsidiaries	44,551	43,002	54,371	68,700
Originating in mines not owned or controlled by smelting companies or their subsidiaries	39,936	38,683	50,095	51,754
Total from domestic sources	84,487	81,685	104,466	120,454
From foreign sources:				
Originating in mines owned or controlled by smelting companies or their subsidiaries	15,257	21,382	14,238	13,831
Originating in mines not owned or controlled by smelting companies or their subsidiaries	98,666	104,193	87,454	79,334
Total from foreign sources	113,923	125,575	101,692	93,165
Grand total from domestic and foreign sources	198,410	207,260	206,158	213,619

1/ Valued chiefly for their lead content.
2/ Valued chiefly for their zinc content.

Source: Reports to the U.S. Tariff Commission from individual smelting companies.

Table 22.--Lead and zinc ores and concentrates: U.S. receipts and U.S. imports for consumption under import quotas and not under import quotas, by country of origin, quarterly averages for specified periods, 1958 to 1963, and ores and concentrates held in bond by lead and zinc smelters in the United States, as of Dec. 31 of specified years 1958 to 1963

(In short tons)

Item	Receipts of foreign ores or concentrates (quarterly average)				Imports for consumption (quarterly average)						Ores and concentrates held in bond as of Dec. 31--				
					Quantity entered under import quotas 1/			Quantity entered not under import quotas							
	Jan.-Sept. 1958	Jan.-Sept. 1959	1961	1963	Jan.-Sept. 1959	1961	1963	Jan.-Sept. 1959	1961	1963	1958	1960	1961	1962	1963
	Lead content														
Lead ores and concentrates (ores and concentrates valued chiefly for their lead content) from foreign sources, total	50,045	34,355	40,040	41,110	30,480	32,384	29,755	3,169	1,154	3,698	8,727	15,936	28,613	34,637	60,557
From individual countries for which separate import quotas were established:															
Peru	18,787	9,044	7,955	11,851	8,082	8,063	8,062	2,196	190	47	3,254	3,016	831	3,220	17,604
Union of South Africa	11,003	7,535	10,896	10,127	7,440	7,440	7,440	-	160	-	4,040	7,562	11,919	16,471	24,972
Australia	5,789	6,269	5,541	7,577	5,005	5,019	5,325	951	-	87	830	1,318	2,247	6,674	14,916
Canada	5,467	7,630	8,534	6,639	6,510	6,537	3,885	-	804	3,552	603	2,958	7,103	4,866	681
Bolivia	4,539	2,774	2,906	2,753	2,520	2,604	2,510	-	-	12	-	432	897	1,703	2,360
From other countries, total	4,460	1,103	4,208	2,163	923	2,721	2,533	22	-	-	-	650	5,616	1,703	24
Honduras	911	758	1,552	1,728	609	1,123	2,375	18	-	-	-	517	1,735	1,359	-
Philippine Republic	319	114	41	16	114	29	-	-	-	-	-	8	43	11	-
Mexico	552	131	325	265	101	224	-	4	-	-	-	125	417	247	-
Guatemala	1,426	52	2,100	33	51	1,214	3	-	-	-	-	-	3,239	-	-
Colombia	241	47	184	58	47	129	93	-	-	-	-	-	182	86	21
Argentina	30	1	-	-	1	-	-	-	-	-	-	-	-	-	-
Greenland	865	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Korea	80	-	-	63	-	-	62	-	-	-	-	-	-	-	3
Ecuador	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chile	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-
Morocco	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-

See footnotes at end of table.

Table 22.--Lead and zinc ores and concentrates: U.S. receipts and U.S. imports for consumption under import quotas and not under import quotas, by country of origin, quarterly averages for specified periods, 1958 to 1963, and ores and concentrates held in bond by lead and zinc smelters in the United States, as of Dec. 31 of specified years 1958 to 1963--Continued

(In short tons)

Item	Receipts of foreign ores or concentrates (quarterly average)				Imports for consumption (quarterly average)						Ores and concentrates held in bond as of Dec. 31--				
					Quantity entered under import quotas 1/			Quantity entered not under import quotas							
	Jan.-Sept. 1958	Jan.-Sept. 1959	1961	1963	Jan.-Sept. 1959	1961	1963	Jan.-Sept. 1959	1961	1963	1958	1960	1961	1962	1963
	Zinc content														
Zinc ores and concentrates (ores and concentrates valued chiefly for their zinc content) from foreign sources, total	113,923	125,575	101,692	93,165	2/ 94,439	88,397	87,980	3,051	12,272	10,756	9,740	61,902	68,567	97,772	79,129
From individual countries for which separate import quotas were established:															
Mexico	42,430	47,275	46,629	34,580	35,240	34,779	33,926	1,451	8,977	5,512	959	13,725	25,124	20,569	6,053
Canada	39,788	43,164	28,999	35,471	33,240	28,566	32,906	111	97	2,516	1,812	12,379	14,606	62,991	63,820
Peru	22,080	18,877	16,981	18,724	17,453	16,690	15,726	1,453	875	1,435	6,969	6,927	5,918	2,148	6,099
From other countries, total	9,625	16,259	9,083	4,390	8,506	8,362	5,422	36	2,323	1,293	-	28,871	22,919	12,064	3,157
Spain	-	4,392	-	-	3,054	1,754	-	11	523	-	-	10,224	1,117	-	-
Italy	-	2,908	-	-	2,280	374	-	-	-	-	-	2,189	695	-	-
Australia	-	5,112	-	-	1,688	1,169	477	-	420	284	-	6,702	345	3,095	53
West Germany	-	1,097	-	-	763	3/	-	-	3/	-	-	2	1	-	-
Union of South Africa	6,506	962	1,541	-	344	407	-	25	206	-	-	823	4,537	-	-
Bolivia	1,628	488	-	880	233	-	650	-	-	412	-	-	-	1,317	609
Guatemala	1,490	144	3,366	361	144	1,717	656	-	268	363	-	3,983	9,495	2,621	-
Sweden	-	1,156	-	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Honduras	-	-	1,306	1,640	-	1,608	1,726	-	-	234	-	1,210	-	1,894	969
Philippine Republic	-	-	793	-	-	1,049	-	-	11	-	-	3,738	2,625	-	-
Union of South West Africa	-	-	-	1,497	-	-	1,900	-	-	-	-	-	-	-	-
Korea	-	-	-	12	-	-	13	-	-	-	-	-	-	-	-
Miscellaneous	-	-	2,077	-	-	284	-	-	895	-	-	-	4,104	3,137	1,526

1/ For periods indicated, totals, and data for some individual countries, are less than those reported by the U.S. Bureau of Customs. Data in this table differ from those reported by the U.S. Bureau of Customs (tables 38 and 44) chiefly because (1) lead contained in zinc and copper ores, and zinc contained in lead and copper ores are excluded, and (2) individual concerns were instructed to exclude the lead and zinc content of ores and concentrates used directly in the manufacture of lead and zinc pigments and salts.

2/ Adjusted on basis of U.S. Bureau of Customs data for Canada and Mexico because it was apparent that imports reported by individual concerns to the U.S. Tariff Commission for these 2 countries involved duplication and amounted to more than that which was permissible under the quotas.

3/ Less than 1 ton.

Source: Compiled from reports to the U.S. Tariff Commission from individual smelting companies.

Table 23.--Lead and zinc: Average number 1/ of all employees at lead and zinc mines and mills, and at primary lead and zinc smelters and refineries in the United States, specified years 1952 to 1963

Year	Total	Lead and zinc mines and mills 2/ 3/	Primary smelters and refineries 2/ 4/		
			Total	Lead	Zinc
1952	42,171	24,282	17,889	4,757	13,132
1954	5/	17,016	5/	5/	5/
1956	34,001	16,845	17,156	4,853	12,303
1958	24,141	10,500	13,641	3,778	9,863
1959	23,201	9,893	13,308	2,844	10,464
1960	22,733	9,430	13,303	3,030	10,273
1961	22,647	9,312	13,335	2,946	10,389
1962	20,581	8,561	12,020	2,672	9,348
1963	20,491	8,598	11,893	2,660	9,233

1/ Average number of employees was calculated for each year by averaging the number of employees on the payroll in the pay period ending nearest the 15th of each month.

2/ Data include a small number of construction workers (on the payroll of the companies) that were engaged in modernizing or making additions to the mines, mills, smelting and refining plants, and auxiliary works.

3/ Data for lead and zinc mines and mills cover operations engaged in producing ores or concentrates (including newly mined ore, old tailings, and material reclaimed from mine dumps and mill sites) in which the value of lead-plus-zinc content was greater than the value of any other single metal contained, and non-producing lead and zinc operations engaged in maintenance, development, or construction work. Data include proprietors and partners. Since 1956, the output of such mines accounted for 96 to 97 percent of the total mine production of lead and for 90 to 94 percent of the total mine production of zinc as reported by the U.S. Bureau of Mines.

Data shown for lead and zinc mines and mills (as defined above) were adjusted to include estimated employment for those concerns that did not report employment data. The estimated additional employment was computed on the basis of known production for unreported operations in each State and on the assumption that productivity for these operations was the same as for those that reported employment in those States.

Reported lead and zinc mining and milling operations accounted for the following percentages of total production of recoverable lead and zinc from materials valued chiefly for their lead-plus-zinc content:

Year	Lead	Zinc
1952 (of newly mined ore only)	91.9	92.9
1956	99.1	99.3
1958	96.7	98.3
1960	99.7	99.8
1962	99.3	99.4

4/ For lead smelters and refineries data are for 13 plants in 1952-56, for 12 in 1958, 11 in 1959, 10 in 1960, 9 in 1961, and for 8 in 1962 and 1963. Production was curtailed at one smelter from November 1962 to March 1963 due to a labor strike. For zinc smelters and refineries data through 1956 are for 18 plants. For 1958-61, data cover 16 primary zinc smelting and refining plants plus 3 roasting and sintering plants and 1 slag-treating plant. For 1962-63, data cover 14 primary zinc smelting and refining plants plus 5 roasting and sintering plants.

5/ Comparable data not available.

Source: Data for 1954, from the 1954 Census of Mineral Industries; data for other years, from reports to the U.S. Tariff Commission by companies engaged in the mining, milling, and primary smelting and refining of lead and zinc.

Table 24.--Lead and zinc mining and milling: Average number of production and related workers, wages paid, and man-hours worked in the United States, specified years 1952 to 1963 1/

Year	Average number of production and related workers employed and proprietors and firm members performing manual labor			Production and related workers				
				Total wages paid	Man-hours		Average wages paid per hour	
	Total	Production and related workers	Proprietors and firm members		Actually worked	Total 2/	Actually worked	Total 2/
				1,000 dollars	1,000 man-hours	1,000 man-hours		
1952	19,747	3/	3/	85,187	43,791	3/	$1.95	3/
1954	13,935	13,592	343	53,676	27,554	3/	1.95	3/
1956	14,457	14,251	206	66,595	30,351	3/	2.19	3/
1958	8,631	8,566	65	38,089	16,357	17,430	2.33	$2.19
1959	8,248	8,155	93	38,008	15,985	16,928	2.38	2.25
1960	7,872	7,752	120	37,207	15,308	16,228	2.43	2.29
1961	7,903	7,803	100	37,695	15,459	16,345	2.44	2.31
1962	6,989	6,919	70	36,054	13,730	3/	2.63	3/
1963	7,243	7,177	66	36,962	14,321	3/	2.58	3/

1/ Data have not been adjusted to account for unreported operations. See footnote 3, table 23 for the operations covered.

2/ Includes man-hours paid for holidays, sick leave, and vacations taken.

3/ Comparable data not available.

Source: Data for 1954, from the 1954 Census of Mineral Industries; data for other years, compiled from reports submitted to the U.S. Tariff Commission by companies engaged in lead and zinc mining and milling.

Table 25.--Lead and zinc mining and milling: Production of crude ore and recoverable lead and zinc; man-hours worked by, and wages paid to, production and related workers; and average man-hours worked, and wages paid, per unit of output at lead and zinc mines in the United States, 1/ specified years 1952-63

Item	1952	1956	1958	1960	1962	1963
Crude ore mined 2/----------1,000 short tons--	22,919	22,762	14,759	15,243	13,394	3/
Lead and zinc output from lead-zinc mines:						
Recoverable lead----------short tons--	346,359	337,404	250,977	239,137	225,222	3/
Recoverable zinc----------short tons--	596,185	507,372	373,730	397,461	453,764	3/
Total----------short tons--	942,544	844,776	624,707	636,598	678,986	4/ 715,724
Man-hours actually worked at lead-zinc mines and mills by production and related workers 5/----------1,000 man-hours--	43,791	30,351	16,357	15,308	13,730	14,321
Man-hours actually worked per ton of ore mined----------	1.91	1.33	1.11	1.00	1.03	3/
Man-hours actually worked per ton of recoverable lead plus zinc----------	46	36	26	24	20	20
Total wages paid to production and related workers at lead-zinc mines and mills----------1,000 dollars--	85,187	66,595	38,089	37,207	36,054	36,962
Labor cost of production and related workers per ton of recoverable lead plus zinc produced----------	$90.38	$78.83	$60.97	$58.45	$53.10	5/ $51.64

1/ Mines and mills that produced ores or concentrates valued chiefly for their recoverable lead-plus-zinc content. As indicated in table 23, data on employment and corresponding production account for well over 90 percent of the total production of recoverable lead and zinc from lead-zinc mines.

2/ Includes small quantities of old tailings and other materials reclaimed at mines and mills except in 1952, for which data are not available.

3/ Not available.

4/ Estimated on the basis of the ratio for 1962 of output of recoverable lead and zinc by lead-zinc mines to total U.S. mine output of recoverable lead and zinc. Data on employment and wages cover the same mines and mills in 1962 and 1963.

5/ Based on partly estimated data on production.

Source: Data on crude ore mined, man-hours worked, and wages paid from reports to the U.S. Tariff Commission by companies engaged in lead and zinc mining and milling; data on recoverable lead and zinc produced, from the reports to the U.S. Tariff Commission supplemented by data from the U.S. Bureau of Mines.

Table 26.--Lead and zinc mining and milling: U.S. production and average number of all employees in the United States, by principal metal in ores produced, specified years 1952 to 1963 1/

Item	Total, all lead and zinc mines and mills	Lead or lead-zinc 2/	Zinc or zinc-lead 3/
Crude ore mined:			
1952----------1,000 short tons--	22,919	8,150	14,769
1956----------do--------	21,244	9,129	12,115
1958----------do--------	14,279	6,946	7,333
1960----------do--------	15,139	6,733	8,406
1962----------do--------	13,391	4,100	9,291
Old tailings reclaimed: 4/			
1956----------1,000 short tons--	1,518	1,377	141
1958----------do--------	480	480	-
1960----------do--------	104	2	102
1962----------do--------	3	3	-
Recoverable metal contained in ores mined and in other material reclaimed: 5/			
Recoverable lead:			
1952----------short tons--	346,359	224,471	121,888
Percent of total----------	100.0	64.8	35.2
1956----------short tons--	337,404	229,693	107,711
Percent of total----------	100.0	68.1	31.9
1958----------short tons--	250,977	185,675	65,302
Percent of total----------	100.0	74.0	26.0
1960----------short tons--	239,137	179,999	59,138
Percent of total----------	100.0	75.3	24.7
1962----------short tons--	225,222	153,611	71,611
Percent of total----------	100.0	68.2	31.8
Recoverable zinc:			
1952----------short tons--	596,185	57,723	538,462
Percent of total----------	100.0	9.7	90.3
1956----------short tons--	507,372	67,227	440,145
Percent of total----------	100.0	13.3	86.7
1958----------short tons--	373,730	40,709	333,021
Percent of total----------	100.0	10.9	89.1
1960----------short tons--	397,461	37,012	360,449
Percent of total----------	100.0	9.3	90.7
1962----------short tons--	453,764	44,291	409,473
Percent of total----------	100.0	9.8	90.2
Average total number employed: 6/			
1952----------	22,582	7,790	14,792
1956----------	16,708	6,713	9,995
1958----------	10,304	4,852	5,452
1959----------	9,855	4,595	4,838
1960----------	9,394	4,131	4,890
1961----------	9,281	4,050	4,760
1962----------	8,397	2,961	5,386
1963----------	8,573	2,983	5,496

1/ See footnote 3, table 23 for operations covered.

2/ Lead-zinc ore is that in which the gross market value of the recoverable lead-plus-zinc content is greater than the gross market value of the recoverable content of any other single metal and the value of the lead is greater than that of the zinc.

3/ Zinc-lead ore is that in which the gross market value of the recoverable zinc-plus-lead content is greater than the gross market value of the recoverable content of any other single metal and the value of the zinc is greater than that of the lead.

4/ Includes old tailings and material reclaimed from mine dumps and mill sites. Similar data were not reported for 1952.

5/ Represents recoverable metal content of ore mined (including old tailings and material reclaimed from mine dumps and mill sites) after deduction of estimated metal losses in milling, smelting, and refining. For 1952, data cover only metal content of mined ore.

6/ Data have not been adjusted to include employment at unreported operations. Data through 1958, by principal metal in ores produced and total, include employment at nonproducing lead and zinc operations which were engaged in maintenance, development or construction work. For 1959-63 only the total includes employment at nonproducing lead and zinc mines; data by type of mine were not available.

Source: Compiled from reports submitted to the U.S. Tariff Commission by lead- and zinc-mining and milling companies.

Table 27.--Lead and zinc mining and milling: Production, and average number of all employees in the United States, by principal producing regions and States, specified years 1956 to 1963 1/

Item	United States, total reported	Principal producing regions and States					
		States east of the Mississippi River			West Central States		
		Total	N. Ill. and Wisc.	N.Y., N.J., Pa., Tenn., and Va.	Total	SE Mo.	Tri-State (Okla., Kans., and SW Mo.)
Crude ore mined:							
1956----------1,000 short tons--	21,244	4,169	1,313	2,856	10,361	6,841	3,520
1958----------do--------	14,279	4,152	1,071	3,081	6,454	5,926	528
1960----------do--------	15,139	5,530	1,329	4,201	5,970	5,899	71
1962----------do--------	13,391	5,087	983	4,104	3,459	2,992	467
Old tailings and other material reclaimed: 2/							
1956----------1,000 short tons--	1,518	139	139	-	1,224	1,224	-
1958----------do--------	480	-	-	-	480	480	-
1960----------do--------	104	1	1	-	98	-	98
1962----------do--------	3	-	-	-	-	-	-
Recoverable metal contained in ores mined and other material reclaimed: 3/							
Recoverable lead:							
1956----------short tons--	337,404	8,946	4,303	4,643	143,367	123,226	20,141
Percent of total----------	100.0	2.6	1.2	1.4	42.5	36.5	6.0
1958----------short tons--	250,977	5,283	1,770	3,513	117,702	113,097	4,605
Percent of total----------	100.0	2.1	0.7	1.4	46.9	45.1	1.8
1960----------short tons--	239,137	5,337	2,410	2,927	113,482	111,885	1,597
Percent of total----------	100.0	2.2	1.0	1.2	47.5	46.8	0.7
1962----------short tons--	225,222	7,353	2,231	5,122	64,629	60,982	3,647
Percent of total----------	100.0	3.3	1.0	2.3	28.7	27.1	1.6
Recoverable zinc:							
1956----------short tons--	507,372	162,816	37,734	125,082	59,409	3,345	56,064
Percent of total----------	100.0	32.1	7.4	24.7	11.7	0.7	11.0
1958----------short tons--	373,730	168,822	30,680	138,142	9,677	362	9,315
Percent of total----------	100.0	45.2	8.2	37.0	2.6	0.1	2.5
1960----------short tons--	397,461	222,674	38,735	183,939	6,801	2,821	3,980
Percent of total----------	100.0	56.0	9.7	46.3	1.7	0.7	1.0
1962----------short tons--	453,764	212,085	30,353	181,732	16,514	2,792	13,722
Percent of total----------	100.0	46.8	6.7	40.1	3.6	0.6	3.0
Average number of all employees: 4/----------							
1956----------	16,708	2,450	517	1,933	4,552	3,221	1,331
1958----------	10,304	2,181	264	1,917	3,146	2,823	323
1959----------	9,855	2,017	298	1,719	2,632	2,513	119
1960----------	9,394	2,181	369	1,812	2,609	2,420	189
1961----------	9,281	2,140	313	1,827	2,263	2,058	205
1962----------	8,397	2,201	268	1,933	1,538	1,215	323
1963----------	8,573	2,321	225	2,096	1,647	1,284	363

See footnotes at end of table.

Table 27.--Lead and zinc mining and milling: Production, and average number of all employees in the United States, by principal producing regions and States, specified years 1956 to 1963 1/--Continued

Item	Principal producing regions and States--Continued									
	Western States									
	Total	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Utah	Alaska and Washington
Crude ore mined:										
1956----------1,000 short tons--	6,714	367	168	955	1,241	1,513	102	481	635	1,252
1958----------do--------	3,673	361	2	737	877	333	6	65	452	840
1960----------do--------	3,639	357	2	734	669	244	5	212	456	960
1962----------do--------	4,845	311	2	834	1,190	914	5/	311	451	832
Old tailings and other material reclaimed: 2/										
1956----------1,000 short tons--	155	-	3	-	114	-	-	-	38	-
1958----------do--------	5/	5/	-	-	-	-	-	-	5/	-
1960----------do--------	5	5/	2	5/	-	2	5/	-	-	-
1962----------do--------	3	-	-	-	-	-	-	3	-	-
Recoverable metal contained in ores mined and other material reclaimed: 3/										
Recoverable lead:										
1956----------short tons--	185,091	11,764	8,854	18,328	60,091	17,687	3,380	5,980	47,487	11,520
Percent of total----------	54.9	3.5	2.6	5.4	17.8	5.3	1.0	1.8	14.1	3.4
1958----------short tons--	127,992	9,182	81	12,818	49,701	7,433	3,484	709	35,572	9,012
Percent of total----------	51.0	3.6	6/	5.1	19.8	3.0	1.4	0.3	14.2	3.6
1960----------short tons--	120,318	8,329	404	17,840	40,702	4,114	588	1,801	38,793	7,747
Percent of total----------	50.3	3.5	0.2	7.5	17.0	1.7	0.2	0.8	16.2	3.2
1962----------short tons--	153,240	6,863	369	16,848	80,399	4,616	5/	1,072	37,155	5,918
Percent of total----------	68.0	3.0	0.2	7.5	35.7	2.0	-	0.5	16.5	2.6
Recoverable zinc:										
1956----------short tons--	285,147	22,708	7,841	39,434	43,261	65,728	7,270	34,989	38,668	25,248
Percent of total----------	56.2	4.5	1.5	7.8	8.5	13.0	1.4	6.9	7.6	5.0
1958----------short tons--	195,231	26,217	37	37,073	42,356	27,507	75	8,575	34,595	18,796
Percent of total----------	52.2	7.0	6/	9.9	11.3	7.4	6/	2.3	9.3	5.0
1960----------short tons--	167,986	27,009	152	31,245	35,106	6,909	258	13,679	32,311	21,317
Percent of total----------	42.3	6.8	6/	7.9	8.9	1.7	0.1	3.4	8.1	5.4
1962----------short tons--	225,165	21,423	78	43,206	58,127	28,666	23	21,985	30,179	21,478
Percent of total----------	49.6	4.7	6/	9.5	12.8	6.3	6/	4.9	6.7	4.7
Average number of all employees: 4/										
1956----------	9,706	558	322	1,495	2,484	1,976	200	622	1,691	358
1958----------	4,977	308	2	894	1,792	636	36	112	947	250
1959----------	5,206	345	12	1,049	1,794	611	29	136	990	240
1960----------	4,604	355	14	1,118	1,197	412	41	231	978	258
1961----------	4,878	326	9	1,179	1,700	166	19	280	939	260
1962----------	4,658	302	6	1,086	1,658	95	1	257	1,003	250
1963----------	4,605	291	6	1,023	1,629	156	-	186	1,081	233

1/ See footnote 3, table 23 for operations covered.
2/ See footnote 4, table 26.
3/ See footnote 5, table 26.
4/ Data include employment at nonproducing lead and zinc operations engaged in maintenance, development, or construction work. Data also include proprietors and partners.
5/ Less than 500 short tons.
6/ Less than 0.05 percent.

Source: Compiled from reports of lead- and zinc-mining and milling companies to the U.S. Tariff Commission.

Table 28.--Lead and zinc smelting and refining: Average number of all employees at primary lead and zinc smelters and refineries in the United States, classified by plants processing mostly domestic materials and plants processing mostly imported materials, specified years 1952 to 1963

Year	Primary lead and zinc smelters and refineries			Primary lead smelters and refineries 1/ 2/			Primary zinc smelters and refineries 1/ 3/		
	Total	At plants processing mostly--		Total	At plants processing mostly--		Total	At plants processing mostly--	
		Domestic materials	Imported materials		Domestic materials	Imported materials		Domestic materials	Imported materials
1952	17,889	13,942	3,947	4,757	3,577	1,180	13,132	10,365	2,767
1956	17,156	9,957	7,199	4,853	3,572	1,281	12,303	6,385	5,918
1958	13,641	7,663	5,978	3,778	2,520	1,258	9,863	5,143	4,720
1959	13,308	7,134	6,174	2,844	1,962	882	10,464	5,172	5,292
1960	13,303	6,636	6,667	3,030	1,903	1,127	10,273	4,733	5,540
1961	13,335	6,906	6,429	2,946	1,975	971	10,389	4,931	5,458
1962	12,020	6,635	5,385	2,672	1,501	1,171	9,348	5,134	4,214
1963	11,893	6,604	5,289	2,660	1,459	1,201	9,233	5,145	4,088

1/ See footnote 2, table 23.

2/ Data are for 13 plants in 1952 and 1956; for 12 in 1958; for 11 in 1959; for 10 in 1960; for 9 in 1961; and for 8 in 1962 and 1963.

3/ Data are for 18 plants in 1952 and 1956. For 1958-61, data cover 16 primary zinc smelting and refining plants plus 3 roasting and sintering plants and 1 slag-treating plant. For 1962-63, data cover 14 primary zinc smelting and refining plants plus 5 roasting and sintering plants.

Source: Compiled from reports by primary lead and zinc smelting and refining companies to the U.S. Tariff Commission.

Table 29.--Lead and zinc smelting and refining: Employment, 1/ wages, and man-hours worked at primary lead and zinc smelters and refineries in the United States, specified years 1952 to 1963

Item and year	All employees (average number)	Production and related workers				Average wages paid per hour	
		Average number	Total wages paid	Man-hours			
				Actually worked	Total 2/	Actually worked	Total 2/
			1,000 dollars	1,000 man-hours	1,000 man-hours		
Lead smelters and refineries: 3/							
1952	4,757	3,885	4/	4/	4/	4/	4/
1956	4,853	3,939	18,007	8,128	4/	$2.22	4/
1958	3,778	3,009	14,067	5,855	6,320	2.40	$2.23
1959	2,844	2,156	10,017	4,040	4,369	2.48	2.29
1960	3,030	2,334	12,049	4,734	5,069	2.55	2.38
1961	2,946	2,323	11,965	4,617	4,953	2.59	2.42
1962	2,672	2,123	11,145	4,177	4/	2.67	4/
1963	2,660	2,115	11,414	4,172	4/	2.74	4/
Zinc smelters and refineries: 5/							
1952	13,132	11,135	4/	4/	4/	4/	4/
1956	12,303	10,190	46,531	20,867	4/	2.23	4/
1958	9,863	7,852	36,870	15,542	16,582	2.37	2.22
1959	10,464	8,647	41,944	17,184	18,349	2.44	2.29
1960	10,273	8,418	43,373	16,989	18,214	2.55	2.38
1961	10,389	8,620	44,676	17,162	18,402	2.60	2.43
1962	9,348	7,636	41,626	15,423	4/	2.70	4/
1963	9,233	7,568	42,221	15,319	4/	2.76	4/

1/ See footnote 1, table 23.

2/ Includes man-hours paid for holidays, sick leave, and vacations taken.

3/ Statistics through 1956 are for 13 plants: 2 in Utah, and 1 each in California, Colorado, Idaho, Illinois, Indiana, Kansas, Nebraska, New Jersey, Missouri, Montana, and Texas. Data are for 12 plants in 1958 (plant in Kansas closed in 1957); 11 plants in 1959 (1 plant in Utah closed in 1958); 10 plants in 1960 (plant in Illinois closed in 1959); 9 plants in 1961 (plant in Colorado closed in 1960); and 8 plants in 1962 and 1963 (plant in New Jersey closed in 1961).

4/ Comparable data not available.

5/ Statistics through 1956 are for 18 plants: 1 each in Arkansas, Idaho, and West Virginia; 2 in Montana; 3 each in Oklahoma, Pennsylvania, and Texas; and 4 in Illinois. Data for 1958-61 are for 16 primary smelting and refining plants (1 plant closed in Pennsylvania and 1 plant in Illinois changed to roasting of concentrates only) plus 3 roasting and sintering plants, located in Kansas, Colorado, and Illinois, respectively. Data for 1962-63 are for 14 primary smelting and refining plants (3 each in Texas and Oklahoma, 2 each in Illinois and Pennsylvania, and 1 each in Arkansas, Idaho, Montana, and West Virginia) and 5 roasting and sintering plants (2 in Illinois, and 1 each in Kansas, Colorado and in Montana). Of the 5 roasting and sintering plants operating in 1962-63, 2 smelted and refined zinc ore as well as roasting and sintering ore prior to 1962; and at another plant lead smelting operations were conducted, as well as roasting and sintering.

Source: Compiled from data submitted to the U.S. Tariff Commission by primary lead and zinc smelting and refining companies.

Table 30.--Lead: Producers' stocks at primary smelters and refineries in the United States, by kinds, average of yearend stocks, 1953-57, at the end of each year, 1958-64, and at the end of each month in 1964

(In short tons)

Period or date	In ores and mattes and in process at smelters (lead content)	In base bullion (lead content) 1/	Refined pig lead and antimonial lead (gross weight)			Grand total
			Refined pig lead	Antimonial lead	Total	
Average 1953-57	71,771	43,919	54,667	12,880	67,547	183,237
At end of--						
1958	72,378	32,430	185,913	12,595	198,508	303,316
1959	73,381	36,954	108,002	11,991	119,993	230,328
1960	89,502	56,190	149,034	11,115	160,149	305,841
1961	65,877	36,968	198,423	11,134	209,557	312,402
1962	62,394	28,626	139,168	6,359	145,527	236,547
1963	75,000	35,171	50,146	7,796	57,942	168,113
1964	63,954	34,475	35,978	3,775	39,753	138,182
1964, at the end of--						
January	73,690	35,731	40,779	7,546	48,325	157,746
February	78,807	38,559	39,365	6,817	46,182	163,548
March	72,921	38,591	40,174	6,329	46,503	158,015
April	67,312	41,878	35,329	6,128	41,457	150,647
May	57,252	40,433	25,692	5,186	30,878	128,563
June	58,244	39,197	25,081	4,624	29,705	127,146
July	60,935	32,939	27,254	4,365	31,619	125,493
August	62,074	34,411	29,489	4,077	33,566	130,051
September	55,976	36,930	33,117	4,051	37,168	130,074
October	59,202	35,190	38,196	3,377	41,573	135,965
November	56,708	34,119	35,081	3,813	38,894	129,721
December	63,954	34,475	35,978	3,775	39,753	138,182

1/ At smelters and refineries, in transit to refineries, and in process at refineries.

Source: Compiled from data supplied the U.S. Tariff Commission by the American Bureau of Metal Statistics.

Table 31.--Slab zinc: Primary and secondary U.S. producers' stocks, by standard grades, averages of yearend stocks, 1953-57, at the end of each year, 1958-64, and at the end of each month in 1964

(In short tons)

Period or date	At U.S. smelters					All grades elsewhere 2/	Grand total
	Special High Grade	High Grade	Intermediate	Prime Western 1/	Total		
Average 1953-57	28,310	17,658	2,355	67,953	116,276	3/	3/
At end of--							
1958	52,921	9,236	3,874	124,206	190,237	17,534	207,771
1959	12,512	4,442	1,928	135,537	154,419	29,859	184,278
1960	61,627	12,268	4,400	112,515	190,810	22,441	213,251
1961	75,953	6,226	1,868	67,142	151,189	21,397	172,586
1962	43,472	6,767	5,116	94,199	149,554	31,959	181,513
1963	14,174	3,748	1,171	35,971	55,064	19,403	74,467
1964	14,687	1,824	544	14,952	32,007	18,219	50,226
1964, at end of--							
January	10,794	2,607	1,045	33,705	48,151	18,011	66,162
February	9,264	2,276	1,195	30,862	43,597	19,573	63,170
March	12,162	2,514	939	30,360	45,975	19,106	65,081
April	13,472	1,965	981	27,124	43,542	18,481	62,023
May	13,191	2,675	1,148	21,010	38,024	20,360	58,384
June	10,367	3,631	894	15,528	30,420	21,477	51,897
July	9,651	4,090	543	11,447	25,731	23,511	49,242
August	12,780	2,548	751	13,422	29,501	21,710	51,211
September	12,306	3,478	960	13,867	30,611	20,692	51,303
October	15,968	3,556	662	13,738	33,924	18,757	52,681
November	15,859	3,914	625	15,995	36,393	15,465	51,858
December	14,687	1,824	544	14,952	32,007	18,219	50,226

1/ Including Select and Brass Special Grades.

2/ Refers to stocks located in outside warehouses, afloat, or in transit, or in consumers' plants which are still owned or controlled by the reporting smelter or its agent or distributor.

3/ Not available.

Source: Compiled from data supplied the U.S. Tariff Commission by the American Zinc Institute, Inc., and the American Bureau of Metal Statistics.

Table 32.--Zinc in ore and other zinciferous materials: Indexes of stocks held at zinc smelters in the United States at the end of each year, 1958-64, and at the end of each month in 1964

(Average of yearend stocks during 1953-57=100 1/)

Date	Zinc contents of stocks			
	Domestic ore	Foreign ore	Other zinciferous materials	Total
At end of--				
1958	41.1	120.8	136.1	81.7
1959	45.3	120.4	178.3	86.3
1960	90.6	125.0	184.8	111.5
1961	82.8	115.0	121.3	99.2
1962	70.1	107.3	117.7	89.2
1963	52.7	73.3	146.5	67.6
1964	37.3	67.6	105.0	54.7
1964, at the end of--				
January	51.5	67.4	129.2	63.4
February	51.0	67.5	131.0	63.2
March	47.1	66.6	131.9	60.9
April	46.6	60.9	128.3	58.0
May	44.2	61.8	120.6	56.7
June	45.1	61.9	115.8	56.9
July	39.4	62.9	122.4	54.9
August	35.5	62.7	120.7	52.8
September	36.0	60.4	122.8	52.1
October	36.1	62.7	128.8	53.6
November	36.7	64.8	112.5	53.7
December	37.3	67.6	105.0	54.7

1/ Index numbers are based on data compiled by the American Zinc Institute, Inc., which represented stocks of zinc ore (including sinter) and of other zinciferous materials held at smelters, at electrolytic plants, and in storage in the United States, suitable for the manufacture of metal, regardless of ownership, and including any Government-owned stocks, but excluding material in the operating circuit; data exclude stocks at mines and at old slag and residue piles or dumps, and material that is awaiting conversion into pigments and is suitable and definitely earmarked for that purpose. Data on actual tonnages of zinc-ore stocks may not be published; permission was granted the U.S. Tariff Commission by the American Zinc Institute, however, to publish such data in terms of index numbers, which reflect changes in stocks.

Source: Compiled from data supplied the U.S. Tariff Commission by the American Zinc Institute, Inc.

Table 33.--Refined lead: Commercial stocks of pig lead and lead content of antimonial lead held by producers in the United States and in certain other free-world areas, indicating stocks located both at smelters or refineries and elsewhere, at the end of specified periods, 1961 to 1964

(In thousands of short tons)

Date	United States			Europe 2/	All other reporting areas 3/			Free world--all reporting areas		
	At own plants 1/	Elsewhere 1/	Total		At own plants 1/	Elsewhere 1/	Total	At own plants 1/	Elsewhere 1/	Total 4/
At end of 1961	202.6	8.9	211.5	5/	5/	5/	5/	338.6	129.4	468.0
1962, at end of--										
March	204.1	12.0	216.1	66.4	5/	5/	142.2	303.1	121.6	424.7
June	186.6	12.0	198.7	78.0	5/	5/	112.3	271.2	117.8	389.0
September	178.8	11.5	190.3	69.8	5/	5/	108.0	253.5	114.5	368.1
December	143.1	11.9	155.0	57.5	5/	5/	96.9	207.4	101.9	309.4
1963, at end of--										
March	113.3	8.0	121.3	60.6	5/	5/	87.8	186.1	83.7	269.8
June	101.6	11.5	113.1	67.8	5/	5/	74.6	168.2	87.3	255.5
September	80.9	10.9	91.9	69.2	5/	5/	90.1	158.5	92.7	251.2
December	57.5	15.0	72.4	59.3	5/	5/	74.4	120.9	85.2	206.1
1964, at end of--										
January	47.9	14.6	62.5	70.0	17.5	70.4	87.9	5/	5/	220.4
February	45.8	12.5	58.3	67.1	26.7	65.2	91.9	5/	5/	217.3
March	46.1	17.0	63.1	62.1	32.7	62.9	95.6	5/	5/	220.8
April	41.1	19.6	60.6	54.1	21.7	66.1	87.8	5/	5/	202.5
May	30.5	25.7	56.2	59.8	22.7	58.8	81.5	5/	5/	197.5
June	29.4	27.6	57.0	56.9	32.3	49.6	81.9	5/	5/	195.8
July	31.3	24.9	56.2	59.2	19.2	45.1	64.3	5/	5/	179.7
August	33.3	21.0	54.3	56.3	22.6	49.7	72.3	5/	5/	182.9
September	36.9	18.1	55.0	50.0	24.7	43.9	68.6	5/	5/	173.6
October	41.4	14.1	55.5	50.8	20.2	50.6	70.8	5/	5/	177.1
November	38.7	11.5	50.2	46.2	25.8	49.6	75.4	5/	5/	171.8
December	39.6	10.3	49.9	46.5	31.7	46.9	78.6	5/	5/	175.0

1/ As defined by the International Lead-Zinc Study Group, stocks at "own plants" are stocks physically located at smelters or refineries, while stocks "elsewhere" are located in outside warehouses, in transit, or in consumers' plants and are still owned or controlled by the reporting smelter or its agent or distributors. Stocks held "elsewhere" are not necessarily physically located in the area as tabulated but are reflected under the area covering the respondent, regardless of where the stocks may be physically located.

2/ Beginning with 1964, the following countries of the Organization for Economic Cooperation and Development (OECD) are covered: Austria, Belgium, Denmark, France, West Germany, Greece, Italy, the Netherlands, Spain, Sweden, and the United Kingdom. Austria, Denmark, Greece, Italy, the Netherlands, Spain, and Sweden were not included prior to 1964. Detail for Europe on stocks at own plants and elsewhere is not available.

3/ Covers the following countries: Argentina, Australia, Canada, Mexico, Morocco, Peru, and Tunisia.

4/ During 1961-63, these totals represent about 84 percent of the free-world stocks or about 70 percent of total world stocks. Beginning with January 1964, when data were added for additional smelters and refineries in free Europe, data represent about 85 percent of the total stocks in the free world and about 75 percent of the total world stocks. For this reason, the data on total free-world stocks for 1961-63 are not comparable with data for such stocks for 1964.

5/ Not available.

Source: Statistics as published by the American Bureau of Metal Statistics, except the data for 1962 and 1963 for Europe and "all other reporting areas," which are from the Monthly Bulletin of the International Lead-Zinc Study Group.

Table 34.--Slab zinc: Commercial stocks held by producers in the United States and in certain other free-world areas, indicating stocks located both at smelters or refineries and elsewhere, at the end of specified periods, 1961 to 1964

1961 to 1964

(In thousands of short tons)

Date	United States			Europe 2/	All other reporting areas 3/			Free-world total 4/
	At own plants 1/	Elsewhere 1/	Total		At own plants 1/	Elsewhere 1/	Total	
At end of 1961	5/	5/	172.6	67.6	45.7	45.7	91.4	331.6
1962, at end of--								
March	138.7	28.8	167.5	69.6	32.3	48.5	80.8	317.9
June	147.0	37.9	184.9	81.8	40.5	45.1	85.6	352.3
September	168.9	30.5	199.4	101.8	48.2	50.5	98.7	399.9
December	149.6	31.9	181.5	97.8	41.8	49.0	90.8	370.1
1963, at end of--								
March	154.1	26.2	180.3	100.4	48.8	41.6	90.4	371.1
June	105.9	24.3	130.2	98.1	52.5	39.4	91.9	320.2
September	55.4	24.1	79.5	97.2	42.9	47.4	90.3	267.0
December	55.1	19.4	74.5	63.3	47.2	43.1	90.3	228.1
1964, at end of--								
January	48.2	18.0	66.2	63.3	42.5	50.8	93.3	222.8
February	43.6	19.6	63.2	59.4	40.7	42.3	83.0	205.6
March	46.0	19.1	65.1	56.8	40.5	45.4	85.9	207.8
April	43.5	18.5	62.0	49.5	37.4	48.1	85.5	197.0
May	38.0	20.4	58.4	51.8	39.1	44.5	83.6	193.8
June	30.4	21.5	51.9	48.2	39.0	44.7	83.7	183.8
July	25.7	23.5	49.2	55.0	35.1	48.4	83.5	187.7
August	29.5	21.7	51.2	64.1	43.1	46.7	89.8	205.1
September	30.6	20.7	51.3	64.2	36.5	44.9	81.4	196.9
October	33.9	18.8	52.7	56.4	35.5	48.9	84.4	193.5
November	36.4	15.4	51.8	51.4	32.9	47.0	79.9	183.1
December	32.0	18.2	50.2	50.6	38.9	45.4	84.3	185.1

1/ As defined by the International Lead-Zinc Study Group, stocks at "own plants" are stocks physically located at smelters or refineries, while stocks "elsewhere" are located in outside warehouses, in transit, or in consumers' plants and are still owned or controlled by the reporting smelter or its agent or distributors. Stocks held "elsewhere" are not necessarily physically located in the area as tabulated but are reflected under the area covering the respondent, regardless of where the stocks may be physically located.

2/ Covers the following countries of the Organization for Economic Cooperation and Development (OECD): Austria, Belgium, France, West Germany, Italy, Netherlands, Norway, Spain, and the United Kingdom. Detail for Europe on stocks at own plants and elsewhere is not available.

3/ Covers the following: Africa (part), Argentina (part), Australia, Canada, Mexico, and Peru.

4/ These totals represent about 85 percent of the free-world stocks, or about 72 percent of total world stocks.

5/ Not available.

Source: Statistics, published by the American Bureau of Metal Statistics (A.B.M.S.) were collected by the American Zinc Institute (for the United States), by the OECD (for Europe), and by the A.B.M.S. (for other areas).

Table 35.--Lead and zinc mining, milling, refining, and smelting: Consolidated profit-and-loss experience of 61 domestic producers of lead and zinc, 1961-63

(Money figures in thousands of dollars)

Year and item	Net sales	Cost of goods sold	Gross profit	Administrative, selling, and general expense	Net profit before income taxes	Ratio (percent) of net profit to net sales
1961						
Integrated mining and smelting companies 1/	267,377	238,055	29,322	11,886	17,436	6.5
Nonintegrated zinc smelters 2/	45,959	41,680	4,279	2,271	2,008	4.4
Nonintegrated lead and zinc mines and mills 3/	19,533	17,146	2,387	933	1,454	7.4
Total 1961	332,869	296,881	35,988	15,090	20,898	6.3
1962						
Integrated mining and smelting companies 1/	268,506	235,258	33,248	12,270	20,978	7.8
Nonintegrated zinc smelters 2/	39,831	35,799	4,032	2,370	1,662	4.2
Nonintegrated lead and zinc mines and mills 3/	20,794	18,309	2,485	1,031	1,454	7.0
Total 1962	329,131	289,366	39,765	15,671	24,094	7.3
1963						
Integrated mining and smelting companies 1/	294,516	246,497	48,019	13,159	34,860	11.8
Nonintegrated zinc smelters 2/	42,454	36,817	5,637	2,208	3,429	8.1
Nonintegrated lead and zinc mines and mills 3/	23,667	20.493	3,174	1,218	1,956	8.3
Total 1963	360,637	303,807	56,830	16,585	40,245	11.2

1/ Integrated operations of the companies for which data are shown include mining, milling, and primary refining and smelting. The figures shown here are a consolidation of all lead and zinc operations of the companies.

2/ The companies for which data are shown do not operate zinc mines of their own.

3/ The nonintegrated mines and mills for which data are shown do not operate smelters or refineries.

Source: Compiled from data submitted to the U.S. Tariff Commission by the domestic producers.

Note.--The data for the 61 companies covered by this table represent all lead and zinc primary smelters and refineries in the United States; they also account for about 90 percent of the mine output of recoverable lead and 98 percent of the recoverable zinc from all mines and mills that produced ores or concentrates valued chiefly for their recoverable lead plus zinc content. Of the 61 companies included, 51 operate on a calendar year basis.

Table 36.--Lead and zinc mining and milling: Profit-and-loss experience of 49 1/ nonintegrated domestic producers of lead and zinc, 1961-63

(Money figures in thousands of dollars)

Year and item	Number of producers	Net sales	Cost of goods sold	Gross profit	Administrative, selling and general expense	Net profit or (loss) before income taxes	Ratio (percent) of net profit or (loss) to net sales	GSA subsidy payments	Total earnings including GSA subsidy	Number with profits before subsidy	Number with profits including subsidy
1961											
Zinc producers	22	18,190	15,796	2,394	811	1,583	8.7	2/	1,583	14	-
Lead producers	10	1,343	1,350	(7)	122	(129)	(9.6)	2/	(129)	6	-
Total 1961	32	19,533	17,146	2,387	933	1,454	7.4	2/	1,454	20	-
1962											
Zinc producers	30	18,544	16,452	2,092	866	1,226	6.6	477	1,703	14	23
Lead producers	12	2,250	1,857	393	165	228	10.1	119	347	9	9
Total 1962	42	20,794	18,309	2,485	1,031	1,454	7.0	596	2,050	23	32
1963											
Zinc producers	34	21,075	18,536	2,539	1,032	1,507	7.2	523	2,030	11	25
Lead producers	12	2,592	1,957	635	186	449	17.3	45	494	8	9
Total 1963	46	23,667	20,493	3,174	1,218	1,956	8.3	568	2,524	19	34

1/ Usable profit-and-loss data were received from 49 producers, although some of the producers did not operate for all years covered. The number of producers for each year is shown in column 1; 30 companies produced in all 3 years. Of the 49 companies included, 41 operate on a calendar-year basis.

2/ Payments under this program did not start until 1962 (Public Law 87-347).

Source: Compiled from data submitted to the U.S. Tariff Commission by the domestic producers.

Table 37.--Lead and zinc mining and milling: Profit-and-loss experience of 30 nonintegrated domestic producers of lead and zinc, 1961-63

(Money figures in thousands of dollars)

Year and item	Net sales	Cost of goods sold	Gross profit	Administrative, selling, and general expense	Net profit or (loss) before income taxes	Ratio (percent) of net profit or (loss) to net sales	GSA subsidy payments	Total earnings including GSA subsidy	Number with profits before subsidy	Number with profits including subsidy
1961										
Zinc producers	18,133	15,746	2,387	809	1,578	8.7	1/	1,578	12	12
Lead producers	1,343	1,350	(7)	122	(129)	(9.6)	1/	(129)	6	6
Total 1961	19,476	17,096	2,380	931	1,449	7.4	1/	1,449	18	18
1962										
Zinc producers	17,816	15,727	2,089	826	1,263	7.1	308	1,571	11	15
Lead producers	2,198	1,840	358	163	195	8.9	119	314	8	8
Total 1962	20,014	17,567	2,447	989	1,458	7.3	427	1,885	19	23
1963										
Zinc producers	19,329	16,888	2,441	928	1,513	7.8	253	1,766	9	14
Lead producers	2,511	1,925	586	184	402	16.0	45	447	6	7
Total 1963	21,840	18,813	3,027	1,112	1,915	8.8	298	2,213	15	21

1/ Payments under this program did not start until 1962 (Public Law 87-347).

Source: Compiled from data submitted to the U.S. Tariff Commission by the domestic producers.

Note.--Of the 30 companies included, 26 operate on a calendar year basis.

Table 38.--Unmanufactured lead: Annual equivalent of quarterly import quotas established on Oct. 1, 1958 (as modified by the TSUS, effective Aug. 31, 1963), and actual U.S. imports under the quotas, by countries, 1959-64

(In short tons)

Item and country	Annual equivalent of quota	Actual imports under the import quotas in--					
		1959	1960	1961	1962	1963	1964
Ores (lead content):							
Peru	32,320	32,320	32,320	32,320	32,179	32,320	32,320
Union of South Africa 1/	29,760	29,760	29,760	29,760	29,760	29,760	29,760
Canada	26,880	26,880	26,880	26,880	26,880	16,511	21,130
Australia	2/ 22,440	20,160	20,160	20,160	20,160	21,300	22,440
Bolivia	10,080	10,080	10,080	10,080	7,630	10,080	9,536
All other	13,120	5,522	12,624	13,120	13,120	11,408	7,352
Total	3/ 134,600	124,722	131,824	132,320	129,729	121,379	122,538
Metal (lead content):							
Mexico	73,760	73,760	73,754	73,760	73,059	73,332	73,758
Australia	4/ 45,080	47,360	47,360	47,360	44,861	46,220	45,079
Canada	31,840	31,840	31,840	31,840	31,840	31,823	31,840
Yugoslavia	31,520	31,520	31,520	31,487	31,246	31,498	31,520
Peru	25,760	25,756	25,758	25,755	23,013	25,750	25,758
All other	12,160	12,160	12,160	12,160	6,446	12,160	11,150
Total	5/ 220,120	222,396	222,392	222,362	210,465	220,783	219,105
Grand total (ores and metals)	354,720	347,118	354,216	354,682	340,194	342,162	341,643

1/ Beginning Jan. 1, 1962, Republic of South Africa.
2/ Quota prior to Aug. 31, 1963--20,160 short tons.
3/ Quota prior to Aug. 31, 1963--132,320 short tons.
4/ Quota prior to Aug. 31, 1963--47,360 short tons.
5/ Quota prior to Aug. 31, 1963--222,400 short tons.

Source: Quotas, from Presidential Proclamation No. 3257, dated Sept. 22, 1958; imports subject to quotas, from the U.S. Department of the Treasury.

Note.--For kinds of material subject to quota limitations, see table 1.

Table 39.--Unmanufactured lead: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 1/	1964 1/
	Quantity (short tons of lead content)							
Peru	74,590	135,062	68,183	59,033	58,815	56,411	56,337	56,031
Mexico	106,171	128,041	88,896	77,671	78,569	74,850	82,740	75,460
Australia	99,775	113,252	76,821	66,921	75,145	93,090	79,192	67,711
Canada	77,598	74,437	73,715	59,926	89,933	90,883	64,324	60,795
Yugoslavia	41,065	36,789	32,376	30,159	30,230	32,460	31,063	30,434
Bolivia	13,018	22,681	10,939	10,581	10,471	7,479	10,071	8,373
Union of South Africa 2/	38,202	41,386	28,939	30,785	29,849	29,756	29,740	29,760
Morocco	9,896	9,760	5,032	6,480	4	-	-	-
Spain	5,296	9,505	11,270	6,388	8,786	3,958	7,714	847
Guatemala	5,779	4,944	158	1,520	5,538	4,691	387	6
Chile	3,806	422	113	27	401	3	-	-
United Kingdom	1,515	8,556	1,048	150	57	1	1,464	2,257
West Germany	1,523	3,286	2,693	655	911	614	580	3,413
Denmark	3,107	2,188	625	319	208	-	2	700
Honduras	2,243	3,811	3,649	4,457	4,803	5,959	8,693	6,489
All other	7,860	3/ 13,775	8,802	5,683	1,023	2,370	5,012	5,487
Total	491,444	607,895	413,259	360,755	394,743	402,525	377,319	347,763
	Foreign value (1,000 dollars)							
Peru	18,975	28,430	13,207	12,121	10,153	8,133	9,265	12,214
Mexico	29,119	27,184	18,339	16,743	16,907	13,094	16,077	15,089
Australia	24,701	21,069	13,986	12,763	11,942	12,932	12,045	13,299
Canada	19,826	15,531	15,262	11,901	16,062	14,963	11,263	12,794
Yugoslavia	11,809	7,865	7,745	7,402	6,220	5,761	6,322	6,818
Bolivia	3,355	5,126	2,101	2,274	1,740	919	1,716	1,547
Union of South Africa 2/	11,231	10,229	6,475	7,203	6,712	5,966	5,179	3,640
Morocco	2,526	2,125	1,058	1,118	1	-	-	-
Spain	1,342	1,613	2,347	1,135	1,469	596	1,202	121
Guatemala	890	620	39	246	1,123	1,101	32	4
Chile	790	132	15	7	63	2	-	-
United Kingdom	401	1,595	240	40	15	5	282	442
West Germany	398	813	745	154	149	86	211	695
Denmark	1,048	690	280	108	64	-	4	169
Honduras	643	953	896	957	906	1,048	1,622	1,339
All other	1,834	3/ 2,394	1,923	1,144	133	341	775	1,097
Total	128,888	126,369	84,658	75,316	73,659	64,947	65,995	69,268

1/ Preliminary.
2/ Republic of South Africa beginning Jan. 1, 1962.
3/ Includes 5,276 short tons, valued at $793,000, from Greenland, and 4,684 short tons, valued at $925,000, from Belgium.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Data for 1963 and 1964 are not strictly comparable with those of previous years; data for type metal are not available beginning in 1963.

Table 40.--Lead-bearing ores, flue dust and mattes: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

(In short tons of lead content)

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 1/	1964 1/
Peru	40,929	92,182	38,872	33,600	32,518	32,213	32,363	32,314
Mexico	3,784	3,650	806	1,151	1,191	1,899	1,850	458
Australia	26,385	33,829	22,291	20,894	20,131	20,627	21,296	22,488
Canada	33,901	31,393	28,632	27,944	31,439	29,511	29,937	27,972
Bolivia	12,654	22,501	10,822	10,581	10,471	7,479	10,055	8,373
Union of South Africa 2/	37,867	41,386	28,939	30,785	29,736	29,756	29,740	29,760
Guatemala	5,621	4,944	158	1,519	5,527	4,691	387	5
Chile	3,798	88	113	27	401	3	-	-
Honduras	2,243	3,811	3,649	4,457	4,803	5,959	8,693	6,489
All other	3,956	8,106	2,680	6,581	895	815	347	208
Total	171,138	241,890	136,962	137,539	137,112	132,953	134,668	128,067

1/ Preliminary.
2/ Republic of South Africa beginning January 1, 1962.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 41.--Lead metal: 1/ U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

(In short tons of lead content)

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 2/	1964 2/
Peru	33,661	42,880	29,311	25,433	26,297	24,198	23,974	23,717
Mexico	102,388	124,391	88,090	76,520	77,378	72,951	80,890	75,002
Australia	73,390	79,423	54,530	46,027	55,014	72,463	57,896	45,223
Canada	43,697	43,044	45,083	31,982	58,494	61,372	34,387	32,823
Yugoslavia	41,065	36,789	32,376	30,159	30,230	32,240	31,063	30,434
Morocco	9,370	9,760	5,032	1,243	4	-	-	-
Spain	5,296	9,505	11,270	6,388	8,786	3,958	7,714	847
United Kingdom	1,515	8,556	1,035	150	57	1	1,464	2,257
West Germany	1,523	3,286	2,667	655	911	614	580	3,413
Denmark	3,107	2,188	625	319	208	-	2	700
All other	5,294	6,183	6,278	4,340	252	1,775	4,681	5,280
Total	320,306	366,005	276,297	223,216	257,631	269,572	242,651	219,696

1/ Lead or base bullion, lead pigs and bars, lead scrap and dross, antimonial lead, type metal, and miscellaneous alloys or combinations of lead (except babbitt metal and solder). Data for type metal not available beginning in 1963.

2/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 42.--Unmanufactured lead: U.S. imports for consumption, by kinds of material and by customs treatment, average 1953-57, annual 1958-64

(In short tons of lead content)

Period	Lead-bearing ores, flue dust, and mattes		Lead metal							Total, ores and metal	
								Total, lead metal			
	Dutiable	Free	Lead or base bullion	Lead pigs and bars	Type metal and antimonial lead	Reclaimed lead, scrap, and dross	Lead alloys, chief value lead	Dutiable	Free	Dutiable	Free
1953-57 average	167,258	3,880	168	300,284	6,991	12,156	707	277,924	42,382	445,182	46,262
1958	241,297	593	416	351,759	4,524	8,619	687	319,966	46,039	561,263	46,632
1959	136,526	436	34	262,632	5,021	7,897	713	231,923	44,374	368,449	44,810
1960	137,302	237	293	213,347	3,915	5,598	63	220,239	2,977	357,541	3,214
1961	132,976	4,136	236	247,428	5,765	3,894	308	221,432	36,199	354,408	40,335
1962	128,862	4,091	2,100	257,866	7,512	2,079	15	230,054	39,518	358,916	43,609
1963 1/	122,080	12,588	3,866	218,522	2/ 3,190	15,405	3/ 1,668	240,895	1,756	362,975	14,344
1964 1/	121,256	6,811	7,039	205,162	4/	1,908	5/ 5,587	218,434	1,262	339,690	8,073

1/ Preliminary.
2/ Represents imports of antimonial lead during the period Jan. 1-Aug. 30, 1963; data on imports of antimonial lead for the remainder of 1963 are included with those for "Lead alloys, chief value lead."
3/ See footnote 2.
4/ The small imports of type metal were subject to quotas under the Presidential proclamation of Sept. 22, 1958, but as a result of the implementation of the TSUS, effective Aug. 31, 1963, type metal was excluded from quota limitations. Data on imports of antimonial lead during 1964 are included with "Lead alloys, chief value lead."
5/ Includes antimonial lead.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Data for 1963 and 1964 reflect changes in import classifications under the TSUS, effective Aug. 31, 1963.

Table 43.--Lead articles, unmanufactured and other: U.S. imports for consumption, average 1953-57, annual 1958-63, and January-June 1964

(In short tons)

Article	Average 1953-57	1958	1959	1960	1961	1962 1/	1963 1/	Jan.-June 1964 1/
Unmanufactured lead:								
Lead-bearing ores:								
Lead content	171,138	241,890	136,962	137,539	137,112	132,953	134,668	66,764
Lead pigs and bars:								
Lead content	300,284	351,759	262,632	213,347	247,428	257,866	218,522	105,476
All other (lead bullion, scrap, type metal, antimonial lead, and all alloys or combinations of lead, not specially provided for):								
Lead content	20,022	14,246	13,665	9,869	10,203	11,706	2/ 24,129	2/ 8,585
Total (lead content)	491,444	607,895	413,259	360,755	394,743	402,525	377,319	180,825
Other lead articles:								
Lead pigments:								
Litharge:								
Gross weight	2,979	7,712	11,382	13,371	15,390	15,597	22,440	8,602
Lead content	2,765	7,157	10,562	12,408	14,282	14,474	20,824	7,983
Red lead:								
Gross weight	75	64	468	537	457	554	1,171	1,136
Lead content	68	58	425	487	414	502	1,062	1,030
White lead:								
Gross weight	22	724	1,073	1,497	1,872	2,361	2,434	1,500
Lead content	18	580	859	1,199	1,499	1,891	1,950	1,202
Other lead pigments:								
Gross weight	37	2	30	3/	-	3/	1	-
Lead content	35	2	29	3/	-	3/	3/	-
Total:								
Gross weight	3,113	8,502	12,953	15,405	17,719	18,512	26,046	11,238
Lead content	2,886	7,797	11,875	14,094	16,195	16,867	23,836	10,215
Bearing metal and solder:								
Gross weight	1,171	2,099	10,053	9,184	7,591	2,421	2/ 2,307	2/ 1,706
Lead content	701	1,006	2,849	1,449	1,101	1,015	2/ 1,217	2/ 834
Lead pipe, sheet, shot, glaziers' lead, and lead wire:								
Gross weight	3,239	2,625	3,608	2,855	2,845	2,276	2,422	1,135
Lead mill products, not elsewhere specified:								
Gross weight	4/	1,271	1,398	2,097	2,319	2,021	5/ 2,100	6/ 1,000
Total, other lead articles 7/	4/	12,699	19,730	20,495	22,460	22,179	29,575	13,184
Grand total 8/	4/	620,594	432,989	381,250	417,203	424,704	406,894	194,009

1/ Preliminary

2/ As a result of changes under the TSUS, imports of type metal after Aug. 31, 1963, are included with bearing metal (previously called babbitt metal).

3/ Less than 1 ton.

4/ Not available.

5/ Estimated on the basis of the rate of imports during January-August 1963.

6/ Estimated on the basis of the rate of imports during 1960-63.

7/ Represents the sum of the gross weight of lead pipe, sheet, shot, glaziers' lead, lead wire, the gross weight of lead mill products, not elsewhere specified, and the lead content of all other items.

8/ Represents the sum of the total lead content of unmanufactured lead and the total, other lead articles.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Note.--Data for 1963 and 1964 reflect changes in import classifications under the TSUS, effective Aug. 31, 1963.

Table 44.--Unmanufactured zinc: Annual equivalent of quarterly import quotas established on Oct. 1, 1958 (as modified by the TSUS, effective Aug. 31, 1963), and actual U.S. imports under the quotas, by countries, 1959-64

(In short tons)

Item and country	Annual equivalent of quota	Actual imports under the import quotas in--					
		1959	1960	1961	1962	1963	1964
Ores (zinc content):							
Mexico	140,960	140,960	140,960	140,866	140,729	140,960	117,752
Canada	132,960	132,960	132,960	110,173	132,960	132,960	132,960
Peru	70,240	70,240	70,240	67,535	66,598	67,465	67,829
All other	35,680	35,680	35,680	35,680	35,680	35,680	35,680
Total	379,840	379,840	379,840	354,254	375,967	377,065	354,221
Metal (gross weight):							
Canada	75,680	75,680	75,680	73,157	75,680	75,680	75,680
Belgium and Luxembourg	15,040	11,425	5,696	12,465	15,040	15,040	14,491
Mexico	12,640	9,412	8,601	8,498	12,334	12,619	12,637
Belgian Congo 1/	10,880	10,880	9,618	10,876	10,878	10,721	10,876
Peru	7,520	7,517	7,518	7,517	7,515	7,518	7,520
Italy	7,200	7,200	3,614	883	551	-	-
All other	12,160	12,160	11,035	12,160	12,160	12,160	12,159
Total	141,120	134,274	121,762	125,556	134,158	133,738	133,363
Grand total (ores and metal)	520,960	514,114	501,602	479,810	510,125	510,803	487,584

1/ Beginning June 30, 1960, Republic of the Congo.

Source: Quotas, from Presidential Proclamation No. 3257, dated Sept. 22, 1958; imports subject to quotas, from the U.S. Department of the Treasury.

Note.--For kinds of material subject to quota limitations, see table 1.

Table 45.--Unmanufactured zinc: 1/ U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 2/	1964 2/
	Quantity (short tons--zinc content of ores, gross weight of other materials)							
Canada	284,622	265,800	227,082	208,763	183,411	212,852	212,140	211,852
Mexico	211,694	231,383	170,123	199,360	175,665	169,818	168,558	123,691
Peru	104,543	120,109	93,438	82,843	80,312	90,915	80,279	66,320
Union of South Africa	7,836	28,007	4,629	10,409	6,290	12,115	11,438	6,383
Belgian Congo 3/	17,747	20,991	12,790	9,308	11,420	10,882	9,590	10,378
Belgium and Luxembourg	23,364	17,969	11,648	5,724	12,381	16,829	16,070	14,668
Australia	13,184	8,327	25,878	15,164	9,254	12,903	8,078	3,403
Bolivia	9,461	6,838	1,704	1,690	1,018	798	5,072	2,977
Guatemala	7,992	6,093	10	1,811	8,088	29,251	4,074	51
Italy	13,570	5,816	17,104	8,478	4,009	1,687	907	-
Yugoslavia	6,126	5,009	3,384	5,640	3,277	2,751	1,564	832
Norway	1,509	2,600	329	7	-	-	-	-
West Germany	9,671	2,035	7,952	1,619	1,444	1,890	1,585	2,939
Japan	1,680	1,734	355	-	-	-	-	-
Honduras	991	1,478	1,116	2,140	4,119	17,984	9,227	6,374
Spain	3,500	-	13,476	14,598	14,833	3,602	4,666	4,993
All other	12,039	3,891	11,843	2,680	6,074	8,588	4,508	18,874
Total	729,529	728,080	602,861	570,234	521,595	592,865	537,756	473,735
	Foreign value (1,000 dollars)							
Canada	48,558	38,014	35,117	33,978	26,942	29,706	28,946	33,877
Mexico	19,647	15,162	10,122	14,781	11,714	12,347	11,567	13,816
Peru	15,841	15,742	10,354	9,972	9,153	8,558	9,211	10,781
Union of South Africa	1,599	4,043	796	1,563	1,543	1,942	1,818	1,304
Belgian Congo 3/	3,825	4,179	2,689	2,438	2,426	1,990	1,782	2,667
Belgium and Luxembourg	5,600	3,300	2,306	1,321	2,601	3,259	3,110	3,086
Australia	2,393	1,474	3,226	1,518	1,351	1,809	959	572
Bolivia	1,163	639	192	145	199	119	641	428
Guatemala	822	734	3	217	930	3,662	472	5
Italy	2,801	1,081	2,244	1,787	657	267	207	-
Yugoslavia	872	902	661	1,352	766	480	297	-
Norway	336	459	67	1	-	-	-	-
West Germany	2,264	400	710	420	332	347	286	567
Japan	386	361	58	-	-	-	-	-
Honduras	258	329	245	597	854	2,809	1,225	826
Spain	396	-	1,350	2,057	2,075	604	846	1,023
All other	2,590	703	2,198	411	896	2,528	739	3,094
Total	109,351	87,522	72,338	72,558	62,439	70,427	62,106	72,046

1/ See footnote 5, table 7. If the data on zinc in imported ore were reported during all of 1963 and 1964 on the same basis as in previous years, it is estimated that total imports of unmanufactured zinc would have been 550,000 tons in 1963 and 511,000 tons in 1964.

2/ Preliminary.

3/ Beginning June 30, 1960, Republic of the Congo.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 46.--Zinc-bearing ores: U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

(In short tons of zinc content)

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 1/	1964 1/
Canada	174,321	171,535	137,545	133,391	110,385	137,234	135,838	133,378
Mexico	191,624	208,579	160,394	190,685	167,138	157,484	155,939	110,897
Peru	93,653	110,373	81,101	75,326	72,730	83,300	72,705	58,800
Union of South Africa	7,500	28,007	4,331	10,409	6,282	12,115	11,438	6,383
Belgium and Luxembourg	481	-	-	-	-	-	-	-
Australia	6,815	6,054	16,737	14,714	8,225	11,153	7,031	2,981
Bolivia	9,461	6,838	1,704	1,690	1,018	798	5,072	2,978
Guatemala	7,992	6,093	10	1,811	8,088	29,251	4,074	51
Italy	1,744	-	9,931	4,241	2,189	695	-	-
Yugoslavia	3,532	-	-	-	-	-	-	-
West Germany	2	-	7,290	-	12	1	-	-
Japan	126	26	-	-	-	-	-	-
Honduras	991	1,478	1,116	2,140	4,119	17,984	9,227	6,374
Spain	3,500	-	13,476	11,788	10,273	3,602	-	-
All other	6,425	2,433	3,625	1,910	4,540	485	1,225	2/14,287
Total	508,167	541,416	437,260	448,105	394,999	454,102	402,549	336,129

1/ Preliminary; also see footnote 5, table 7, respecting zinc-bearing ores. If data on zinc in imported ores were reported during all of 1963 and 1964 on the same basis as in previous years, it is estimated that imports of zinc-bearing ores would have been 415,000 tons in 1963 and 373,500 tons in 1964.

2/ Includes 13,633 tons from Argentina.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 47.--Zinc metal: 1/ U.S. imports for consumption, by principal sources, average 1953-57, annual 1958-64

(In short tons, gross weight)

Country	Average 1953-57	1958	1959	1960	1961	1962	1963 2/	1964 2/
Canada	110,301	94,265	89,537	75,372	73,026	75,618	76,302	78,473
Mexico	20,070	22,804	9,729	8,675	8,527	12,334	12,618	12,794
Peru	10,890	9,736	12,337	7,517	7,581	7,615	7,574	7,519
Union of South Africa	336	-	298	-	8	-	-	-
Belgian Congo 3/	17,746	20,991	12,790	9,308	11,420	10,882	9,590	10,378
Belgium and Luxembourg	22,883	17,969	11,648	5,724	12,381	16,829	16,070	14,668
Australia	6,369	2,273	9,141	450	1,029	1,750	1,047	422
Italy	11,826	5,816	7,173	4,237	1,820	992	907	-
Yugoslavia	2,594	5,009	3,384	5,640	3,277	2,751	1,564	833
Norway	1,509	2,600	329	7	-	-	-	-
West Germany	9,669	2,035	662	1,619	1,432	1,889	1,585	2,939
Japan	1,554	1,708	355	-	-	-	-	-
All other	5,615	1,458	8,218	3,580	6,095	8,103	7,950	9,580
Total	221,362	186,664	165,601	122,129	126,596	138,763	135,207	137,606

1/ Includes zinc blocks, pigs, and slabs, and zinc scrap, dross, and skimmings.
2/ Preliminary.
3/ Beginning June 30, 1960, Republic of the Congo.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 48.--Unmanufactured zinc: U.S. imports for consumption, by kinds of material and by customs treatment, average 1953-57, annual 1958-64

(In short tons--zinc content of ores, gross weight of other materials)

Period	Zinc-bearing ores 1/		Zinc metal					Total, ores and metals 1/	
			Zinc blocks, pigs and slab	Zinc scrap	Dross and skimmings	Total, zinc metal			
	Dutiable	Free				Dutiable	Free	Dutiable	Free
1953-57 average	490,301	17,866	219,666	870	826	182,296	39,066	672,597	56,932
1958	538,565	2,850	185,693	236	736	148,624	38,041	687,189	40,891
1959	420,921	16,339	164,463	183	955	138,072	27,529	558,993	43,868
1960	382,910	65,195	120,925	105	1,099	121,413	716	504,323	65,911
1961	356,640	38,359	125,186	303	1,107	125,509	1,087	482,149	39,446
1962	387,406	66,696	135,995	861	1,907	138,272	491	525,678	67,187
1963 2/	371,920	30,629	132,331	1,461	1,415	134,050	1,157	505,970	31,786
1964 2/	311,434	24,695	133,995	1,274	2,337	136,493	1,113	447,927	25,808

1/ See footnote 5, table 7, pertaining to zinc ores. If the data on zinc in imported ores were reported during all of 1963 and 1964 on the same basis as in previous years, it is estimated that the following quantities would have been reported for--

	Zinc-bearing ores		Total, ores and metals	
	1963	1964	1963	1964
Dutiable	384,000	346,000	518,000	482,500
Free	31,000	27,500	32,000	28,500

2/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 49.--Zinc articles unmanufactured and other: U.S. imports for consumption, average 1953-57, annual 1958-63, and January-June 1964

(In short tons)

Article	Average 1953-57	1958	1959	1960	1961	1962	1963	Jan.-June 1964 1/
Unmanufactured zinc:								
Zinc-bearing ores:								
Zinc content	508,168	541,416	437,260	448,105	394,999	454,102	402,549	171,759
Zinc blocks, pigs, or slabs:								
Gross weight	219,666	185,693	164,463	120,925	125,186	135,995	132,331	67,715
Zinc scrap, dross, and skimmings:								
Gross weight	1,695	971	1,138	1,204	1,410	2,768	2,876	2,310
Total	729,529	728,080	602,861	570,234	521,595	592,865	537,756	241,784
Other zinc articles:								
Zinc pigments:								
Zinc oxide and leaded zinc oxide:								
Gross weight	3,153	11,729	16,510	12,695	10,222	12,890	13,957	5,777
Zinc content	1,703	6,334	8,915	10,043	8,126	10,248	11,095	4,567
Lithopone and other combinations of zinc sulfide and barium sulfate:								
Gross weight	65	68	73	62	74	97	158	90
Zinc content	15	16	18	15	18	23	38	22
Total, zinc pigments:								
Gross weight	3,218	11,797	16,583	12,757	10,296	12,987	14,115	5,867
Zinc content	1,718	6,350	8,933	10,058	8,144	10,271	11,133	4,589
Zinc fume: 2/								
Zinc content	9,022	35,934	60,050	16,444	28,934	25,410	22,446	11,294
Zinc wire:								
Gross weight	3/	4/ 109	4/ 151	4/ 202	4/ 136	5/	5/	100
Zinc dust:								
Gross weight	260	96	44	19	86	909	2,608	1,929
Zinc sheets, including unwrought zinc plates:								
Gross weight	414	6/ 823	951	905	1,183	1,303	1,532	947
Zinc alloys and mill products, not elsewhere specified:								
Gross weight	5/	7/ 393	7/ 468	7/ 860	7/ 750	5/	5/	3,247
Total, other zinc articles 8/	5/	43,705	70,597	28,488	39,233	39,720	40,028	22,106
Grand total	5/	771,785	673,458	598,722	560,828	632,585	577,784	263,890

1/ Preliminary.

2/ As reported to the U.S. Tariff Commission by individual importers for 1953-63.

3/ Not available. Statistics on imports of zinc wire are not segregated in official import statistics but are included in statistics with other miscellaneous wire not of brass, bronze, or copper, and not coated. The total quantity of imports of zinc wire probably did not exceed 150 tons in any year during 1953-57.

4/ Estimated on the basis of a sample of consumption entry documents for wire that was classified under par. 316(a) of the Tariff Act of 1930.

5/ Not available; estimates are included in totals.

6/ Official statistics were revised downward to exclude material entered as zinc sheet by importers but subsequently classified as zinc strip by the U.S. Bureau of Customs.

7/ Estimate based on a sample analysis of consumption entry documents covering imports of "manufactures of zinc, not specially provided for" dutiable under par. 397 of the Tariff Act of 1930. In order of importance estimated imports in 1958 were comprised of zinc sticks, zinc strip, and zinc alloys; in 1959, of zinc sticks and zinc alloys; and in 1960, of zinc alloys, zinc in bars, and zinc strip.

8/ The total is the sum of the zinc content of zinc pigments and zinc fume and the gross weight (virtually all zinc) of the other articles.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 50.--Manufactured articles exported from the United States with benefit of drawback of duties paid on the imported lead content, by types of manufactured articles exported, 1958-63

(In short tons of lead content on which drawback of duty was paid)

Article exported	1958	1959	1960	1961	1962 1/	1963 1/
Antiknock compound 2/	8,876	6,149	10,614	13,821	11,998	16,978
Batteries:						
Complete (6 and 12 volt)	1,152	235	497	163	1,017	233
Parts	43	-	-	-	-	-
Total	1,195	235	497	163	1,017	233
Paint pigments and paint:						
Litharge	465					
Red lead (dry and in oil) 3/	65	2,228	2,637	1,197	1,016	837
White lead (dry and in oil) 3/	18					
All other 3/	183	76	511	553	4/	368
Total	731	2,304	3,148	1,750	1,016	1,205
Chemical products, n.e.s.:						
Oxide	21	-	-	-	-	-
All other 5/	1,210	1,591	710	847	836	515
Total	1,231	1,591	710	847	836	515
Lead metal products:						
Pipe, sheet, strip, wire, etc. 6/	-	9	2	-	-	-
Base alloys	233	463	1,007	650	474	468
Solder	26	8	33	37	7	34
All other 7/	89	48	676	462	398	33
Total	348	528	1,718	1,149	879	535
Automobiles and trucks:						
Automobiles	253	495	204	53	155	225
Trucks	105	127	187	87	29	179
Parts	-	-	51	202	59	72
Total	358	622	442	342	243	476
Ammunition 8/	344	833	983	806	1,098	1,286
Diesel locomotives	-	133	-	-	111	96
Separators, electric	-	59	-	-	-	-
Grand total	13,083	12,454	18,112	18,878	17,198	21,324

1/ Preliminary.
2/ Tetraethyl lead.
3/ Primarily dry red and white lead. Data for "All other" (paint pigments and paint) include the lead content of ready-mixed paints and paint pigments when listed collectively.
4/ Less than one-half short ton.
5/ Includes arsenate, industrial and chemical pigments, lithopone, sublimed lead, silicate, and salts. Industrial and chemical pigments are the most important articles in this group.
6/ Lead sheet is the most important article in this group.
7/ Includes miscellaneous and nonmetal manufactured articles.
8/ Includes cartridges, small arms and rifle ammunition, and buckshot shells.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 51.--Manufactured articles exported from the United States with benefit of drawback of duties paid on the imported zinc content, by types of manufactured articles exported, 1958-63

(In short tons of zinc content on which drawback of duty was paid)

Article exported	1958	1959	1960	1961	1962 1/	1963 1/
Zinc metal products:						
Plate, rod, ribbon, sheet, strip, etc. 2/	4,104	3,879	2,552	2,532	4,122	3,677
Slug, screw, etc.	289	151	273	-	266	179
Base alloys	149	133	184	106	1,667	756
Anodes, bars, and slab	3	33	66	58	20	19,342
All other 3/	315	28	188	1,148	458	16,545
Total	4,860	4,224	3,263	3,844	6,533	40,499
Steel products:						
Galvanized sheet	3,928	1,786	2,635	1,690	657	1,523
Other galvanized products	144	86	8	34	36	386
All other 4/	131	335	193	685	295	641
Total	4,203	2,207	2,836	2,409	988	2,550
Automobiles, trucks, and parts:						
Automobiles	1,707	3,486	2,103	397	1,269	1,442
Trucks	363	422	732	299	71	515
Parts	923	889	400	1,482	1,858	1,273
Total	2,993	4,797	3,235	2,178	3,198	3,230
Chemical products:						
Oxide	822	595	1,318	1,178	1,008	1,138
All other 5/	364	132	23	4	762	878
Total	1,186	727	1,341	1,182	1,770	2,016
Grand total	13,242	11,955	10,675	9,613	12,489	48,295

1/ Preliminary.
2/ Zinc sheet is the most important article in this group.
3/ Includes cartridges, photoengraving plates, and zinc dust.
4/ Includes bars and miscellaneous steel shapes and machinery.
5/ Includes lithopone, sulfate, and sulfide.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 52.--Lead: Free-world mine production, refined lead production, and refined lead consumption, 1958-64

Item	1958	1959	1960	1961	1962	1963	1964 1/
	Quantity (1,000 short tons)						
Mine production: 2/							
United States	272.5	260.3	251.2	272.8	246.8	263.9	295
Outside United States	1,738.2	1,715.6	1,743.5	1,675.8	1,797.2	1,792.3	1,730
Total	2,010.7	1,975.9	1,994.7	1,948.6	2,044.0	2,056.2	2,025
Refined lead production: 3/							
United States	763.0	661.2	709.7	790.5	726.2	779.9	822
Outside United States	1,720.1	1,745.4	1,828.4	1,822.5	1,830.9	1,951.2	1,989
Total	2,483.1	2,406.6	2,538.1	2,613.0	2,557.1	2,731.1	2,811
Refined lead consumption: 4/							
United States	870.5	961.5	892.0	916.7	993.4	1,037.2	1,064
Outside United States	1,325.9	1,412.8	1,546.6	1,609.2	1,636.6	1,702.5	1,812
Total	2,196.4	2,374.3	2,438.6	2,525.9	2,630.0	2,739.7	2,876
	Percent of free-world total accounted for by the United States						
Mine production of lead	13.6	13.2	12.6	14.0	12.1	12.8	15
Refined lead production	30.7	27.5	28.0	30.3	28.4	28.6	29
Refined lead consumption	39.6	40.5	36.6	36.3	37.8	37.9	37

1/ Data on consumption for some countries outside the United States are partly estimated for last part of year.

2/ Lead content by analysis of lead ores and concentrates plus the lead content of other ores and concentrates known to be intended for treatment for lead recovery.

3/ Total production by smelters or refineries, of refined pig lead, plus the lead content of antimonial lead--including production on toll in the reporting country--regardless of the type of source material, i.e., whether ores, concentrates, lead bullion, lead alloys, mattes, residues, slags, or scrap. Remelted pig lead and remelted antimonial lead are excluded.

4/ Consumption of the types of metal reported under metal production.

Source: March 1965 Monthly Bulletin of the International Lead and Zinc Study Group, except as noted.

Table 53.--Zinc: Free-world mine production, metal production, and metal consumption, 1958-64

Item	1958	1959	1960	1961	1962	1963	1964 1/
	Quantity (1,000 short tons)						
Mine production: 2/							
United States	452.7	467.4	478.5	510.4	555.5	581.6	627
Outside United States	2,298.2	2,249.6	2,346.2	2,409.9	2,534.6	2,562.3	2,838
Total	2,750.9	2,717.0	2,824.7	2,920.3	3,090.1	3,143.9	3,465
Metal production: 3/							
United States	827.8	856.5	872.5	902.0	938.3	952.8	1,031
Outside United States	1,658.3	1,706.7	1,816.3	1,930.7	1,984.5	2,071.6	2,228
Total	2,486.1	2,563.2	2,688.8	2,832.7	2,922.8	3,024.4	3,259
Metal consumption: 4/							
United States	860.2	951.0	871.3	923.6	1,024.3	1,098.2	1,182
Outside United States	1,542.9	1,635.0	1,833.4	1,927.4	1,959.0	2,111.7	2,325
Total	2,403.1	2,586.0	2,704.7	2,851.0	2,983.3	3,209.9	3,507
	Percent of free-world total accounted for by the United States						
Mine production of zinc	16.5	17.2	16.9	17.5	18.0	18.5	18
Refined zinc production	33.3	33.4	32.4	31.8	32.1	31.5	32
Refined zinc consumption	35.8	36.8	32.2	32.4	34.3	34.2	34

1/ Data on consumption for some countries outside the United States are partly estimated for last part of year.

2/ Zinc content by analysis of zinc ores and concentrates plus the zinc content of other ores and concentrates known to be intended for treatment for zinc recovery.

3/ Total production of slab zinc by smelters and refineries, including production on toll in the reporting country, regardless of the type of source material, i.e., whether ores, concentrates, residues, slags, or scrap. Remelted zinc and zinc dust are excluded.

4/ Consumption of the type of metal reported under metal production.

Source: March 1965 Monthly Bulletin of the International Lead and Zinc Study Group, except as noted.