

# CONTRIBUTIONS TO ECONOMIC GEOLOGY, 1930

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## PART 1. METALS AND NONMETALS EXCEPT FUELS

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### A GRAPHIC HISTORY OF METAL MINING IN IDAHO

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#### ABSTRACT

In this paper the mining history of Idaho is reviewed by means of three statistical charts which show that there was considerable placer mining in the sixties, that a depression in all mining occurred in the seventies, that lode mining started in the eighties, and that the mining of lead-silver ore soon became the dominant factor in the industry. Improvements in ore dressing have recently caused some increase in the production of zinc. The production of copper, never large, reached its peak in 1907 and has since been declining.

Shoshone County has been the outstanding producer almost since the first discovery of the deposits of the Coeur d'Alene district and in 1926 produced nearly 94 per cent of the total for the State. Boise and Idaho Counties were the dominant producers in the early placer days but have since been relatively unimportant. Blaine, Custer, and Lemhi Counties had large production in the eighties, and each has had a revival since 1900. Custer County, the least productive of the three in the early days, has had the most encouraging revival, but the formerly famous Blaine County had the smallest and most delayed revival of the three. Owyhee County had an early placer boom, followed by active production from lodes in 1867 to 1876 and again in 1889 to 1914, the longest period of mining prosperity anywhere in Idaho outside of Shoshone County.

Production in each of the counties, except Shoshone County, has been governed primarily by discovery of ore and only secondarily by economic factors, and in most counties the quantity found in any one period was small. Although ores of several metals exist in Idaho, production of lead-silver ore is now and apparently is likely to remain the most important branch of the industry.

#### FOREWORD

From the beginning of settlement mining has been one of the principal industries of Idaho. At the present time, after the period of uncertainty that followed the World War, there is renewed ac-

tivity in this fundamental industry. As predictions must be based largely on the experience of the past, it will be of interest to review the long history of mining in the State. In order to present the essential data on a quantitative basis but without the use of cumbersome tables of figures the three accompanying charts (pls. 1-3) have been prepared. Plate 1 gives data on gold mining; Plate 2 represents the value of Idaho's total metal production, the total quantities of lead, silver, copper, and zinc produced, the prices of silver, copper, lead, and zinc, and, to emphasize its dominant position in the State's mining industry, the total value of Shoshone County's production; Plate 3 shows the trend of production in all those counties, except Shoshone, which have maintained an annual production in excess of \$500,000 during any considerable period. In Plate 2 the production of lead, which greatly exceeds that of zinc and copper, is plotted on a reduced scale to keep the chart within convenient dimensions.

The charts and statistics have been compiled mainly from Mineral Resources of the United States, supplemented where necessary by the annual reports of the State mine inspector, the mint report, and the reports on mines and mining west of the Rocky Mountains. The data for early years published in Mineral Resources have been kindly amplified by Mr. C. N. Gerry for use in this paper. Some data were obtained from Strahorn's book,<sup>1</sup> which appears to be one of the most reliable of the early publications on the State. For some of the earlier years incomplete data, especially on base-metal production, have been supplemented by the writer's estimates based on the history of the principal mines then operated. It is probable that these estimates are somewhat low, especially for the nineties, but the errors can hardly be sufficient to have any great effect on the shapes of the graphs. On the whole the data available are adequate for the present purpose, although, as can be seen from gaps and question marks in the graphs, they are not as complete as would be desirable. The most serious deficiencies are the absence of authentic information on the total placer production of the State prior to 1900 and on the early production of Idaho County.

### PRODUCTION OF METALS

*Gold.*—Although the available data are so incomplete that several of the graphs can not be extended to include the early years of mining in Idaho, the general situation at that time is known. The first recorded discovery of a metalliferous deposit in the State was that of placer gold in 1852 on the Pend Oreille River.<sup>2</sup> Copper lodes

<sup>1</sup> Strahorn, R. E., Idaho, 1881.

<sup>2</sup> See Rees, J. E., Idaho chronology, nomenclature, bibliography, p. 15, Chicago, W. B. Conkey Co., 1918.

may have been prospected in the Lemhi Valley in 1854, but the first discovery of any consequence was that of the Oro Fino placer deposits by Captain Pierce in 1860. The boom days of this and neighboring camps in what is now Idaho County lasted only until about 1864, but the production in that brief period was close to \$20,000,000, as is indicated on Plate 3. In 1862 the even more productive placers of the Boise Basin were discovered and gave rise to a second boom of a few years' duration.

The part of the graph in Plate 1 showing total production of gold prior to 1870 may be taken to represent essentially the production from placers, for little lode mining was undertaken in the early days; but as early as 1870 the gold excitement in the State died down with the exhaustion of the richer placers, and the depression in mining that followed until 1880 was the most marked in the history of the State. The next 20 years witnessed a slight revival of placer mining and growth in the mining of lode gold; but since 1900 gold has played a decreasingly important part in the mining industry of Idaho, although from 1912 to 1916 and to a less extent in 1923 the activity of dredges caused some revival in placer production. Dredging started in 1897, and since 1911 most of the placer gold has been obtained in this way, although the number of dredges in successful operation has always been small. In spite of the great decline in placer mining since the boom days, it has continued to be the principal source of gold in the State, closely followed, in the present century, by the mining of dry and siliceous ore. The most productive lodes of gold ore are in Boise County. In 1926 placers yielded 61.16 per cent of the gold mined, siliceous ore 21.91 per cent, and lead-bearing ore only 13.77 per cent, in spite of the fact that mining of lead ores greatly exceeds that of all other ores. The remaining 3.16 per cent came from copper ore.

*Silver and lead.*—The graphs for silver and lead on Plate 2 show great similarity, because silver is obtained almost entirely from ores that contain lead, with or without commercial quantities of other metals. Some dry siliceous silver ore is mined, particularly in the Silver City and De Lamar districts, Owyhee County, but the silver thus obtained is an insignificant part of the total mined in the State. In 1926 only 0.21 per cent came from dry siliceous silver ore, 0.11 per cent from dry siliceous gold and gold-silver ores, and 0.03 per cent from placers, whereas 60.55 per cent came from lead ore, 33.42 per cent from copper-lead and lead-zinc ores, and 5.68 per cent from copper ore. Comparison of these percentages with those given for gold emphasizes the fact that, although the lead-bearing ores are conspicuously low in gold, they contain considerable silver. The

high position of the graph for silver with respect to that for lead from 1880 to 1901 is due to production in Owyhee County. Since 1924 the production of silver has been declining, while that of lead has risen. This is to be accounted for largely by increase in production from complex ores, especially those containing zinc, many of which are relatively low in silver.

The production of lead is plotted with ordinates on a scale one-third as large as was adopted for zinc and copper, in order to get it within the limits of a practicable chart. Lead came into prominence about 1884, when the Wood River district began active production and lead ore was discovered in the Coeur d'Alene district. In a few years it attained the dominance which it has kept ever since. In 1926 the value of lead-bearing ores constituted over 98 per cent of the yield from all lode and placer mines.

*Zinc.*—Most of the lead-bearing ore contains some zinc, and there are a few lodes in which zinc is the dominant valuable metal. The amount of zinc produced depends on the demand and on metallurgical progress. Little was recovered from ore mined in Idaho prior to 1905, although the presence of zinc in the State had long been known. The spectacular rise in production to a peak in 1916 was in direct response to the increase in price occasioned by the World War, but it is interesting to note that the upward trend began about 1910, when the price was but little above the average for the preceding decade. Increased economy in recovery doubtless played a part here. Improvement in metallurgy is even more strikingly reflected by the recovery in production after the depression in 1921, at a rate markedly in excess of the rate of increase in price. The drop in 1924 was due to the termination of operations by the Callahan Lead-Zinc Co., formerly the principal producer, but this has since been more than offset by increases from other mines in the Coeur d'Alene district.

*Copper.*—Although copper ore was discovered as early as 1854, the production of copper has never been a large factor in the mining industry of Idaho. It was very small prior to 1903, and its maximum in 1907 amounted to only about 10 per cent of the total production of the State. Thereafter the decline was fairly steady until 1926, when the value of copper produced was only 0.6 per cent of the total. The increase in production in 1907 corresponds to a peak of 20 cents a pound in the price of copper, but the increase in price during the war years 1915 and 1916 was accompanied by only a slight increase in production, and increase to the maximum price of 27.3 cents a pound in 1917 was even accompanied by a decline in production.

## PRODUCTION BY COUNTIES

The salient features in the history of mining in the different parts of the State are well brought out in the graphs of production by counties, all of which, except that for Shoshone County, are grouped on Plate 3. Most of these graphs might almost as well be termed district graphs, for in most of the counties the major production comes from one district. For example Shoshone County, in this connection, is almost synonymous with the Coeur d'Alene district, and Blaine County corresponds essentially to the Wood River district.

The graphs correspond throughout essentially to the counties as at present constituted, in spite of various changes in county boundaries in the history of the State. Blaine County corresponds approximately to Alturas County prior to 1895. Addition of the numerous other counties in which a little mining has been done would add very little of value and would make the chart too confusing. Elmore, Valley, and a few of the other counties thus omitted contain deposits of interest and promise, even though their past production has been relatively small.

Comparison of the graph for Shoshone County with that for the total production of the State, immediately above it in Plate 2, shows strikingly the dominant part played by this county almost since the discovery of the lead deposits of the Coeur d'Alene district in 1884. As early as 1891 the production of this county exceeded in value the combined production of the rest of the State, and it has maintained its supremacy ever since. In 1926 the production of the Coeur d'Alene district was valued at nearly 94 per cent of the total for the State. The variations in production in this county, unlike the others in the State, depend mainly on economic considerations rather than on the amount of available ore. The peak of production in 1917 obviously resulted from the World War, and recovery after the postwar slump has almost brought the graph in line with the pre-war upward trend.

The graph for Boise County and, less accurately, that for Idaho County show the spectacular rise and prompt decline of placer mining in the central part of the State. The peak shown in the incomplete early part of the graph for Lemhi County in 1868 marks the development of placers discovered there in 1866. Presumably in the seventies the annual production in this county was only a few hundred thousand dollars. If it were possible to plot the graph for Owyhee County from 1862 to 1866 it would likewise show a peak due to a placer boom. Peaks in the other graphs subsequent to 1880 record mainly the results of lode mining, except that the graph for Boise County shows the success of dredging there in 1912 to

1916. Since 1870 neither Boise County nor Idaho County, the two great producers in the early placer days, have contributed any large proportion of the production of the State. Lode mining has been attempted and, especially in Boise County, has met with some success, but there seems little likelihood of lode mining in these counties ever approaching the commanding position once held by placer mining.

The boom in the mining of lead-silver ore in south-central Idaho in the eighties is well illustrated by the graphs for Blaine, Custer, and Lemhi Counties. The collapse in mining in these counties coincides in part with the drop in the price of silver in the early nineties, but the crest of production in each was passed some years earlier, with the exhaustion of many of the principal known ore shoots. Each of these counties has had its period of revival since 1900. Blaine County, the most famous and productive of the three in the early days, has had the least effective and longest delayed revival, but Custer County, whose peak of early production was lower than that of either of the others, had a much greater peak in production during its recent revival. The production of all three has declined sharply in recent years, but that of Blaine County, which did not reach its crest until several years after the others, has dropped back below its previous level, while Lemhi and Custer Counties have each maintained an average annual production since 1919 well above that prior to 1910. Activity in the eighties in all three counties exhausted the greater part of the richer and more readily found ore, which was in part oxidized and enriched; but most of the lodes worked since 1900 were known in the early days, and in a substantial number there appears to have been little fundamental change in the character of the ore. The outstanding fact is that ore shoots were individually so small as to be quickly mined out, and additional ore at depth, although doubtless present, has proved difficult to find. One of the principal reasons why Custer County has sustained a creditable production recently is the discovery of valuable ore bodies in the Livingston mine in 1923 and later years—a conspicuous exception to the rule that nearly all valuable lodes were found long ago. The future of mining in these three counties, especially in Blaine County, depends in part on treatment of lower-grade and more complex ores and largely on the discovery of new ore shoots in lodes already known.

Custer County, unlike other parts of south-central Idaho, derived its initial boom in mining in part from ore in Tertiary lava. This ore occurred in the Yankee Fork district, which has attracted little attention since the exhaustion of the bonanzas originally discovered.

The mining done during the recent revival in the county has been in lodes of deeper-seated origin in the older rocks.

The graph for Owyhee County, which represents mainly the production of the famous Silver City region, differs materially from the others. Lack of data makes it impossible to show this curve from 1862 to 1866, which would record a production, mainly from placers, of about \$4,000,000.<sup>3</sup> The jagged graph for the years 1867 to 1874 records the first boom in lode mining, mainly on War Eagle Mountain. This boom subsided with decline in grade of the ore and came to an end with the collapse of the Bank of California, the main financial support of mining in the county.<sup>4</sup> The third and greatest period of prosperity started in 1889 with discoveries in the Florida Mountain and De Lamar districts, reached its peak in 1896, and persisted with declining yield and gradual exhaustion of known ore shoots until 1914. This is the longest period of mining prosperity anywhere in Idaho, except in Shoshone County. The irregularities in the part of the graph corresponding to this period result in part from the fact that most of the production came from only three mines, so that variation in production at an individual mine would have a marked effect on the shape of the graph. The comparatively long sustained prosperity in Owyhee County is the more remarkable when it is recalled that nearly all the production of that county came from lodes in Tertiary volcanic rocks, whereas in most of the rest of the State the productive lodes have been of deeper-seated type and Mesozoic age. The greater persistence usually attributed to the lodes of deep-seated deposition has been realized only in the Coeur d'Alene district.

### CONCLUSIONS

Consideration of the graphs on the three charts in the light of available geologic and other data leads to three principal conclusions—(1) that production in each of the counties except Shoshone County has been governed primarily by discovery of ore and only secondarily by such economic factors as price and demand; (2) that in most counties the quantity of workable ore found in any one productive period has been small; and (3) that the production of lead-silver ore is the only branch of the metal-mining industry of importance at the present time or likely to be of much importance in the near future.

The first two conclusions are emphasized by the characteristic sharp peaks of the graphs, followed by rapid declines. Comparison

<sup>3</sup> Lindgren, Waldemar, The gold and silver veins of Silver City, De Lamar, and other mining districts in Idaho: U. S. Geol. Survey Twentieth Ann. Rept., pt. 3, p. 111, 1900.

<sup>4</sup> Piper, A. M., and Laney, F. B., Geology and metalliferous resources of the region about Silver City, Idaho: Idaho Bur. Mines and Geology Bull. 11, pp. 51-56, 1926.

with the price curves and with the history of mining in the United States will show that most of these peaks show little relation to general economic conditions. In most of the districts of south-central Idaho, except minor subsidiary ones, the number of productive mines is sufficiently large for the graphs to represent average trends rather than the vicissitudes of individual properties. Owyhee County has had a smaller average number of producers than most of the other mining counties in the State. The fact that the quantity of ore found in any one period has been relatively small is shown by the decline in production in advance of decline in price and demand and is substantiated by all available data on the several districts. This does not necessarily mean that the lodes themselves are not persistent, or that chances of finding additional ore are slight, but it does indicate that individual ore shoots are relatively small and discontinuous, even though many have been highly remunerative to their owners.

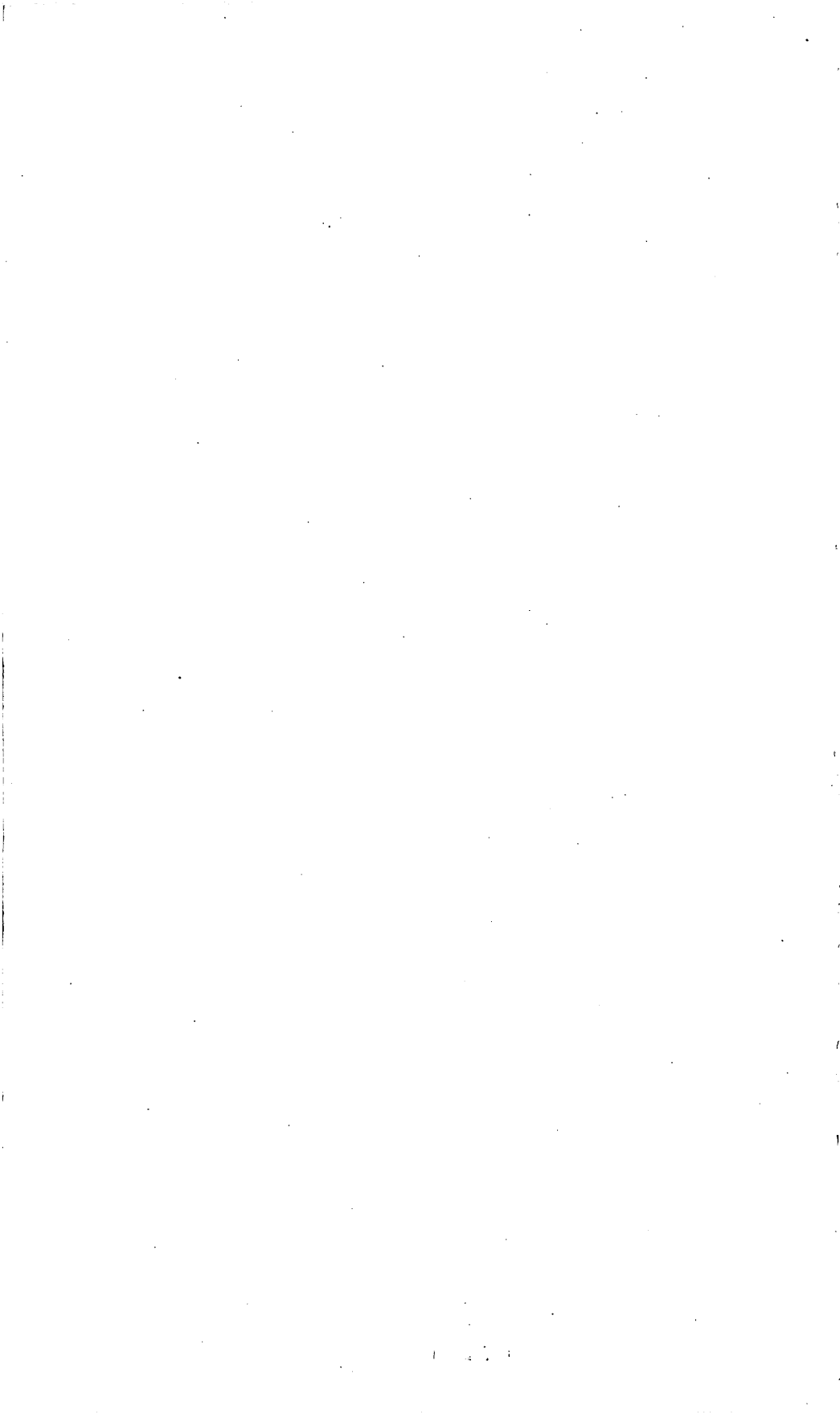
The conclusion that lead-silver ore is and will be the principal product of mining is evident from the graphs. Changing economic conditions and metallurgical developments will affect the production of other ores, but, so far as can be foreseen, there is no likelihood that any of these will approach the volume of production of lead-silver ore. Several other metals, such as antimony, bismuth, cobalt, molybdenum, quicksilver, tin, and tungsten, are known to exist in Idaho, but present production of them is very small. Their production will doubtless increase with increasing demand, but that it will ever become large is unlikely.

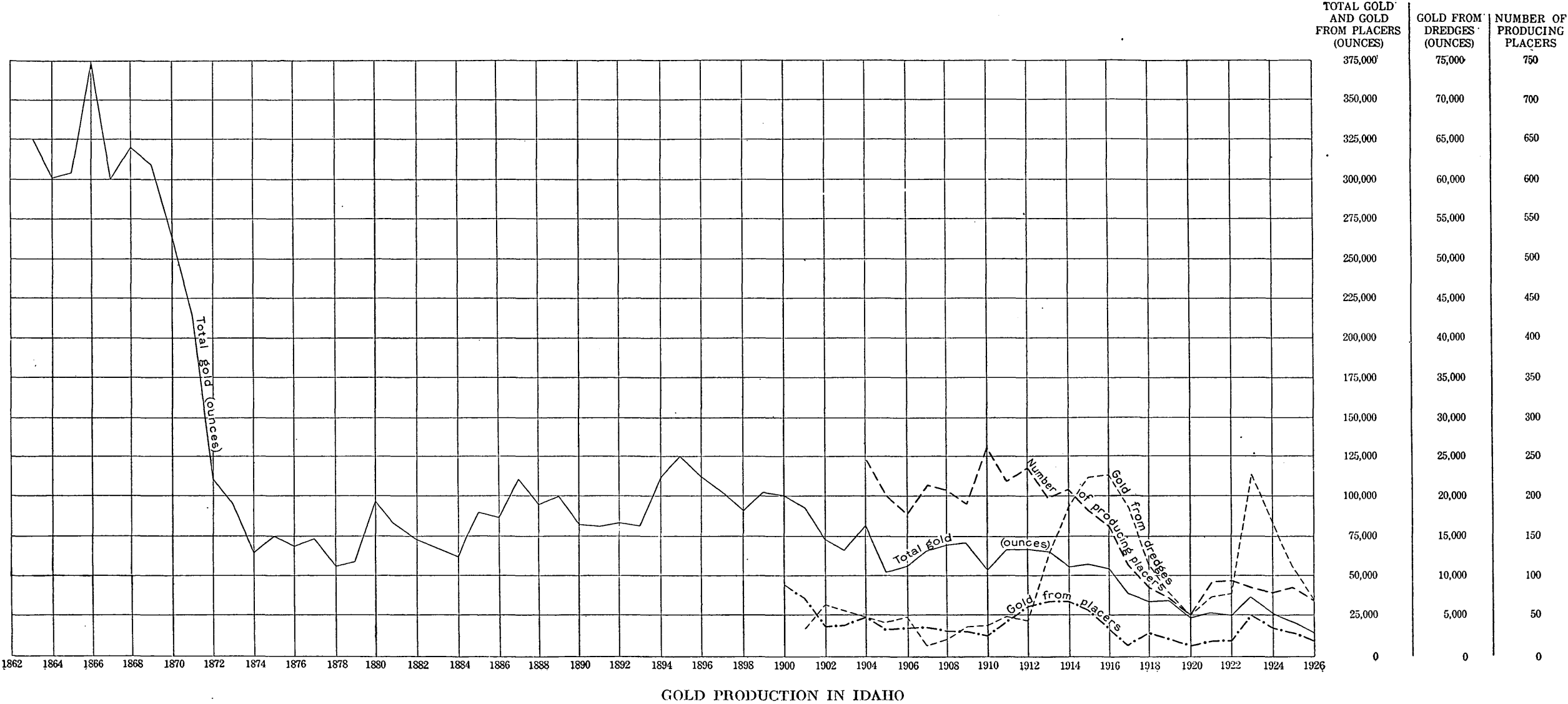
Shoshone County is obviously the leading mining county of the State and the only one in which mining has continued to grow since its beginning. Lemhi and Custer Counties seem to rank next and to be the most favorably situated for development in the near future. Of the three counties most famous in the early days, Boise, Idaho, and Owyhee, only Owyhee has a graph that offers encouragement for the future. Whether the comparatively trivial production from Owyhee County since 1914 indicates the end of successful mining in the county is an open question; but its production on a considerable scale for 26 years shows relative persistence of workable ore in the lodes of the county and lends some support to the hope that genetically similar lodes in Custer and Valley Counties and elsewhere, which have received little attention since their initial booms subsided, may in the future become again productive.

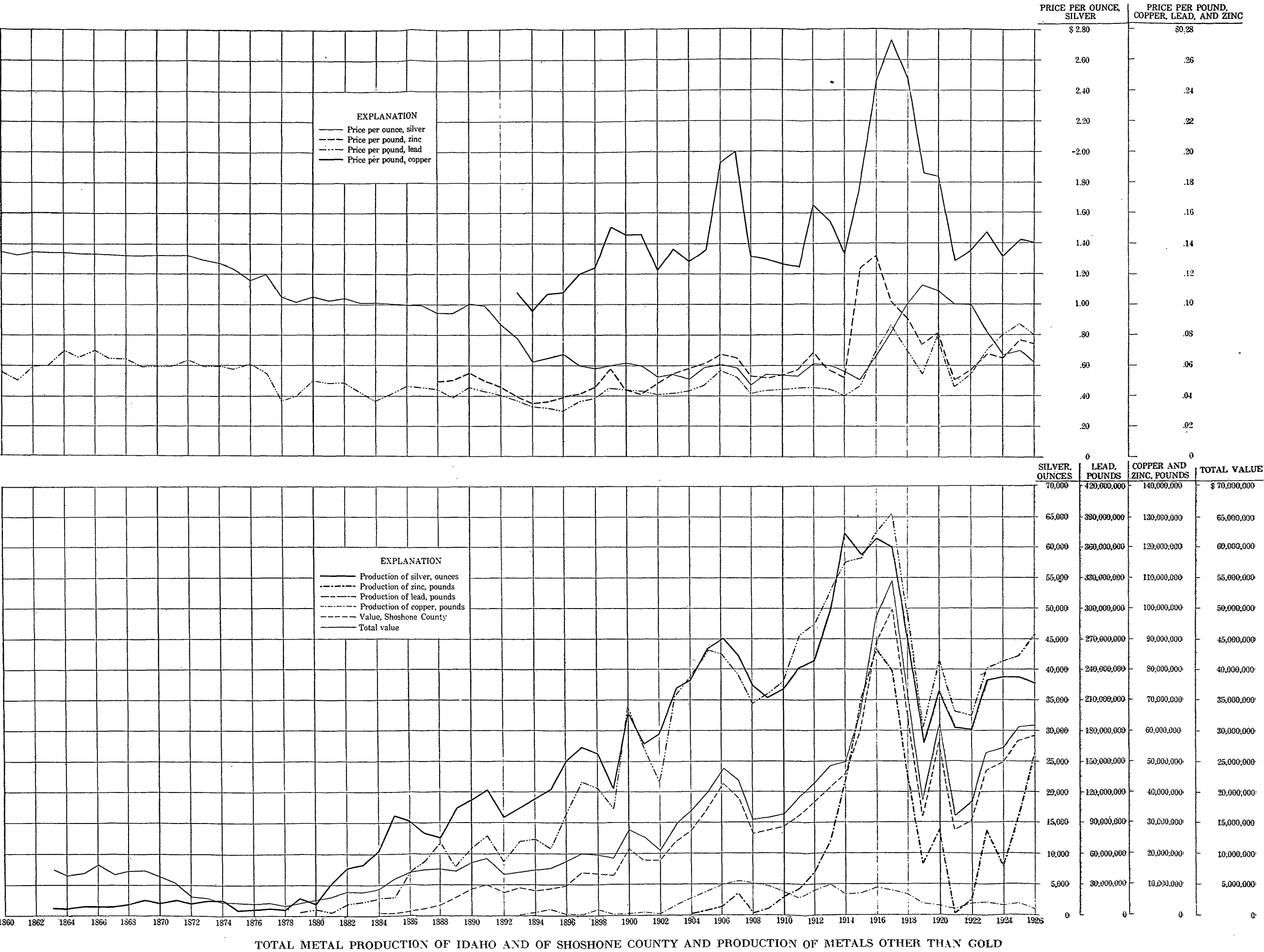
Although the data here presented indicate that the Coeur d'Alene district will continue to be prosperous for some time to come, but offer little hope for large-scale developments elsewhere in Idaho, some factors not represented in the graphs may come into play.

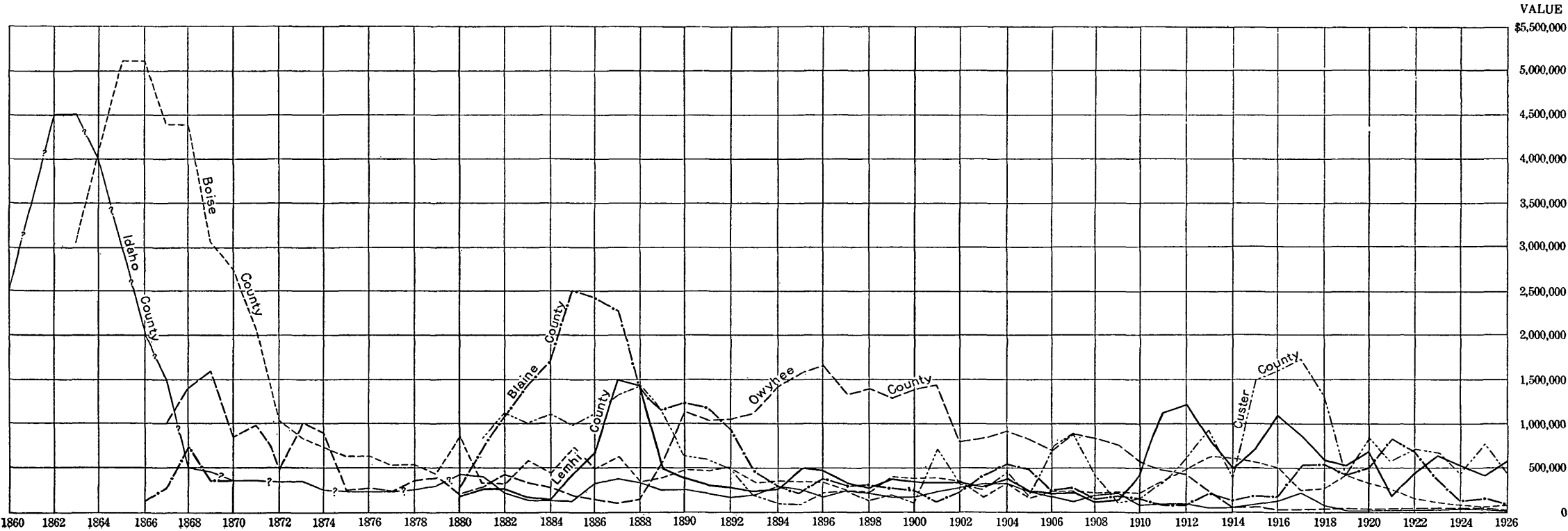


For example, the difficulty of finding new ore shoots, which is one reason for intermittent production in south-central Idaho, may be offset to some degree by improved methods of geophysical and geologic prospecting, and improvements in metallurgy and increase in transportation facilities may make it profitable to treat ores that are too complex or of too low grade to be mined at present. It is hardly to be expected that improvements like these will develop a second Coeur d'Alene district, although here and there low-grade deposits may be developed on a large scale; but as many of the mines outside of Shoshone County have had creditable records as small to moderate producers and as there is still much ground of prospective value in their vicinity, the outlook for profitable mining on a small to moderate scale is fairly encouraging.









METAL PRODUCTION OF PRINCIPAL PRODUCING COUNTIES IN IDAHO