

Deposits of many metals have been found in Wyoming, but most of them are small. The total value of the reported production is slightly more than sixty million dollars, of which nearly 90 percent is credited to the Hartville iron deposits, Platte County. Most of the lode deposits are in old rocks, of pre-Cambrian age, that are exposed in the cores of many mountain ranges in the State; a few deposits are associated with younger sedimentary rocks in places and with the relatively young igneous rocks in northwestern Wyoming. Placer gold is widely distributed, but only a few localities have been worked profitably. The only known ore reserves of major importance and commercial value today are the iron deposits in the Hartville district. The vanadiferous shales in Lincoln County and the titaniferous magnetites in Albany County, which also contain vanadium, are of potential major importance.

The accompanying map is primarily an index map showing the general distribution of the metalliferous deposits in Wyoming. It was compiled from published and unpublished reports and maps of the United States Geological Survey and the Geological Survey of Wyoming, from publications of the Federal Bureau of Mines, and from several scientific journals.

Each productive or potentially productive lode deposit that could be accurately located from available information is shown on the map by a symbol. Within the limits of error resulting from lack of complete reported production data, change of mine names, and other omissions in the records, all mines having a production thought to be worth \$100,000 or more are shown by a solid circle, those having a production of \$1,000 to \$100,000 are shown by an open circle, and mines and prospects having a production less than \$1,000 or no reported production are shown by a cross. Other mines are mentioned in literature, but their exact locations are not given, hence they are not shown or are shown collectively by a single large circle for a mining district. The outcrop of the vanadiferous shale is shown with a dotted line. The general areas of placer ground to which reference is made in literature are shown by a stippled pattern.

Mining districts and some of the more important mines are named. Letter symbols beside the district or mine name or symbol representing the deposit indicate the metals produced or those of potential value. One inset map shows the total metal production by counties, and the other shows the relation of the mining districts to the general geology of Wyoming.

History, production, and outlook.—Most of the productive mining districts in Wyoming were discovered before 1875. Gold and silver dominated the value of the nonferrous metals produced before 1900, but from about 1900 to World War I copper was the important metal of this group. Since World War I the production of gold, silver, copper, and lead in Wyoming has been small. Iron ore has been produced fairly steadily since about 1900, and has far exceeded the value of all other metals. It was the only metallic ore produced in quantity in Wyoming during World War II.

The first important mining operation in Wyoming began in 1867 in the Atlantic-South Pass district, Fremont County. The district boomed during the seventies, but from then until the early part of the twentieth century production declined steadily. Spencer estimates that \$1,500,000 worth of precious metal, mostly gold, was taken from the district before 1914. Since World War I there has been little mining in the district except during the middle and late thirties, when several hundred thousand dollars worth of gold was taken from gravel deposits along Rock Creek.

The first recorded gold discovery in Albany County was in the Douglas Creek district in 1868. From then until about 1890 gold production from the county was relatively steady, augmented by discoveries in other districts, and totaled about \$230,000. About the same value in copper was produced in the county from 1900 to 1912, mostly from the Rambler mine. Production from the county since 1912 has been small.

Important production from the Encampment district, Carbon County, started in 1898, although gold ores had been discovered about 25 years earlier. Production from 1898 to 1916 totaled nearly \$3,600,000, of which most of the value was in copper but a small part was in gold and silver. Production since World War I has been relatively small.

The Rawlins "paint rock" iron deposits were worked from 1870 to about 1890, yielding 100,000 tons of ore that was used as a metallurgical flux and paintrock. The value of this material is not known.

The copper deposits in the Hartville district, Platte County, and in adjacent parts of Goshen and Niobrara Counties were discovered as early as 1880, but only the Rambler mine, where copper and iron ore are associated, has yielded important production. About \$1,500,000 worth of copper was obtained from the Sunrise mine before 1919, and most of that was produced during World War I. Since 1919 copper production from these counties has been small. The Hartville iron deposits, including the deposit at the Sunrise mine, have been operated rather steadily since about 1900 and have yielded about 20,000,000 tons of ore, calculated to be worth a little more than \$50,000,000, on the basis of the average domestic value of iron ore.

The total value of metals produced in Wyoming is calculated to be nearly \$62,000,000. Of this total, Platte County has yielded about \$55,000,000, Carbon County about \$4,000,000, Fremont County a little more than \$2,000,000, Albany County about \$500,000, and Goshen and Converse Counties about \$40,000 each. It is unlikely that any other county alone has yielded more than \$10,000 worth of metals (see insert map).

Within the foreseeable future, and barring unexpected discoveries of major importance, it seems likely that the production of metals in Wyoming will continue to be small compared with the expected output of mineral fuels and nonmetallic and agricultural products in the State, and also with the metal production in other Western States. Furthermore, with a few possible exceptions, it seems unlikely that the development of cheaper power, or any large increase of industrial or agricultural activities, or a major shift in population will significantly change the outlook for metal production from the State.

The iron deposits in the Hartville district, Platte County, contain sufficient reserves for many years of continued operation at the past rate of production and among the metal commodities they form the only known commercial reserves of major importance in Wyoming today. Future rate of production from these deposits will probably be largely influenced by the requirements of the western iron and steel industry. The titaniferous magnetite deposits of Albany County form a large potential reserve of titanium, iron, and vanadium, but owing mainly to metallurgical problems they cannot compete with the present sources of these commodities. Vanadiferous shales in Lincoln County, although below present commercial grade, are a reserve of potential major importance because of the large tonnage of material available. The date that they will come into production will be largely influenced by the depletion of present sources of vanadium, or by an increased demand for the metal. Likely the exploitation of these deposits would be hastened by the availability of cheaper power, but probably only to a small extent.

A small production of gold, silver, and copper can be expected from many lode deposits in Wyoming under favorable economic conditions, but the present state of development of the known deposits seems to offer little hope of their becoming important producers. Placer deposits will continue to yield some gold, but the amount will be small under present conditions. On the other hand, if cheaper power were available the operation of large dredges might be profitable, particularly in the Douglas Creek, Atlantic-South Pass, Snake River, and Big Horn River areas. An increase in the price of gold should stimulate placer mining.

Geology.—Ore deposits are not haphazard or accidental in occurrence but are the result of certain natural reactions. As the processes that lead to the formation of an ore deposit are fairly well known, places where deposits might have formed in the past can be recognized, and it is possible to point out broad areas most likely to contain ore and areas that are not favorable.

Except in the northwestern part of the State, there has been little igneous activity in Wyoming since pre-Cambrian time; thus most of the metalliferous deposits in Wyoming are in pre-Cambrian rocks (see insert map) and are pre-Cambrian in age. In this particular regard, the geologic history of Wyoming differs from that of the other Rocky Mountain States, which contain intrusive igneous rocks of Tertiary and Mesozoic age with their associated, highly productive, metalliferous deposits.

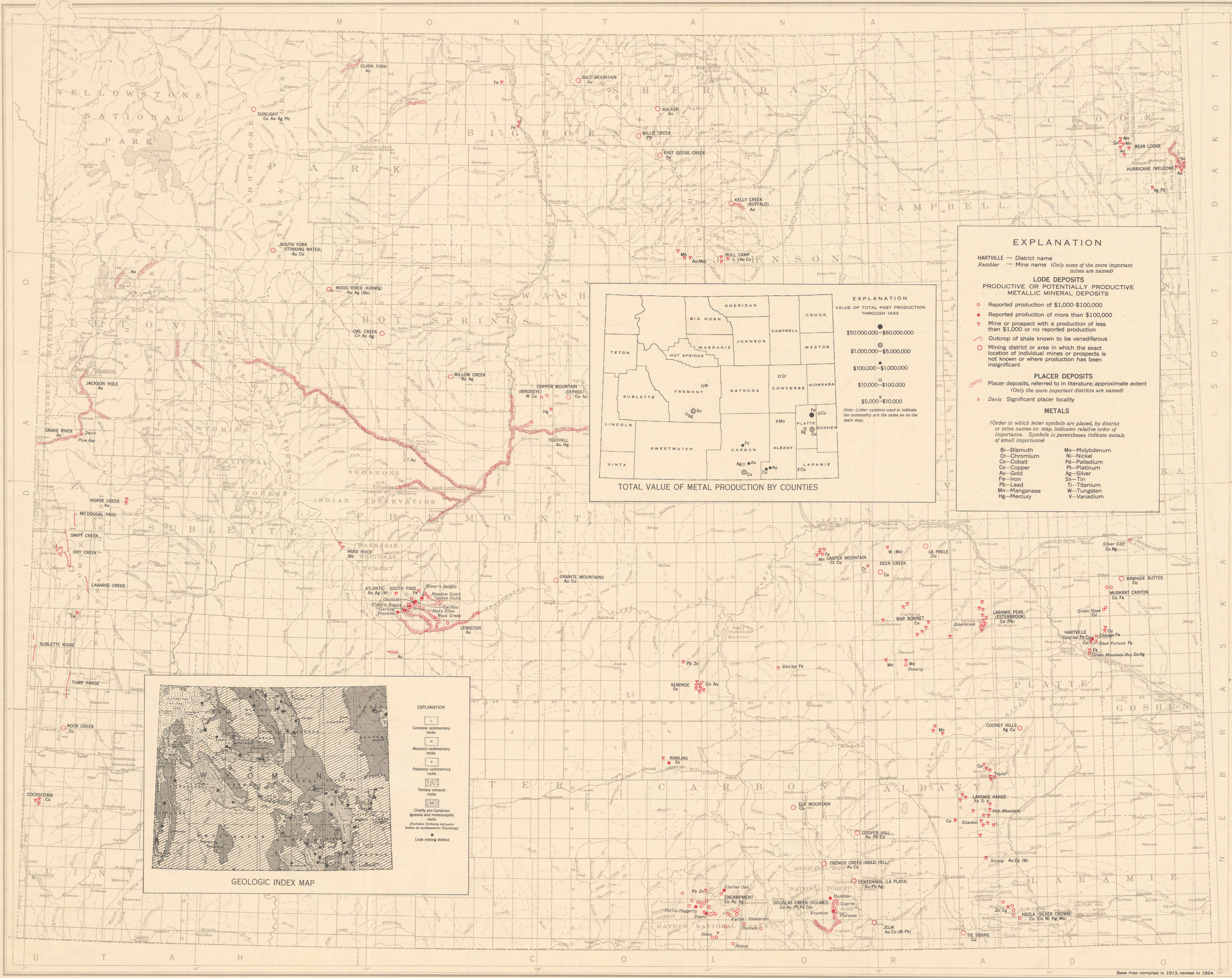
Central and eastern Wyoming is a region of semi-isolated mountain ranges, which are broad uplifts that expose pre-Cambrian igneous and metamorphic rocks in their crests but still are partly covered by remnants of gently folded Paleozoic sedimentary rocks. These ranges are flanked by steeply dipping Paleozoic and Mesozoic strata, beyond which extend broad plains and basins covered with flat-lying or gently flexed Tertiary strata. Most of the lode deposits are in pre-Cambrian rocks exposed in the mountain cores.

Tertiary volcanic rocks and the few intrusive masses exposed with them form the rugged topography of northwestern Wyoming. Although the geology of this region is somewhat similar to that of the San Juan volcanic region of Colorado, where more valuable metalliferous deposits have been found, in most places erosion has not yet cut deeply enough to expose the underlying rocks where ore deposits are most likely to occur. The few metalliferous lode deposits known in this part of the State are mostly in the exposed intrusive masses.

The linear mountain ranges of southwestern Wyoming are formed by closely folded Paleozoic and Mesozoic strata; these ranges contain few metalliferous deposits. Ore deposits of sedimentary origin, such as the vanadiferous shales, have no direct genetic association with mountain ranges, and may be found in sedimentary rocks in areas of mild relief.

¹Spencer, A. C., The Atlantic gold district, Fremont County, Wyo. U. S. Geol. Survey Bull. 626, p. 28, 1916.

²Tricketts, L. D., Wyoming Territorial Geologist Ann. Report for 1890, pp. 60-62.



MAP SHOWING
METALLIC MINERAL DEPOSITS OF WYOMING

Compiled by R. P. Fischer, A. B. Griggs, Helen Cannon,
and M. H. Krieger

Scale 1:1,000,000
10 0 10 20 30 40 Miles
1947

U.S. Geological Survey.
Missouri Basin studies.

Wyoming. Metals. 1:1,000,000. 1947.
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