Geology and Ore Deposits of the Eureka and Adjoining Districts San Juan Mountains, Colorado

By WILBUR S. BURBANK *and* ROBERT G. LUEDKE

GEOLOGICAL SURVEY PROFESSIONAL PAPER 535

Prepared in cooperation with the Colorado State Mining Industrial Development Board

A study of part of the western San Juan Mountains eruptive center, its related cauldron subsidence structures, altered volcanic rocks, and ore deposits

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large proportion of the country is above timberline, which is at about 11,500 feet, and thus is relatively bare except for alpine shrubs, grasses, and flowering plants.

Mining has been the chief industry of the area, but at the time fieldwork was done for this report, only a few mines had operations in progress, and these were mainly exploratory and developmental. Besides mining, the grazing of sheep is an industry of some importance. Some lumbering has been done, but much of the original timber resource has been used in connection with past mining operations.

HISTORY AND PRODUCTION

Ransome (1901, p. 19–25) and Henderson (1926, p. 48–50) stated in their excellent summaries of the early mining history of the Silverton quadrangle and San Juan County that the rugged and inaccessible western San Juan Mountains were not prospected until rather late in the history of the West. The first real attempt at prospecting in the region was by the Baker party in 1860, which penetrated the mountains to the park where Silverton now stands. Harassment by Indians and severe winter conditions discouraged them, and incited little further prospecting until the early 1870's, after the revision of a treaty with the Ute Indians. When prospecting was resumed, many important discoveries were made; real mining began in 1874. A smelter was put in operation in Silverton in 1875, and at about the same time one was constructed in Lake City to the northeast to treat ores from the area. There were no wagon roads or rail transportation into this region until the late 1870's and early 1880's respectively, and consequently, the high costs and difficulties of transporting ores and equipment by pack train and wagon resulted in slow development of the new discoveries. The total production for the Silverton area from the beginning of activity to the close of 1876 has been estimated at a little over $1 million.

In 1879, the first road into the area was completed from Del Norte via the Rio Grande Canyon and Stony Pass southeast of Silverton. Also, a road was completed from Silverton up Cement Creek canyon to the head of Poughkeepsie Gulch where several of the more productive deposits then were being mined. Completion of the Silverton branch of the Denver and Rio Grande narrow-gauge railroad in 1882 and establishment of a smelter in Durango gave new impetus to the treatment of lower grade ores. The future of the region still was not assured, however, until 1890, when J. H. Terry at the Sunnyside mine in the Eureka district and E. G. Stoiber at the Silver Lake mine (southeast of Silverton) in the Animas district both successfully developed methods of concentrating low-grade ores of the area. Extension of the railroad from Silverton up the Animas River canyon through Eureka to Animas Forks in the mid-1890's and up Cement Creek canyon to Gladstone in 1899 permitted further cost reductions in ore treatment. A great improvement in treating the low-grade complex ores of the area was made in 1917 when the first commercial lead-zinc selective flotation plant in North America was introduced at the Sunnyside mine.

Mining activities in the Eureka district have fluctuated considerably throughout the district's history, as many of the operations were small and thus easily affected by the market price. The decline of the price of silver in 1892 and 1893, as well as the smaller declines in lead and copper prices that followed, caused mining activity to decrease and forced many of the smaller operations to close. The major activity in the district, particularly to the late 1930's in the district's history, centered about the operations of the Sunnyside and Gold King mines. These and other concurrent or later operations are reviewed in the section on mining (p. 55). Mining operations in the district are treated annually in the United States Bureau of Mines Minerals Yearbook and the Mining Yearbook of the Colorado Mining Association.

Production records (table 1) for the Eureka district are available only for the years 1932 through 1957 and hence give only the more recent trend of production; for earlier and later years the district's output is included under the total San Juan County records. The figures for the year 1926 are given, however, to illustrate a typical year of operation at the Sunnyside mine and mill; although the output is for all San Juan County during this year, only small-lot shipments were made from a few other mines in the county.

Many of the earlier production records fail to reveal the metal content of the average complex ore mined and milled. The dollar value of payments for the gold and silver recovered from ores not uncommonly exceeded that for the base metals recovered, even though the value of the total base metals present in the ores was considerably larger. Both Robie (1926) and McQuiston (1948) described the progress and improvement made in the treatment of the complex ores of the area before and after 1917.

The production figures in table 1 represent about 20–25 different operations throughout the district. The output came mostly from lode mining, but a little came from cleanup of old mine dumps and placer mining. The more active producers during this period were the Columbus Group near Animas Forks, the Lead Carbonate mines on the mountain slope east of Gladstone, and the Mountain Queen lease at the extreme head of California Gulch. The increased production in 1937–38