C-3680 0278

Au 836

CARLIN

GETCHELL

POTOSI

Reprinted from ECONOMIC GEOLOGY, Vol. 66, No. 1, January–February, 1971
Printed in U. S. A.

Gold-Bearing Deposits in North-Central Nevada and Southwestern Idaho

RALPH J. ROBERTS, ARTHUR S. RADTKE, AND R. R. COATS

With a section on

Periods of Plutonism in North-Central Nevada

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Economic Geology
Vol. 66, 1971, pp. 14–33

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Abstract

Gold-bearing deposits in north-central Nevada occur in a wide variety of geologic environments related to major stratigraphic and structural features. These environments include pre-Tertiary sedimentary and metamorphic rocks, granitic rocks, and volcanic rocks of pre-Tertiary and Tertiary age which have been complexly deformed. The deposits were formed during five principal intrusive metallogenic episodes; the oldest is Jurassic, two are Cretaceous, one early Tertiary, and the last, late Tertiary. Three major epigenetic groups of gold-bearing deposits are recognized: replacement deposits, disseminated deposits, and veins. The replacement deposits may be subdivided in order of decreasing temperature of formation into contact pyrometasomatic deposits, base-metal deposits, and peripheral gold-silver deposits. The disseminated gold deposits seem to be intermediate in mineralogy between the peripheral replacement deposits and low-temperature veins, but differ in that they contain only minor amounts of silver. They are here considered to be a distinct group. The veins are subdivided into two classes: veins in pre-Tertiary and granitic rocks and veins in or associated with Tertiary volcanic rocks.

Contact pyrometasomatic deposits have yielded significant production in only one district, Battle Mountain (Copper Canyon and Copper Basin), where calc-hornfels containing pyrite, chalcopyrite, pyrrhotite, arsenopyrite, sphalerite, and galena was mined as copper-gold ore. Base-metal replacement deposits occur at Eureka (silver-gold-lead-zinc) and Copper Canyon (copper-gold and zinc-lead-silver). Peripheral gold-silver deposits occur at Eureka and Copper Canyon.

Disseminated gold deposits such as Carlin, Cortez, Getchell, and Gold Acres, which are relatively new discoveries, have yielded significant production to date and have excellent potential for continued large-scale future production. They are characterized by generally low-temperature mineral assemblages which include pyrite, quartz, gold, realgar, stibnite, cinnabar, sphalerite, and galena.

Gold-quartz veins in pre-Tertiary and granitic rocks generally contain sulfide assemblages similar to those of the high-temperature replacement deposits; medium-temperature veins are characterized by tetrahedrite, galena, sphalerite, and pyrite; low-temperature veins by pyrite and galena and by stibnite-quartz. Veins in volcanic rocks or in basement rocks just beneath are divisible into three types: argentite-quartz-adularia veins containing pyrite, gold, and sparse galena and sphalerite; argentite-quartz-adularia veins characterized by pyrite, gold or electrum, argentite, naumannite, and lesser amounts of base-metal sulfides; and stibnite-quartz veins containing argentite and silver sulfosalts, locally with adularia.

Introduction

METAL deposits in Nevada were subdivided by Ferguson (1929) into two principal groups, those associated with intrusive rocks and those with volcanic rocks (Table 1). This classification is still valid except that the disseminated gold deposits discovered during the last 40 years at Getchell, Gold Acres, Carlin, and Cortez do not fit readily into the scheme and some modification is required (Joralemon, 1951; Ketner, in Gilluly and Gates, 1965; Roberts, 1960, 1964, 1966; Hardie, 1966; Erickson et al., 1966; Hausen and Kerr, 1968; Hewitt, 1968; Wells, Stoiser, and Elliott, 1969). In addition, many new data on the structural environment, geochronol-

[1] Publication authorized by the Director, U. S. Geological Survey.

ogy, and geochemistry of the ore deposits are available. Some of these new data will be summarized here with particular emphasis on the gold-bearing deposits in north-central Nevada and southwestern Idaho (Figs. 1, 4). In this report Roberts is responsible for the geologic framework and section on replacement deposits; Roberts and Radtke for the section on disseminated deposits; Coats for the sec-

TABLE 1. Metallogenic Epochs in Nevada (Ferguson, 1929)

I Deposits associated with intrusive rocks	
A. Jurassic or Cretaceous Argentiferous quartz veins	B. Early Tertiary Base metals, silver and gold
II Deposits associated with volcanic rocks	
C. Pre-late Miocene Silver-gold deposits	D. Post-late Miocene Gold-silver deposits

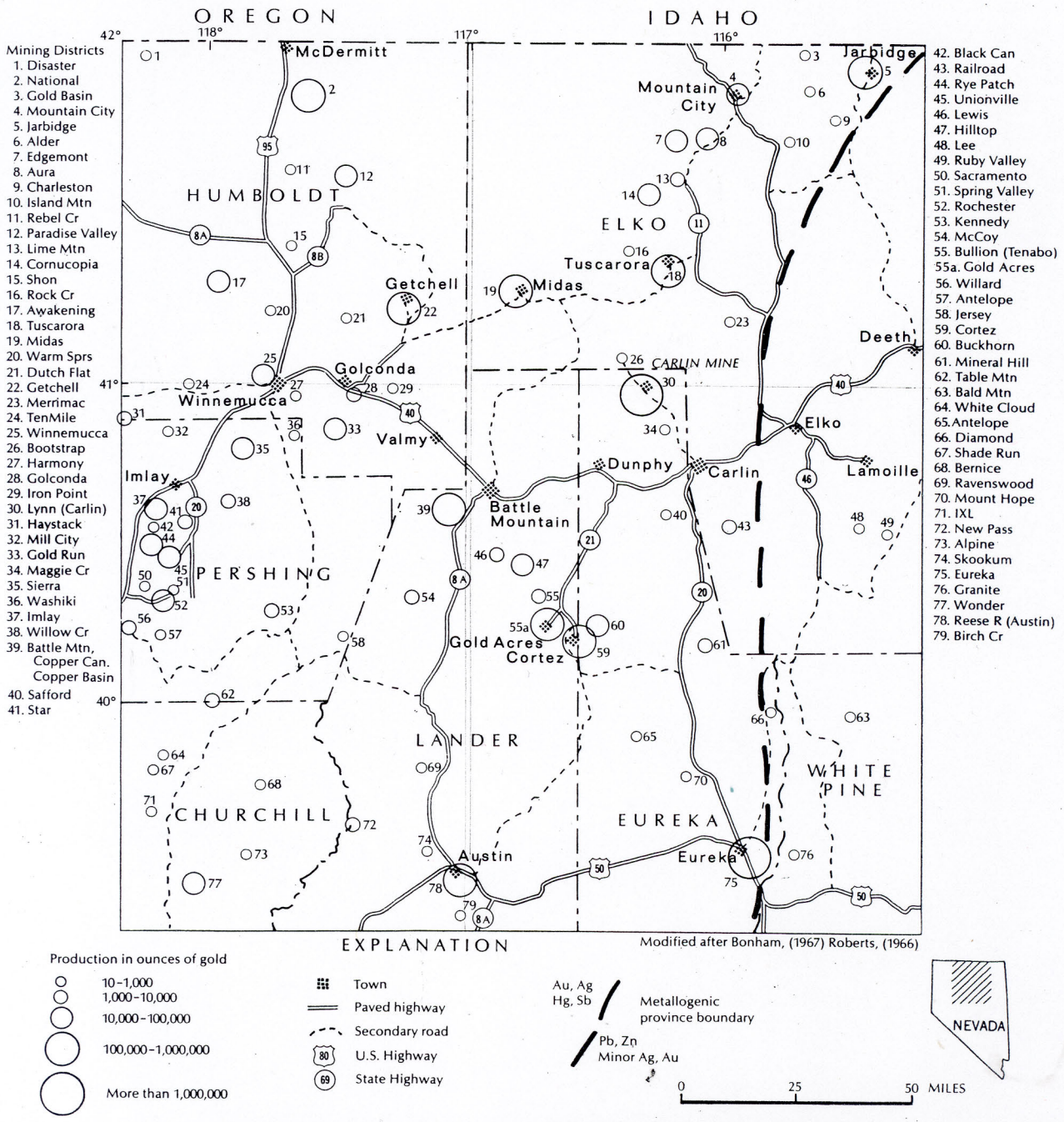

FIG. 1. Index map of north-central Nevada showing gold mining areas.