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Item 50

Geology and Mineral Resources of Elko County

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hundred feet west of Seventy-Six Creek. It is said to have consisted of 600 feet of underground workings. The tunnel drift is 900 feet long and follows a vein reported to contain (1914) an 18-inch-wide ore shoot with value of \$16.00 in copper and gold.

Prunty mine.—The Prunty mine is on Seventy-Six Creek about a third of a mile above the Graham mine. The production of silver, gold, copper, and antimony was small.

Placers

The first mineral deposits found in the district were placers, chiefly on the west side of Seventy-Six Creek about 4 miles above Charleston. Placer deposits in Pennsylvania Gulch, Union Gulch, Dry Ravine, and Badger Creek, all between Seventy-Six Creek and the Bruneau River, were also worked in the early days. According to Vanderburg (1936), the placer gravels of the district also extend for miles along the Bruneau River. They consist mainly of well-rounded pebbles derived from rhyolite, rather coarsely crystalline, quartzite, and granite. In places the gravels are 50 feet thick. The gold recovered is rather fine.

CONTACT (KIT CARSON, PORTER, SALMON RIVER) DISTRICT
Copper, silver

Sources of information

Schrader, F. C., 1912, A reconnaissance of the Jarbidge, Contact, and Elk Mountain mining districts, Elko County, Nevada: U. S. Geol. Survey Bull. 497, p. 99-150.

Lincoln, F. C., 1923, Mining districts and mineral resources of Nevada: Nevada Newsletter Pub. Co., Reno, p. 40-41.

Schrader, F. C., 1935, The Contact mining district, Nevada: U. S. Geol. Survey Bull. 847-A, 41 p.

Location

The Contact mining district is in the northeastern part of the county, about 35 miles east of the Jarbidge district. The town of Contact, the principal settlement, is near the center of the district, about 15 miles south of the Idaho state line and 40 miles west of the Utah boundary. Salmon Falls Creek, the largest stream east of the Bruneau River in northeastern Nevada, flows in the shape of a horseshoe through the district and thence north, past the town of Contact, into the Snake River in Idaho.

History and production

The district probably was discovered in 1870 and prospected for gold. Production records for the 38 years prior to 1908 are not available; however, minor shipments of copper ores were

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made periodically. The district reached its maximum production in 1916-1918 with additional peaks of production in 1928-1930 and 1942-1946. Figure 5 is a graph of annual production and value of ore from 1905 to 1949. From 1913 to 1949 the district produced 34,404 tons of ore with a total value of \$702,760. The metal values were mainly in copper and silver, with minor values in lead and gold.

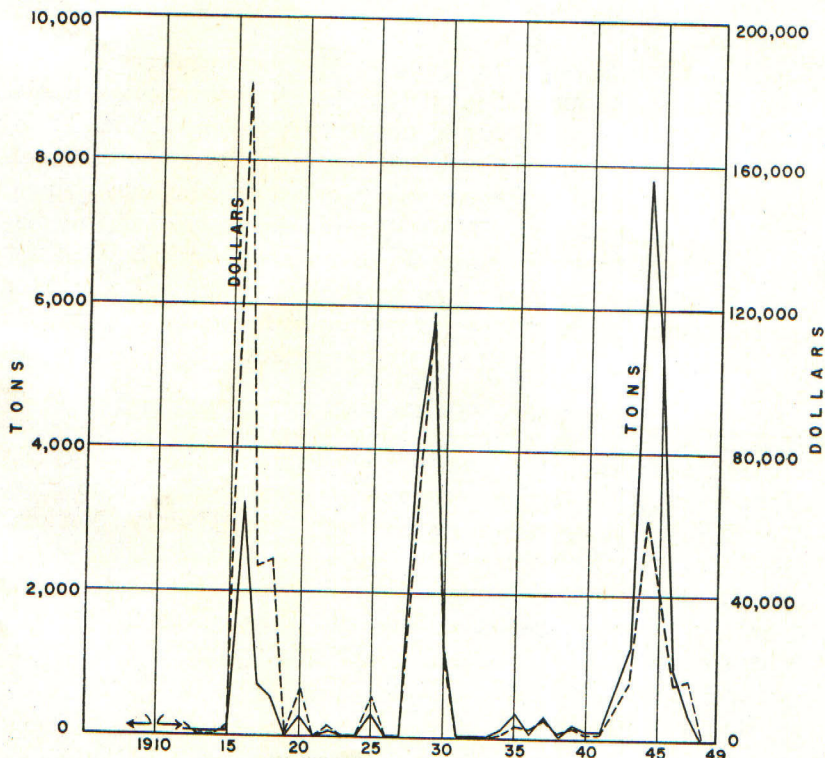


Figure 5. Annual production and value of ore in the Contact mining district, 1905-1949

Geology

The Contact district is underlain by folded and tilted Carboniferous sedimentary rocks, cut by granitic intrusive bodies, and surrounded by Tertiary lavas (see pl. 5).

The Carboniferous sedimentary rocks form an outward-dipping belt from a mile to several miles wide, that encircles a topographic basin underlain by granitic rocks. The sedimentary rocks have been intruded by granitic rocks on the inner side and overlapped by Tertiary lavas on the outer side. The exposed thickness of about 1,600 feet probably does not constitute the entire Paleozoic

section. The Carboniferous rocks consist in descending order of 1,100 feet of limestone with minor amounts of quartzite, 300 feet of slate or dark slaty to shaly quartzite, and 200 feet of basal (?) quartzite.

The limestone has been metamorphosed along the contact with the granitic rocks for a distance up to several hundred feet from the contact. The limestone is in part silicified and in part silicated, with the formation of actinolite, garnet, chlorite, diopside, and lesser amounts of scapolite and other silicates.

The igneous rocks of the district comprise several types of granitic intrusive and Tertiary volcanic rocks. The oldest of the granitic rocks is granodiorite which is exposed in an area 25 miles long in an east-west direction and 6 miles wide north-south. The granodiorite has cut the sedimentary rocks, which generally dip away from the contact.

The granodiorite is a gray, speckled rock of medium to moderate coarse grain. Most of the grains have maximum dimensions of 1 to 2 millimeters. The rock contains about 55 percent plagioclase, 20 percent granular interstitial quartz, 10 percent potash feldspar, and 15 percent biotite.

The granodiorite shows effects of deuteric alteration near the contact between it and the sedimentary rocks, and locally includes large, unoriented blocks of limestone and quartzite (Reeves, R. G., oral communication).

Dikes, mostly alaskitic in composition, cut the granodiorite and the Carboniferous rocks. Most of the dikes are less than 5 feet wide, but some attain widths of 200 feet or more. Only the larger and more persistent dikes are mapped on plate 5. Most of them are pale pink or flesh-colored, especially when weathered. The rock is composed mainly of potash feldspar and oligoclase in roughly equal proportions, with quartz, biotite, and hornblende.

Mineral deposits (data from Schrader, 1935; developments refer to 1930)

The mineral deposits of the Contact district are principally in the contact zone bordering the granodiorite and within the granodiorite area near the dikes. Copper is the main commodity, but the deposits also contain some gold and silver, and locally enough lead to be of value. The deposits are of three related kinds: (1) deposits of ore closely related to contact metamorphosed limestone, commonly close to the border of the granodiorite mass; (2) fissure veins, and (3) deposits along fissures in or near dikes or disseminated in fractured parts of such dikes.

Contact-metamorphic deposits.—Contact-metamorphic deposits are on the contact of the main granodiorite body and in the

metamorphosed limestone. The principal hypogene copper mineral is chalcopyrite; bornite is also present. Most of the lodes are 15 to 30 feet thick, but commonly only certain bands within the lode contain workable ore. The copper content of the ore mined ranged from 3 percent or less to rarely as much as 50 percent. Several bodies of 10-percent copper ore have much of their copper in certain narrow high-grade bands. Nearly all of the workings were in oxidized ore. In places, however, considerable massive chalcopyrite was present.

In these lodes the content of precious metals varies with that of the copper. Except in bands of nearly massive sulfide, the amount of silver and gold is minor.

Fissure veins.—The veins follow lines of fissuring and brecciation in both granodiorite and sedimentary rocks. A few are on the granodiorite-sedimentary rock contact in places where contact metamorphism is inconspicuous.

The veins of this type are rudely banded largely as the result of shearing. Most are from 1 to 10 feet in thickness. Some veins contained 3 to 10 percent of copper and small amounts of precious metals. Certain of the veins, low in copper, evidently originally contained galena, sphalerite, and probably some argentite; but these minerals have been largely oxidized. Most of the lead ore contained 10 to 20 percent lead, 4 to 20 ounces of silver to the ton, and from a trace to 3 ounces of gold to the ton. In the lead mines that have been opened to depths of more than 100 feet, copper is present in the lower levels.

Veins related to dikes.—The veins of this type differ little from the copper-bearing variety of fissure veins. Most of them follow fissures in and parallel to dikes, and locally the ore minerals are disseminated through fractured and altered dike rock, so that the whole dike is more or less mineralized. The principal minerals are chalcopyrite, molybdenite, and specularite in quartz gangue. These veins have been only partially developed or explored.

Oxidation and enrichment.—Oxidation extends to depths of 150 to 250 feet below the surface in most of the lodes, although the ground-water level is at shallower depths in most of the mines. Chrysocolla, malachite, azurite, copper pitch,² cuprite, and native copper constitute much of the valuable content of the oxidized ore.

Mines and prospects.—The mines and prospects of the Contact district are in four areas: Ellen D. Mountain, China Mountain,

²A mixture of several hydrous oxides (of copper, iron, and manganese), often with silicates and carbonates, in a more or less colloidal state. The mixture chiefly embraces the minerals tenorite, chrysocolla, limonite, malachite and manganese oxide (English, 1939).

Blanchard Mountain, and Middle Stack Mountain and Trout Creek areas.

The Ellen D. Mountain or western area comprises the western portion of the granodiorite batholith and the part of the contact zone lying west of Salmon Falls Creek. The principal feature of the geology is the curved contact zone with its scarp of Paleozoic rocks overlooking the garnodiorite. Along the north side of the area the Paleozoic rocks are tilted and irregularly disturbed, and on the west they are steeply upturned or on edge; but in the higher part of Ellen D. Mountain they lie for the most part nearly horizontal or dip gently northwest.

The area contains deposits of all three classes of ore mentioned above, and has yielded most of the district's production. The deposits occur mainly in the contact zone and associated with dikes principally in granodiorite. The more important properties in this area are the Nevada-Bellevue, Palo Alto, and Blue Bird. Of these the Nevada-Bellevue has had the largest production. The properties are on a group of east-west veins near the old town of Contact, which is near the head of Town Gulch west of Salmon Falls Creek and adjacent to and including the granodiorite-Paleozoic rocks contact (pl. 5).

The mineralized zone along the contact extends east from the Brooklyn ground (pl. 6) to the Allen No. 2 claim, where shallow workings expose it for a width of 120 feet. This zone consists of alternating bands of altered and mineralized granitic rock and thin layers of limestone, capped with gossan.

Nevada-Bellevue Group.—The Nevada-Bellevue Copper Mining Co. property comprises 10 claims (pl. 6) that contain several small mines and prospects, as well as the principal mine of the area, the Nevada-Bellevue (Delano and Copper King groups of claims). This mine is about 1,500 feet northeast of the old town of Contact. The Bellevue mine is about 3,000 feet west of the Nevada-Bellevue. The claims were discovered and located in the late 1880's, but no production was recorded until 1913.

Four or more veins have yielded most of the ore mined from the Nevada-Bellevue group. These veins trend east, parallel to the general trend of the granodiorite contact, but at least one of them cuts across part of the contact that trends southeast. The veins range in thickness from 1 to 10 feet and have an average dip of about 50° SE. The longest one, known as "main vein," has been traced on the surface for nearly 10,000 feet. Much of the oxidized ore contains about 4 percent of copper.

The Nevada-Bellevue mine developed the "main vein" (pl. 6),

with principal workings (pl. 7) in 1928 on the zero, 50-foot, 104-foot, 200-foot, and 300-foot levels. The zero level connects directly with the surface, and the other levels are reached by winzes. This part of the mine develops the vein to a depth of more than 400 feet vertically below the outcrop and an average distance of about 500 feet along the strike. On the 250-foot level a drift extends 700 feet eastward on the vein to connect with the Ilo tunnel at a point 1,360 feet from its portal. The Ilo tunnel was driven about 1926 for development and drainage.

The Bellevue mine, also on the "main vein," was developed in 1928 by a 200-foot shaft, a 120-foot crosscut tunnel, and 1,000 feet of drifts, mainly on the 100-foot and 200-foot levels.

The vein is glassy quartz, sporadically mineralized by replacement of the quartz with siliceous reddish-brown hematite intimately associated with chalcocite, chalcopyrite, chrysocolla, and copper oxides; the carbonates azurite and malachite are also present.

Palo Alto mine.—The Palo Alto claim joins the Bellevue and Delano group on the east at an altitude of 5,900 feet on the slope of the basin rim. Since its discovery in 1894, the mine is credited with the production of about 1,700 tons of ore. Most of the 300 tons produced prior to 1910 is said to have averaged about 30 percent of copper, some gold, and 8 ounces of silver to the ton; 200 tons produced in 1914 and 1,200 tons produced in 1928 ran 5 percent of copper and 3 ounces of silver to the ton.

The mine is developed by a 292-foot shaft, a 150-foot crosscut tunnel, 300 feet of drift, and 100 feet or more of crosscuts and stopes distributed on four levels.

The mine is in the contact zone, a few hundred feet from the main granodiorite body. The country rock is chiefly dark, coarse slate and some associated pinkish quartzite of Paleozoic age, that dips about 75° toward the granodiorite-sedimentary rock contact. They are intruded by radial dikes, tongues, or sheets of granodiorite that are offshoots from the main body and thin out as they extend from the main contact.

The ore bodies are in a small fissure vein in one of the granodiorite tongues. A shaft is sunk on the vein, which dips steeply to the south, about parallel with the sedimentary rock-granodiorite tongue contact. In depth the granodiorite and the fissure thin out; the vein ends in impervious slate, and the lower 200 feet of the shaft and other workings are in barren slate. This vein is thought to be the same vein on which the Blue Bird and other openings on the Delano group are located.

Blue Bird mine.—The Blue Bird mine is two-thirds of a mile northwest of Contact and about a quarter of a mile northeast of the Palo Alto mine. It is on the outer slope of the contact-zone ridge, at an altitude of about 5,800 feet. The property consists of a group of 10 claims.

The deposit was discovered in 1884 and was developed mainly by a southwesterly 70° incline with chambers and crosscuts. The total production was not learned; since 1910, 1,000 tons, said to have averaged 6 percent of copper and 3 ounces of silver to the ton, had been shipped, mainly in 1928.

The mine is in white limestone with intercalated quartzite and slate about 1,000 feet north of the granodiorite contact. The lode appears to be the eastward extension of the "main vein" on the Nevada-Bellevue group (pl. 6), with local enlargement by replacement of limestone. It strikes northeast, dips about 60° SE., and is intersected by a fault of northerly trend.

The main ore body in general has a width of 3 feet but in places is much wider. The ore, which is said to average more than 3 percent of copper, contains malachite, chrysocolla, red, brown, and black copper oxides, and some chalcocite. Replacement deposits of oxidized ore occur in and along the cross fault and in the limestone north of the mine.

Other mines of Ellen D. Mountain area.—Records indicate that the following mines have produced some ore during the period 1913–1946: Copper King, Copper Shield, Silver Circle (Queen of the Hills), Mammoth, and Bonanza (see pl. 5).

China Mountain area.—China Mountain is about 5 miles south-southeast of Contact. The China Mountain district is about 5 miles long and 4 miles wide, and lies on the east side of Salmon Falls Creek. The earliest substantial work in the area was done by a group of Chinese in 1876. The property was abandoned in midwinter of that year and lay idle until minor prospecting was resumed late in the 1880's.

The northern part of the area is underlain by granodiorite and the southern part by Paleozoic sedimentary rocks, separated by a well-defined east-west contact. The sedimentary beds, though variously deformed, in general dip southward, or away from the contact, along which the upturned edges form a hogback adjacent to the lower-lying granodiorite area within the basin.

The deposits are similar to most of those in the Ellen D. Mountain area. They occur mostly in association with the granodiorite-Paleozoic rock contact zone, in places having a width of nearly

2,000 feet. Some of the veins are in the granodiorite. The principal mines are the Chinaman, War Eagle, Hanks, Turo-Sheckles, and High Ore. The High Ore mine had small production in 1915, and the Hanks mine had small production in 1916 and 1917.

The War Eagle Mine, in 1895-1896, produced eight carloads of copper ore that averaged about 24 percent of copper, 14 ounces of silver to the ton, and about 7 percent of silica; one of these carloads is said to have averaged 0.33 percent of copper.

Blanchard Mountain area.—The Blanchard Mountain area adjoins the China Mountain area on the east. It is about 4 miles in diameter and centers at Blanchard Mountain, which rises to an altitude of about 8,800 feet.

The country rock is intrusive granodiorite on the northwest and Paleozoic sedimentary rocks on the southwest. The general course of the contact is northeastward and it is concave to the northwest. In the Blanchard Mountain portion of the area the formations and the deposits are traversed by dikes of syenite porphyry. There is no record of production for the mines of this area.

Middle Stack Mountain and Trout Creek area.—The Middle Stack Mountain and Trout Creek area lies in the northeastern part of the Contact district, on the north contact zone. It begins at Middle Stack Mountain, 6 miles northeast of Contact, and extends eastward across Trout Creek for a distance of about 6 miles.

The country rock consists of intrusive granodiorite and of Paleozoic rocks, principally limestone and slate, generally dipping northward away from the contact. Both the granodiorite and the sedimentary rocks are intruded by dikes. The granodiorite in places shows pronounced sheeting.

The mineralized zone has a maximum width of about half a mile. The deposits, except those to the west of Trout Creek, are similar to those in the contact zone described in the preceding sections except that they are more generally associated with dikes. Metamorphic minerals, particularly massive garnet, chloropal, and axinite, are characteristically present in the gangue.

Considerable work has only been done in the Boston mine since 1910. The deposit is in contact-metamorphosed limestone, essentially parallel to the bedding. It is 4 to 20 feet thick and has been opened to a depth of 190 feet by a tunnel, shaft, winze, and drifts. The principal ore minerals besides copper carbonates were bornite and chalcopyrite. In the few years preceding 1926, several small shipments of good-grade copper ore are said to have been made.