Culver Antimony Mine

Antelope Springs Mining District Pershing County, Nevada

Figure 1. **Looking east toward Granite Mountain in East Range, Pershing County, Nevada, from the top of the ridgeline of the Culver mine outcrop.**

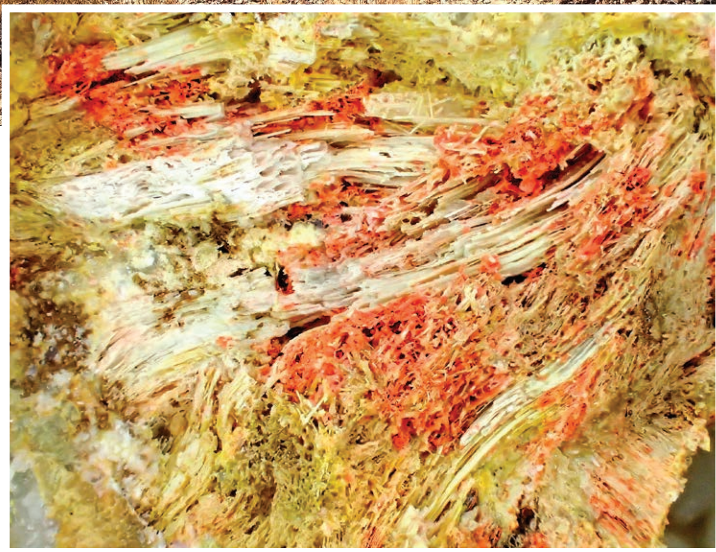

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Figure 2. **Typical example of a combination of multiple antimony oxide species from the romeite group that are found at the Culver antimony mine; fibrous yellow bindheimite and crusts of both red metastibnite and cinnabar are present, field of view 1.8 cm.**

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All unattributed photos by Daniel Evanich

Daniel Evanich has spent more than twenty-five years field collecting and studying the mineralogy and geology of the Western United States, Butte mining district, and historic Tiger, Arizona.

Ted Hadley began field collecting minerals throughout much of the Western United States fifty years ago. He has extensive experience studying and identifying rare mercury species having participated in the discovery of several new minerals from the Clear Creek mine in San Benito County, California, and the McDermitt mine in Humboldt County, Nevada.

Figure 3. **Acicular spray of deep blue connellite crystals found within small pocket areas of massive quartz, field of view 1.8 mm. Ron Gibbs photo.**

The Culver antimony mine is located at an elevation of 4,592 feet (1,461 meters) at 40.142°N, 118.116°W in the Antelope Springs mining district near the southern end of the Humboldt Range of western Nevada. The closest major town is Lovelock on I-80. The region is typical Basin and Range topography as seen throughout much of the state, with sparse vegetation, little annual rainfall, and dry lake beds. The mine can be reached by traveling on I-80 about 2 miles north of Lovelock, then exiting east on Cole Canyon-Stillwater Road, Nevada State Highway 396. Access to the mine is from a north-trending unmarked 2-mile dirt road (four-wheel-drive) off Antelope Road, which intersects Highway 396.

History of Antimony, Mercury, Silver, and Gold Mining in the Pershing District

Pershing County, Nevada, has the largest concentration of known antimony mines and prospects in the state of Nevada, with the Antelope Springs, El Dorado, Star, and Willard mining districts accounting for most of the recorded production. The Antelope Springs district, also known as the Relief or Pershing district, was originally explored for antimony at the Hollywood mine in the late 1800s (Johnson 1977). A total production of 514 tons of antimony metal from the Hollywood mine alone was produced during the World War I period with lesser amounts afterward into the 1940s (Tingley and Quade 1985).

In 1869, high-grade silver ores were found in the original Relief mine, and it was worked from the 1870s until the early 1900s producing ore valued to $2,500,000. Mercury was discovered soon after, in 1907, at the Red Bird mine. Several other mercury mines were discovered in the district including the Pershing, Juniper, Montgomery, Eastern Star, and Lori mines. They were worked on an intermittent basis from 1914 through the 1970s with a total production that exceeded 12,500 flasks of mercury (Tingley and Quade 1985).

The Relief Canyon mine, today an active gold mine in the district, was discovered in the early 1980s by exploration conducted initially by Duval Corporation and subsequently by Lacana Corporation and Southern Pacific Company. The

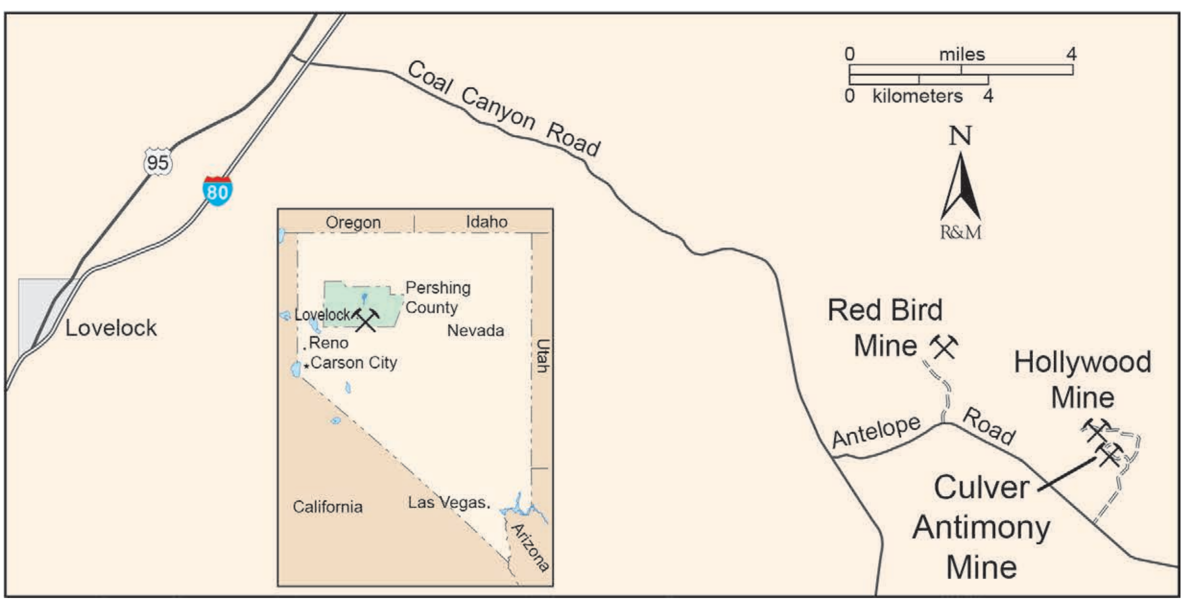

Figure 4. **Location map of the Culver antimony mine, Pershing County, Nevada; prepared by William Besse.**

Figure 5a (inset). **Culver mine atop the ridgeline showing geologic uplift and folding. Stan Bogosian at bottom left of the photo. Authors DE and TH at the upper right entrance to the main adit. Paul Favia photo.**

Figure 5b. **Distorted quartz with fracture lines showing twisted pattern, 11 cm.**

Figure 5c. **Extreme deformation of stibnite crystal in quartz pocket, field of view 3.3 cm.**

Figure 5d. **Author DE collecting samples near main portal of the Culver antimony mine. Cliff Imprescia photo.**

Figure 5e. **Paul Favia *(left)* and Cliff Imprescia collecting samples at the high-grade ore dumps near the bottom of the ridge. This was the first site where specimens were collected by author DE in 2009.**

Figure 5f. **Second portal entrance located on south side of ridge top leading to main stope area.**

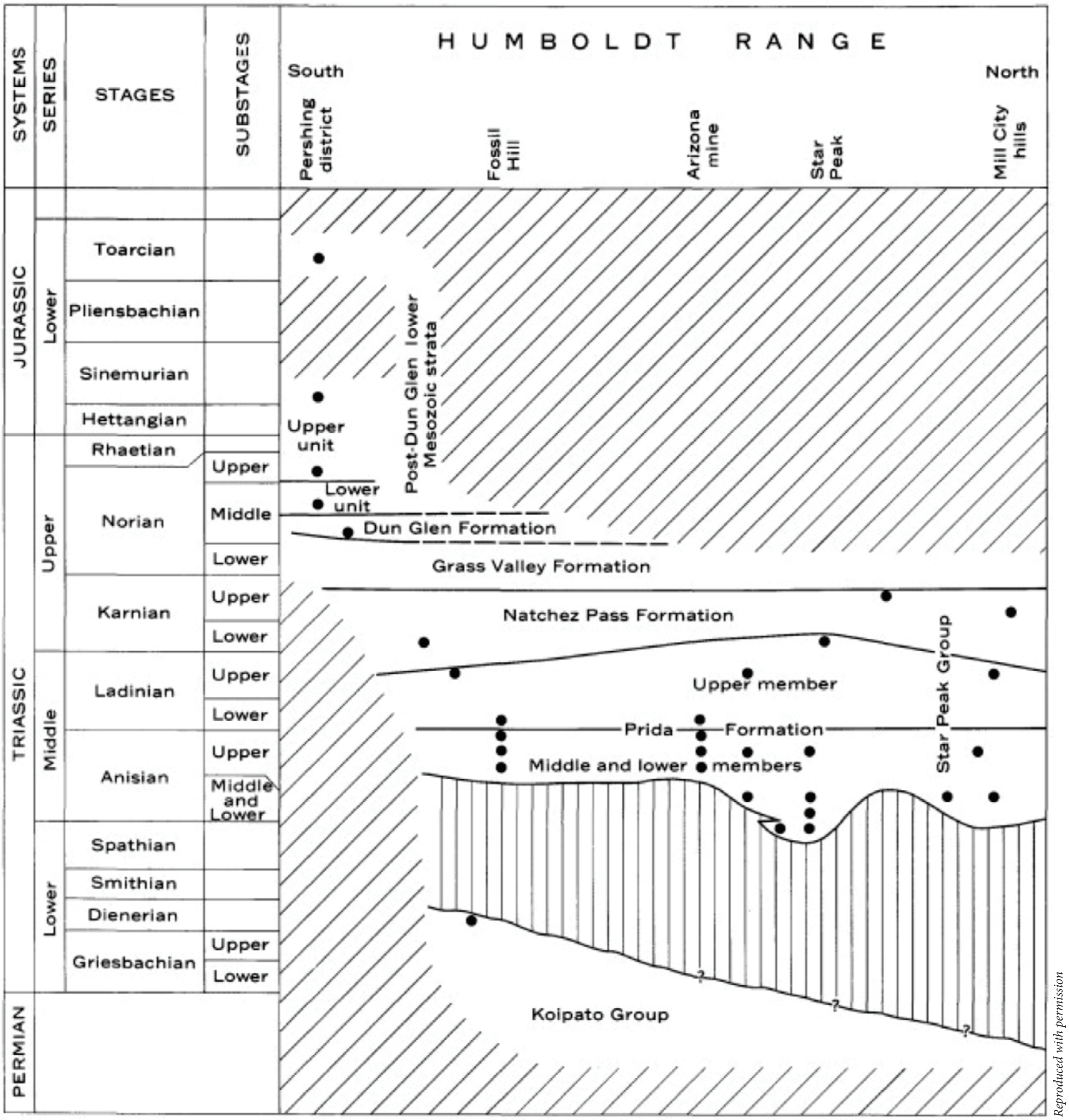

Figure 6. **Time-stratigraphic correlation and lateral variations in the age of the Lower Mesozoic rock units in the Humboldt Range (Silberling and Wallace 1969).**

gold discovery, made in the vicinity of the old Bohannon fluorspar prospect, was put into production by Lacana in 1984. Exploration being conducted now is for gold mineralization in the vicinity of the antimony and mercury deposits (Tingley and Quade 1985).

A short description of the early workings of the Culver mine was given in a geological study done during the 1955–1961 period by Southern Pacific Company (1964, p. 12) as "a deposit that has a small amount of antimony ore mined and the remains of an old furnace nearby." The study provided specific topographic map coordinates for the site referring to it as the Culver antimony mine.

Geologic Features of the Antimony Springs Mining District

Rocks exposed in the Antelope Springs district include a section of Mesozoic rocks ranging in age from Lower Triassic to Middle Jurassic and Tertiary basaltic flows to Quaternary lacustrine and alluvial deposits. Volcanic rocks of the Koipato Group crop out in the northern part of the district. They are overlain to the south by rocks of the Prida, Natchez Pass, and Grass Valley formations. In the southern part of the district the Grass Valley and Dun Glen formations and the Auld Lang Syne Group are present. The Mesozoic rocks are complexly folded and faulted. The Relief fault, a low angle thrust, extends through the northern part of the district. Rocks in the southern part of the district where the Culver mine is located were thrown into a sequence of northwest-trending recumbent to overturned synclines and anticlines. The main antimony deposit in the district is the Hollywood mine. Quartz veins and veinlets in sandstone and phyllite of the Grass Valley Formation contain pods and lenses of stibnite and antimony oxides. The wall rocks are strongly sericitized adjacent to the veins (Carraher-Muto 1979).

Culver Mine Site Geology

The geologic processes at the Culver mine followed several steps. A silty limestone, underlain by a schist or phyllite, was acted upon by hydrothermal waters. This had several effects. First, the limestone was dissolved leaving open spaces for mineralization. Next, crystalline quartz was deposited in the open spaces, nearly but not completely filling them. Following the deposition of quartz, stibnite was deposited in linear crystals roughly parallel to quartz crystals and nearly filling the available voids. Next, a tectonic compression event took place and distorted the quartz and stibnite crystals as seen in figure 5b.

Note how the quartz crystals in figure 5b show a wavy pattern, not straight crystals as one would expect. Further, stibnite crystals in the quartz were forced to bend within the pockets. Small areas of curved stibnite crystals in figure 5b can be seen near the top of the quartz specimen. Extreme deformation of stibnite (altered to yellow stibiconite), seen in figure 5c, shows where the pocket collapsed and forced the stibnite crystal to bend dramatically. Following the compression episode, another deposition of quartz cemented all the brittle pocket fragments.

Culver Antimony Mine Mineralogy

Antimony and mercury were the most important elements for mining activity throughout the Antelope Springs district. Silver was discovered early on, but in the long term it was not as important economically. This article focuses on the antimony, mercury, and copper mineralogy of the district, with many colorful and interesting secondary species.


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Figure 7. **Sheaflike bundle of fibrous yellow bindheimite with amorphous white aragonite, field of view 1.2 cm.**

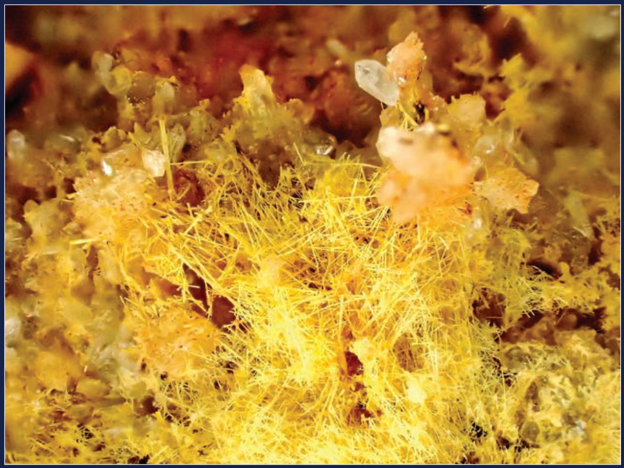
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Figure 8. **Fibrous mat of yellow bindheimite in quartz cavity, field of view 1.6 cm.**


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Figure 9. **A mineral formerly known as cuproroméite, now discredited and described as a plumboroméite-like oxide phase or a green fine-grained weathering product of Sb-bearing fahlore (*fahlore* refers to a group of sulfosalt minerals, most commonly in the tetrahedrite-tennantite series), field of view 2 cm.**


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Figure 10. **Colloidal red cinnabar with calcite, field of view 1.6 cm.**

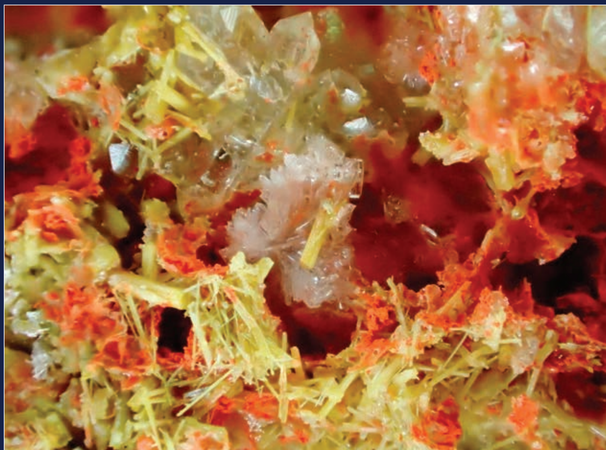

Figure 11. **Amorphous crusts of red metastibnite and red cinnabar on yellow bindheimite; colorless 2-mm acicular spray of valentinite crystals in image center, field of view 1 cm.**

Figure 12. **Black stibnite crystal included in a clear quartz crystal, with associated yellow bindheimite crystals, field of view 1.6 mm.**

Figure 13. **Massive black stibnite in white quartz, 6.5 cm.**

Figure 14. **Acicular group of colorless valentinite crystals on bindheimite, field of view 2 mm.**

Figure 15. **Colorless valentinite crystals on orange iron-stained calcite crystals, field of view 11 mm.**

Figure 16. **Pearlescent white micaceous crystals of valentinite with yellow bindheimite, field of view 12 mm.**

Figure 17. **Large crystals of stibiconite pseudomorphs after stibnite in quartz cavity, 11 cm.**

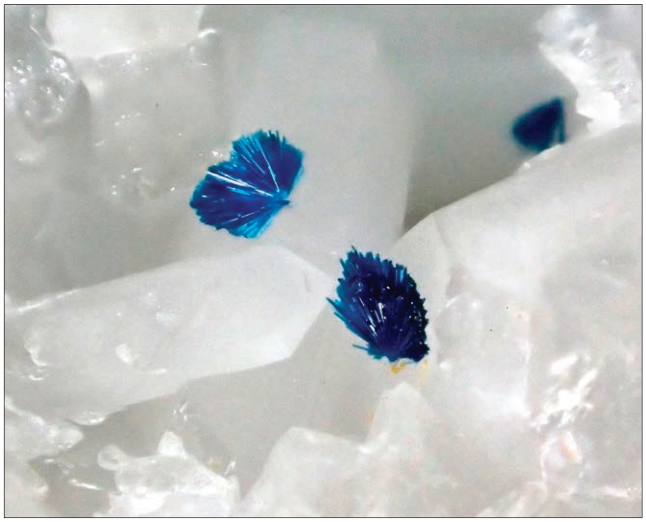

Figure 18. **Multiple acicular sprays of deep blue connellite crystals in small pocket areas of massive quartz, field of view 8 mm.**

Figure 19. **Orange iron-stained rhombohedral calcite crystals in quartz cavity, field of view 1 cm.**

Mineral Collecting History

In 2009 John Magnasco and Stan Bogosian along with author DE led a Bay Area Mineralogists (BAM) mineral collecting field trip to Pershing County, Nevada, to explore several defunct mining localities located on Bureau of Land Management (BLM) public lands. The Red Bird mine and the Hollywood mine were both scheduled stops. While exploring the dirt roads near the Hollywood mine, we noticed three mounds of rock material oddly piled up near the intersection of an unmarked offshoot dirt road. At the time, we figured the only reason this material might have been consolidated at this road junction was for high-grade ore being processed for antimony and mercury. For unspecified reasons, mining operations in the immediate area evidently came to an abrupt halt, and the material was left behind and abandoned. During this 2009 trip, author DE collected a flat of fibrous yellow minerals from the open cavities and fractures of massive quartz to be analyzed later. Some of these were analyzed in 2019 using X-ray diffraction analysis (XRD) and were confirmed to be bindheimite, a secondary mineral phase of oxyplumboroméite occurring in the oxidized zones of antimony-bearing lead deposits. Bindheimite is not unusual to find here because there were several major antimony mines operating in the region during the early twentieth century.

Figure 20. **Calcite crystal coated with crusts of red cinnabar and red metastibnite on yellow bindheimite needle crystals, field of view 1.2 mm.**

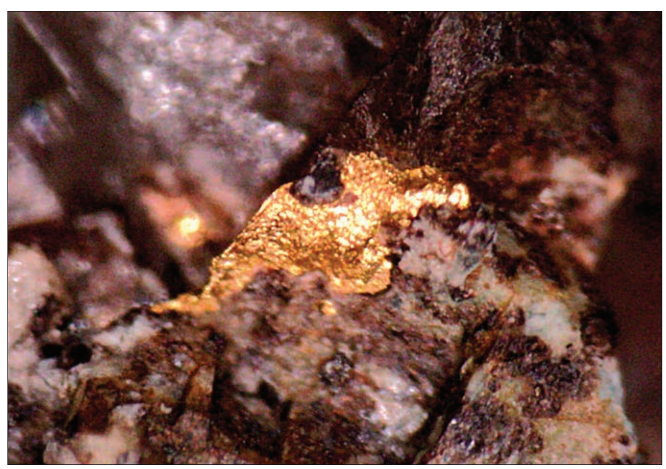

Figure 21. **Native gold on quartz crystal in an open cavity in massive quartz, field of view 2 mm.**

Figure 22. **White aragonite coating yellow bindheimite on quartz crystals, field of view 13 mm.**

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Figure 23. **Yellow sulfur crystal with quartz on orange iron-stained matrix, field of view 3 mm. Paul Favia specimen and photo.**

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Figure 24. **Green staining indicates evidence of secondary copper mineralization in massive quartz; yellow antimony oxide mineralization is also present, field of view 38 cm.**

Over the course of several return visits to the Culver mine during 2022–2024, we collected a wide variety of well-crystallized, colorful antimony secondary minerals in addition to several other species, including cinnabar, native gold, tetrahedrite, malachite, and a relatively rare secondary copper mineral, connellite (figs. 3, 18). Examples of these minerals are shown here with descriptions along with some of the associated gangue minerals. With the aid of scientific analysis methods including XRD, scanning electron microscopy coupled with energy dispersive spectroscopy (SEM-EDS), and some diligent mining history research, the variety of mineral species found at this small, obscure mine demonstrates that it is still possible to collect interesting minerals at localities that have been forgotten or considered no longer economically productive.

Antimony and Mercury Species Collected

In the Grass Valley Formation, which is a highly fractured argillite formation, antimony minerals are found as crystals, pods, and disseminated grains in the quartz veins and the

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Figure 25. **Chatoyant green fibrous malachite in quartz cavity, field of view 4 mm.**

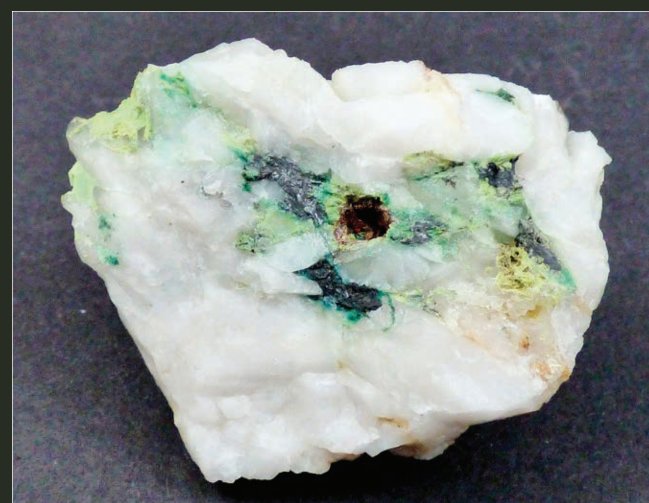

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Figure 26. **Black massive tetrahedrite with copper and antimony secondary minerals in quartz, 5 cm.**

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Figure 27. **Black tetrahedrite in quartz with green malachite, field of view 1.5 cm.**

host sandstone. Stibnite is the major antimony mineral occurring in the mines with several species of antimony oxides associated, including bindheimite, a common lead antimonate. Most of the antimony ore came from the Hollywood mine, with numerous other smaller operations contributing to the total district production (Lawrence 1963).

Hydrothermal type ore deposits often contain additional base metals and accessory gangue minerals. We found additional species at the Culver mine including copper secondary minerals, native gold, and native sulfur.

Some Final Comments and Observations on Nevada's Mines and Minerals

The Culver mine is a typical example of the hundreds, if not thousands, of smaller, historic mines and prospects located on public BLM lands scattered across the state of Nevada. In the Western United States, we are fortunate to still have much of this area to explore and collect a wide variety of mineral species; however, it takes diligent research, well-thought-out planning, and awareness of private property rights before visiting these areas. All old mines are dangerous to some degree. The Basin and Range region of Nevada is weather-diverse with extremes on both ends of the scale: temperatures below freezing in winter and often above 120°F in summer with shade and clean water being scarce commodities.

Economic metal mining has always been a large part of the history of Pershing County and for much of Nevada. It remains so today with new exploration continuing for potential sites that can provide the traditional commodity metals of gold, silver, and copper as well new rare-earth deposits.

ACKNOWLEDGMENTS

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