Virginia Department of Mines Minerals and Energy

VIRGINIA MINERALS

Published by the
Virginia Division of Mineral Resources
Charlottesville, Virginia

VOL. 50 MAY 2007 NO. 2

THE ALLAH COOPER (VALCOOPER) MINE REVISITED

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The Allah Cooper (Ali Cooper, Valcooper, Alley Cooper) mine is located in Louisa County, Virginia approximately 5.5 miles northeast of the town of Mineral on Blackwater Branch, a tributary of Contrary Creek (Figure 1).

Prior to 1907, the Allah Cooper mine was operated for gold and silver, and it was reported that the silver content was unusually large. (Watson, 1907, p. 558). Boyd-Smith Mines Incorporated acquired the mine in 1915 and operated it for lead and zinc. That same year a 50-ton-per-day gravity concentrating mill was erected on the property. The Virginia Lead and Zinc Corporation, "Valzinco," acquired the Allah Cooper mine in 1916. (Sweet and Trimble, 1983, p. 119-120). Headquarters for the corporation were in Richmond, Virginia. The name of the mine was changed from Allah Cooper to Valcooper and the mine continued to operate for lead and zinc from December 1, 1916 to January 1, 1918.

According to Valzinco corporate records covering a period beginning on January 1, 1916

Figure 1. Location of the Allah Cooper (Valcooper) mine.

and ending on January 1, 1918, the Valcooper mine produced approximately 6,000 tons of ore with an average lead content of 4 percent and an average zinc content of 10 percent. Previously it had been believed that 1916 was the final year of production for the Valcooper mine (Sweet and Trimble, 1983, p.120). When the Valcooper mine was closed, ore from the Valzinco mine located in Spotsylvania County, Virginia was transported to the Valcooper mill to be processed. The ore was at first transported by wagons and later by the Mineral Belt Railway.

Description of the Deposit

The country rock is a quartz-sericite schist with foliations that have a regional strike of north 30-35 degrees east and dip steeply to the southeast. The vein is thought to be a sulfide filling of a fracture zone that also has a northeast strike and a southeast dip, and cuts the schistosity at a sharp angle (Sweet and Trimble, 1983, p. 120).

Underground Workings

The Valcooper mine had a total of 1,823 linear feet of underground workings, consisting of an inclined shaft 382 feet deep, with 1,030 feet of drifts and 340 feet of cross cuts. Raises accounted for an additional 40 linear feet, winzes totaled 31 feet. The tunnel maps (Figures 2 and 3) give a more complete picture of the underground workings of the Valcooper mine as it appeared in 1918.

Mill Details

The Valcooper mill was a concentrating plant with a dry crushing department, which by means of a crusher, rolls, and trommels reduced the mine-run ore size to one-eighth of an inch. After being crushed, the ore was transported by an elevator to a storage bin above the concentrator building. From the storage bin, the ore was then delivered by traveling belt feeders to a declining cone, which separated out the bulk of the primary slime to go to the slime concentrators, and the course product was sent to a roughing table. The table separated the high-grade ore containing the larger part of the sulfides from the more silicious material. Each of these products was ground separately in three-foot-diameter Harding Ball Mills, and separately classified and treated the ore on James sand and slime tables. The resulting products, lead concentrates and zinc concentrates, averaged 64 percent lead with 7.6 percent zinc in the lead and 32 percent zinc with 5.5 percent lead in the zinc product. The fine tailings from the gravity concentrating plant were sent to a Dorr thickener and then on to an agitation flotation machine. Then the froth concentrate product was sent to a grading table where it was separated into a zinc concentrate and a lead concentrate. Although the mill was rated at 50 tons per day, company records state that no more than 40 tons per day could be handled efficiently. This diminished capacity resulted in increased operating costs which totaled $6.50 per ton.

Surface Works

The Valcooper mine consisted of more than just the underground workings and a processing plant. Most mines of the period were self sufficient, the mine superintendent's quarters were on the mine property as was a company store and even dwellings for some of the employees. The mine also had a blacksmith's shop on the premises where repairs were effected on machinery, tools, and almost anything else that needed repair. The surface works map (Figure 4) provides valuable insight into just what a mine of 1918 looked like. Figure 5 shows the Valcooper buildings as they appeared in 1916. The figure shows the inclined track way on which a skip transported the ore from the shaft to the ore bin. The three story building with the ore bin and track way attached contained the crushing machinery. The building to the right and below the crushing plant is the mill building which housed the machinery used to processes the ore after it was crushed.

Mine Owned Railroad

The Mineral Belt Railway was a standard gauge railroad 10.5 miles long and connect-

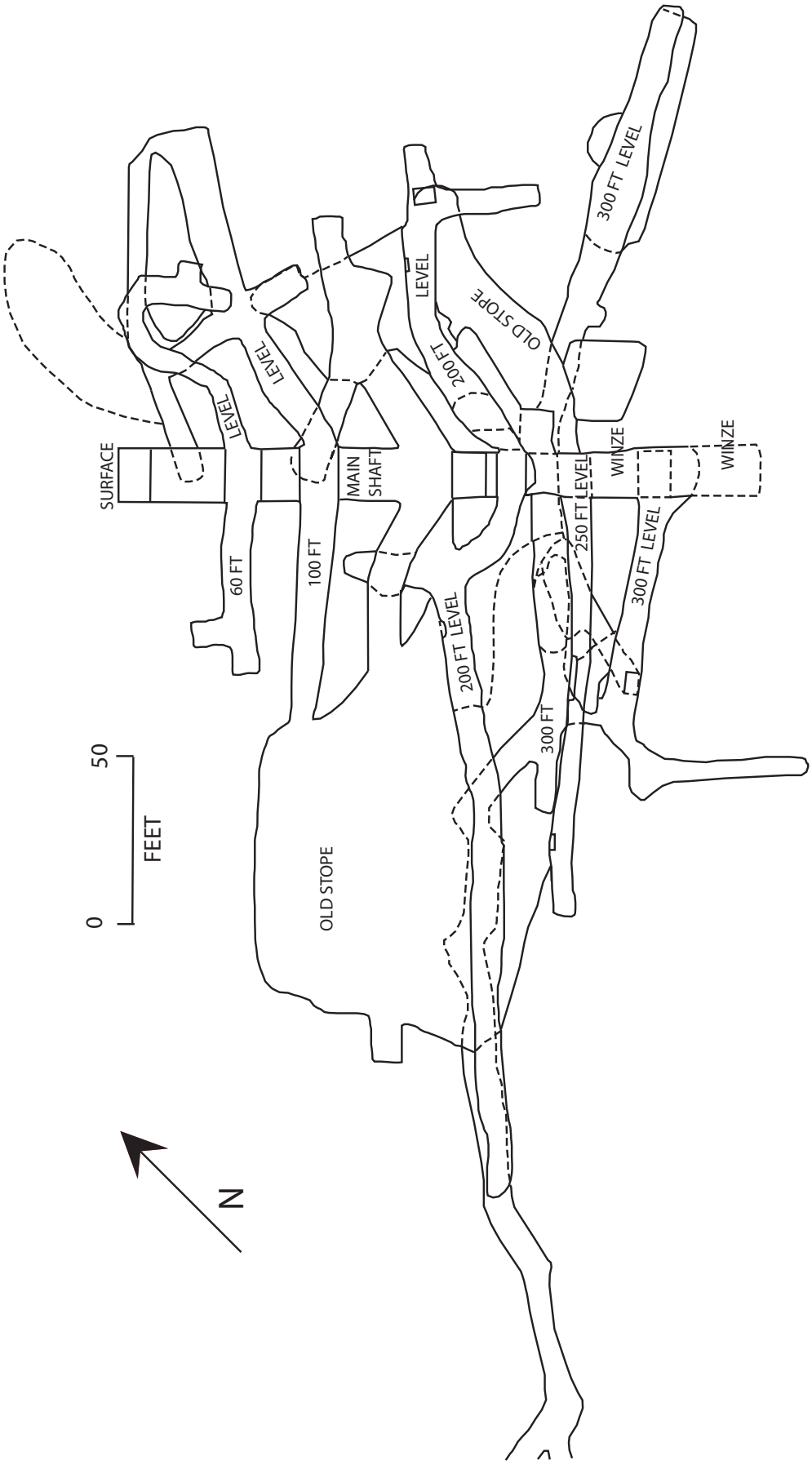

Figure 2. Plan view of the inclined shaft and drifts in the Allah Cooper mine. The scale was approximated from horizontal features in Figure 3, and north was determined by assuming that the inclined shaft followed dip of foliation.

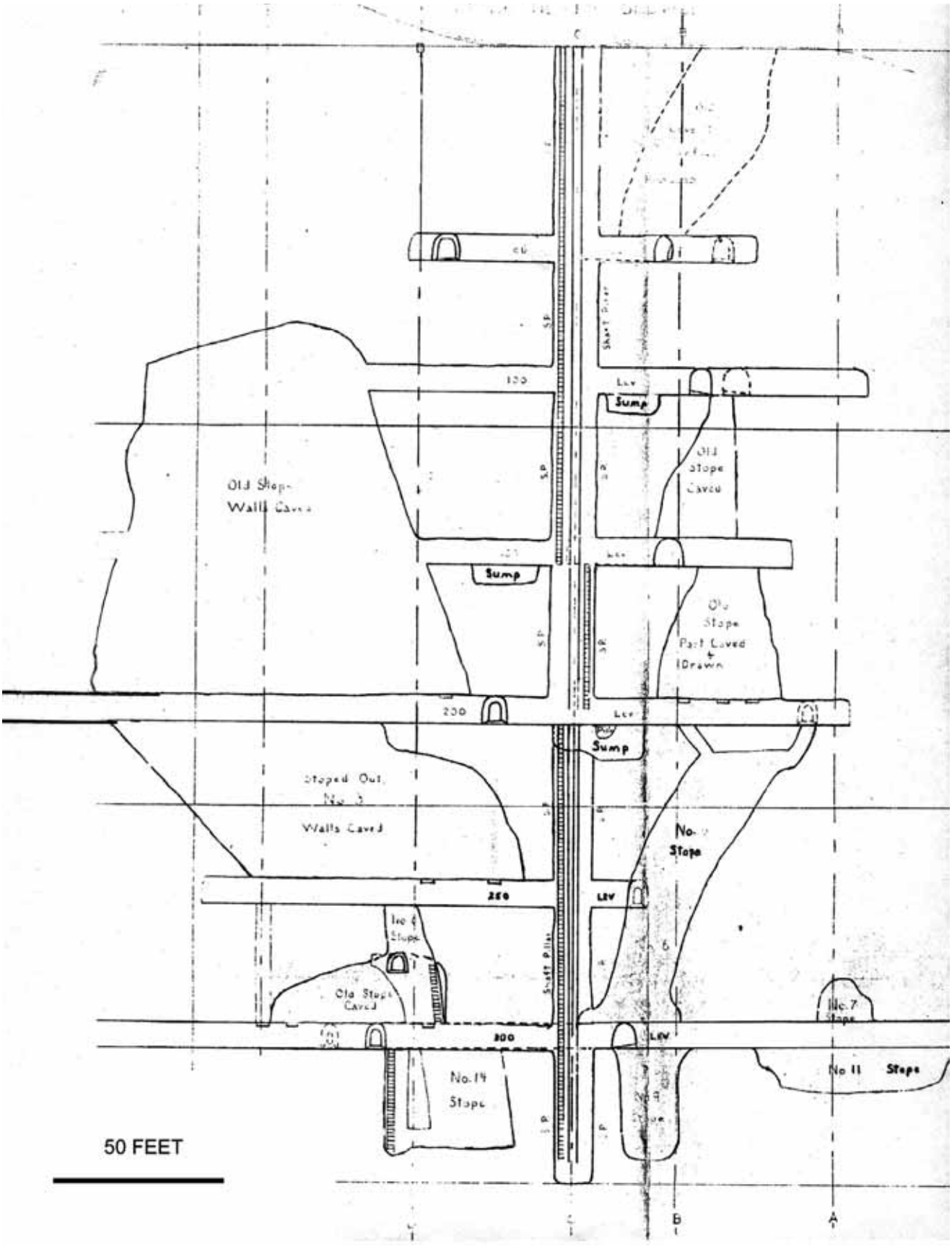

Figure 3. Cross sectional view of the Allah Cooper mine.

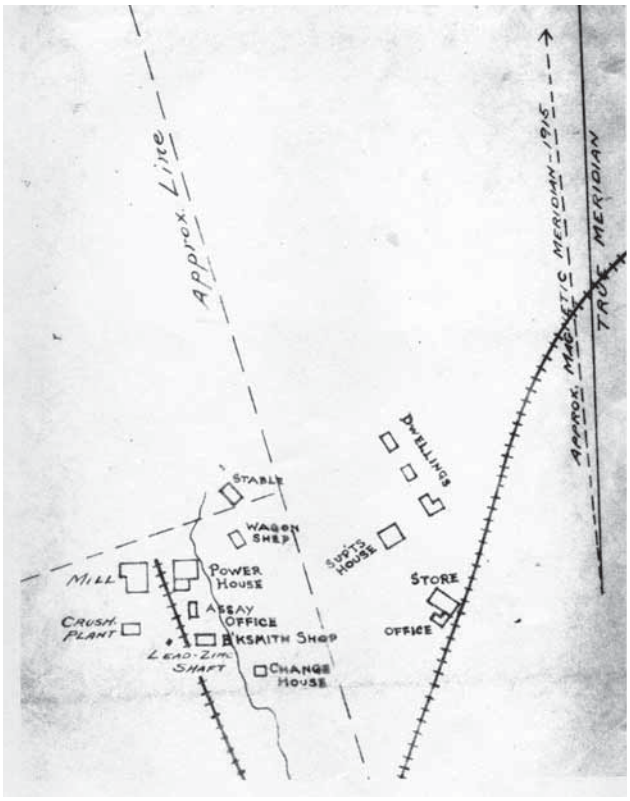

Figure 4. Surface works map the Valcooper buildings as they appeared in 1918. The inclined track way on which a skip transported the ore from the shaft to the ore bin is shown next to the mill.

Figure 5. The Allah Cooper buildings as they appeared in 1916. The inclined track way transported the ore from the shaft to the ore bin.

ed the Valzinco mine (Holladay Tract) and the Valcooper mine, with the Chesapeake and Ohio Railway at the Sulphur mine. From the Sulphur mine, a spur then connected to the main line of the Chesapeake and Ohio Railway at Mineral, Virginia. The rolling stock consisted of one 50-ton locomotive, two ore gondolas, and two flat cars. The appraised value of the railroad alone was $132,000.00 (Figure 6).

The Valcooper Today

The mill buildings were destroyed by fire in 1923 (Sweet and Trimble, 1983, p. 120), and very little remains of the Valcooper mine today. A few railroad ties are all that remain of the spur, and only concrete foundations stand as a reminder of the mill building (Figure 7). A housing development is planned for the site in the very near future.

Minerals Present

Examination of the mine dumps in January, 2003, revealed sphalerite, linarite, galena, gold, chalcopyrite, pyrite, pyromorphite, pyrophyllite, and wulfenite. The pyromorphite, pyrophyllite and wulfenite had not previously been found at either this locality or in Louisa County.

The pyromorphite, $Pb_5(PO_4,AsO_4)3Cl$, (lead chlorophosphate-arsenate) appears as a coating and in crystal form. The most perfect crystals are found on a limonite matrix. The coating and massive forms seem to be restricted to formation on the quartz matrix. The crystals range in size from microscopic pale green clusters and single crystals, to dark green clusters with single crystals reaching 3mm in length. There are occasions where masses of near perfect crystals are formed on iron-stained, sugary quartz (Figure 8).

Wulfenite, $PbMoO_4$, (lead molybdate) was found on a limonite matrix, which frequently is a coating on quartz and the crystals range from microscopic to approximately 2 mm The crystals are a tabular form with some specimens having 20 or more small crystals. They are found with and without pyromorphite and some twinning has been observed. The color in some crystals is a vermillion red and ranges to a light orange in others. This mineral is very interesting to collectors due to its range of colors, crystal shape

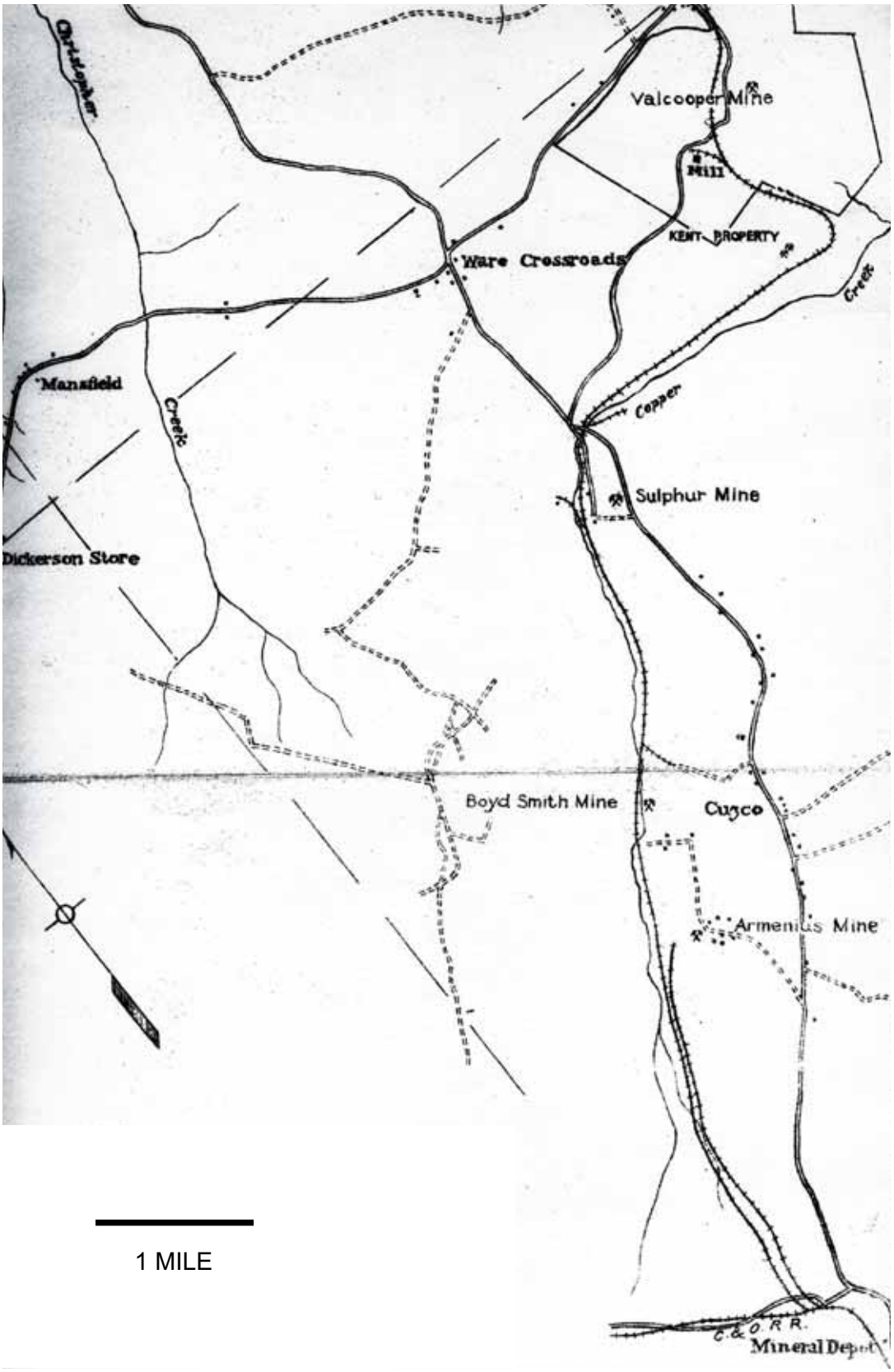

Figure 6. The Mineral Belt Railway connected the Valzinco and Valcooper mines with the Chesapeake and Ohio Railway at the Sulphur mine. That spur connected with the main line of the Chesapeake and Ohio Railway at Mineral.

Figure 7. Concrete foundations are all that remain of the Allah Cooper mill building.

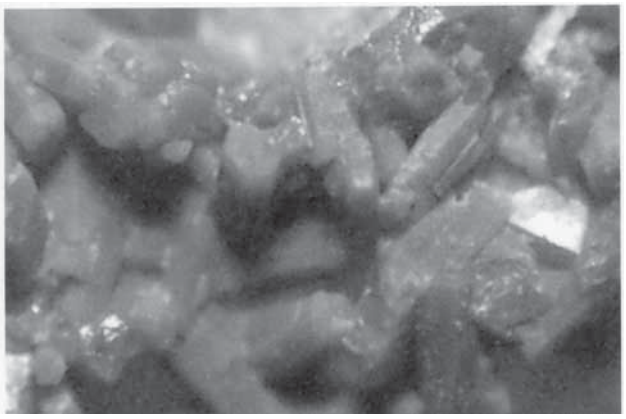

Figure 8. Pyromorphite, $Pb_5(PO_4,AsO_4)3Cl$, appears as a coating and in crystal form. The most perfect crystals are found on a limonite matrix (10X magnification).

and relative rarity (Figure 9). Wulfenite is named after its discoverer Austrian mineralogist Franz Xavier Wulfen.

Pyrophyllite, $AlSi_2O_5OH$, (hydrous aluminum silicate) crystals were found as singles and clusters up to 3 mm on iron stained quartz matrix (Figure 10). These crystals are a rare occurrence and X-ray analysis was employed to identify it. The words are Greek , (pyro) for fire and (phyllite) for leaf. There is a theory which suggests that some of the dump material at the Valcooper mine is from the Valzinco mine in Spotsylvania County, Virginia. According to R. V. Dietrich (1990), however, none of the new minerals from this locality have been found at the Valzinco mine.

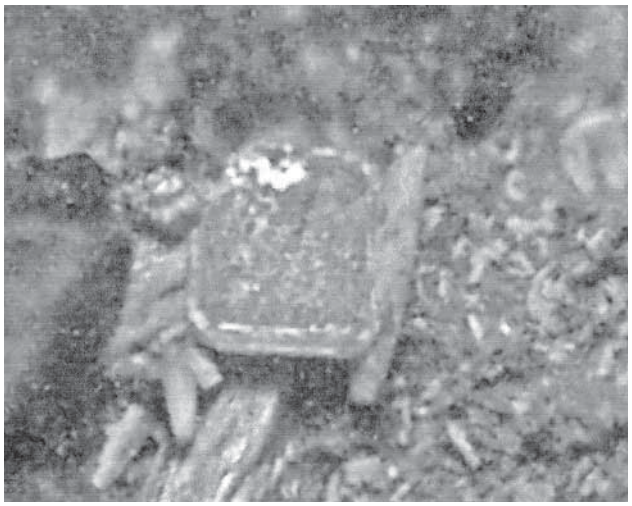

Figure 9. Wulfenite, $PbMoO_4$, found on a limonite matrix (20X magnification).

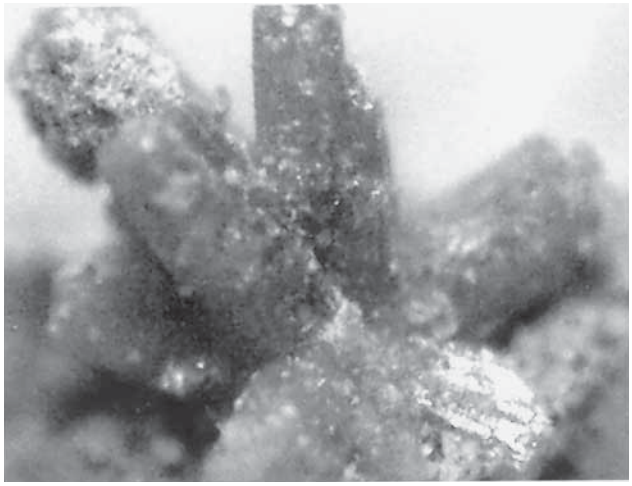

Figure 10. Pyrophyllite, $AlSi_2O_5OH$, crystal cluster found on iron stained quartz matrix (20X magnification).

References

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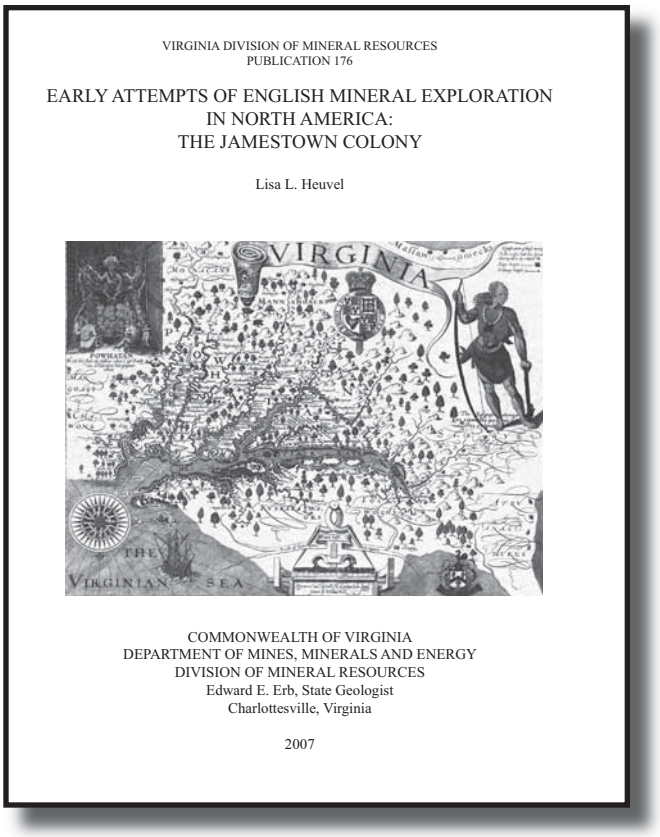

PUBLICATION 176 RELEASED

Modern accounts of early New World exploration and colonization often overlook significant geologic and technical foundations of mineral exploration. These accounts, instead, focus on the English colonists' overall failure to find gold and subsequent success at growing and exporting tobacco in Virginia. The 1607 Jamestown Colony was one of several English investment attempts to discover and exploit precious metals, gems, non-precious metallic ore, and medicinal plant and clay commodities in modern-day North Carolina, Virginia, and Maine. Plans for expeditions and colonization regularly included "mineral men" (prospectors), assayers, miners, and goldsmiths. Familiar with period technology or artisanship, they were as well prepared to explore for minerals as the state of Old World and New World knowledge allowed at that time.

Publication 176, *Early Attempts of English Mineral Exploration in North America: The Jamestown Colony* is available for $6.00 in the Division's sales office in Charlottesville or by phone (434-951-6341).