TEMPLES OF GALENA

Even though rockhounds and geologists know that unexpected wonderful things can exist just below their feet, they can still be amazed. Such amazement came upon me as I was reading a 1907 book by H. Foster Bain about the old lead-zinc mines in the Upper Mississippi Valley mining district.

This district is located where Wisconsin, Iowa and Illinois meet. There a thick section of limestones and sandstones were soaked with hot watery (or "hydrothermal") fluids that moved through channel ways, cracks and crevices. These fluids formed rich deposits characterized by coarse crystals of galena, sphalerite, calcite and marcasite. The most thorough description of these deposits is a U.S. Geological Survey Professional Paper by Heyl, Agnew, Lyons and Behre in 1959. Older papers on these deposits, though, are filled with more of the fascinating mining lore. It is here that one learns of the spectacular "ore caves" that were sometimes encountered. Limestone is well known for its caves. Hydrothermal fluids could fill previously formed caves or even dissolve out new ones. The fluids could then fill them with spectacular crystals of unusual minerals.

Bain describes an ore cave he saw when first studying an active mine called the "California Mine" in the Sand Prairie district of northwestern Illinois. not far from the town of Galena. The mine had been worked for about 50 years before Shaft #3 hit the ore cave. It was initially filled with water, but had been partly pumped out when Bain examined it. The cave was 12 feet high by 12 feet wide. The walls were encrusted with large pyrite and marcasite crystals. Galena and sphalerite crystals grew on these as “irregular crystal aggregates resembling nothing so much as toadstools.”

Bain cites an even more amazing ore cave described first by J.D. Whitney of the Iowa Geological Survey. This cave was in the Levans Range, within the city limits of Dubuque Iowa. By the time the cave was first seen in 1850, about 1,000 tons of ore had already been removed. Whitney referred to it as a “leaden temple” – a high crevice filled with galena. In Whitney's own words:

“The solid mineral projected from this crevice downward a foot in a sheet ... 8 to 10 " thick and 25 to 50 feet long, spreading fan-like as it descended, A part of the way up, there were three sheets, two thick and heavy ones with coarse irregular surfaces, composed of aggregated cubes 2 to 10" on a side. And one long thin sheet the whole covered with oxide (carbonate?) and having in consequence a pure white color ... it was the most rich and beautiful object I ever saw of a mineral kind.”

The oxide or carbonate of lead Whitney refers to is likely a coating of cerussite and anglesite, minerals which form during oxidation of galena. The cave was subsequently completely mined out. Slabs of pure galena 2 feet thick were not uncommon. The mud at the bottom of the cave was full of chunks of ore that had fallen which weighed as much as 23.000 lbs. The cave extended laterally 300 feet. and was up to 25 feet high. Most if not all of this remarkable material went to the smelter.

Such ore caves were not common. Hundreds of miners scouring the hills in the region for decades undoubtedly found the ones that were open to the surface. However, many of these ore caves are blind, and pinch off 5 or 10 or 50 feet short of the surface. Perhaps one of these days

someone blasting in a quarry or making a roadcut or a building foundation will hit another of these temples of galena and amaze us all anew with its beauty.

-Dr. Bill Cordua, University of Wisconsin-River Falls

References: Bain, H. Foster 1907. "Zinc and Lead Deposits of the Upper Mississippi Valley", Wisconsin Geological and Natural History Survey, 19, Economic Series #2, 155 p.

Hey!, H.V., Agnew A.F., Lyons, E..J. and C. H. Behr. Jr. , 1959, The Geology of the Upper Mississippi Valley Zinc-Lead District- 310 U.S. Geological Survey Professional Paper 309.