ART. XLIV.—*On Barite crystals from the Last Chance Mine, Morgan County, Missouri; and on Göthite from Adair County, Missouri; by G. C. BROADHEAD.*

1. *Barite from Morgan County, Missouri.*

THE rocks of the barite locality in Morgan County, Missouri, are of the age of the Second Magnesian Limestone. A shaft has been sunk in a spring through masses of tumbled rock displaying what seemed, in Missouri miners' parlance, to be a "circle" of about twenty feet diameter. This "circle" was found to be filled with fractured masses of limestone, sandstone and clay for forty feet in depth, or to the bottom of the shaft when I visited it. These masses of rock were often found studded over with beautiful crystals of barite. The galenite was also often covered with such crystals. In some cases a thin coating of transparent barite covered the rock to which the crystals adhered, but they were often seen loosely adhering to the naked rock.

The form of these crystals is different from any heretofore found in Missouri. They are elongated into prismatic forms ($\frac{1}{2}\bar{2}$) in the direction of the macrodiagonal axis and are attached to the rock by one of its extremities. The development of the basal plane gives them a flattened appearance. The free extremity of the crystals is gradually sharpened off to a thin edge through the presence of very low macrodome. This is so irregularly developed, however, as not to admit of trustworthy measurements, but seems to have the symbol $\frac{1}{2}\bar{2}$. The central portion of all the crystals toward the attached extremity is perfectly transparent. This clear portion has a rhombic form corresponding to the fundamental (cleavage) prism, and is

very sharply defined, the remainder of the crystals being of an opaque milky white.

There being a spring of water in the mine, the water may be sometimes charged with an excess of mineral solutions. The lead has probably been deposited from an aqueous solution and the barite from similar and more recent solutions. The waters also seem to have subsequently held iron oxide in solution as some of the crystals of barite are coated with it.

A crystal in my possession from the Cordray mines, but probably from same mine as the above, possesses similar characteristics. It is of rhombic form, about two inches long and a half inch thick; the edges are bevelled by the plains $\frac{1}{2}$ - $\frac{1}{2}$ which gave on measurement the angle $77^{\circ} 40'$. It has a border a half inch wide of white opaque barite, the outer angle sharp, inner angle truncated, and the remainder is clear mineral, which corresponds in shape to the cleavage prism; the direction of the cleavage is also indicated by cracks across the crystal. The white portion of this crystal would seem to indicate alteration, but that can hardly be the cause of the similar appearance of the crystals from the Last Chance mine.

2. *On the Göthite from Adair County, Missouri.*

The Coal measures, it is well known, often contain, within the thicker shale beds, interstratified beds of clay ironstone, sometimes in connected layers, at other times in concretionary masses, occurring along a marked horizon. These concretions are often reticulated by calcite veins, one system in concentric lines, the other crossing them; they are generally termed septaria.

In 1873, while examining the structure of the formations on Chariton River, Adair County, Missouri, I broke open a number of the concretionary masses which were reticulated by veins of calcite from a quarter to half an inch wide, occasionally widening into small cavities one-eighth to one-half an inch high, lined with calcite crystals reposing on the more compact calcite of the vein. Upon and sometimes interpenetrating these crystals are small slender acicular crystals of black göthite, generally not more than an eighth of an inch, but sometimes as much as three-fourths of an inch, in length. The göthite is generally aggregated in bundles at the base of the calcite from which they radiate. Sometimes a single crystal will shoot directly through a calcite crystal. Sometimes also, a single point of a quartz crystal will be seen penetrated in various directions by the göthite. The calcite, often, has its angles bevelled or rounded, and they were sometimes colored red on the surface as was also a little of the göthite. Minute velvety balls of göthite not larger than the one-thirty-second of an inch were also found reposing on the calcite.

Pleasant Hill, Mo., March, 1877.