

obtained. These were examined on the goniometer and all showed the same characteristic habit, but only one, which was about one millimetre in diameter, gave fairly good reflections. This one was measured as accurately as possible. The best readings for the side faces gave values of $59^{\circ} 16'$, $60^{\circ} 05'$ and $59^{\circ} 10'$ for the outer angles between these faces, which agree closely with the values given by Penfield ($60^{\circ} 02'$) and Goldschmidt ($60^{\circ} 01'$) for the prism $m : m$. The base, as nearly as could be ascertained, was at 96° to the side faces. The vicinal faces, indicated in the drawing (Fig. 29), gave a continuous hazy band of light in which no definite points could be observed, from about 16° to about 14° from the base. This crystal had been attached by one side, and the lower half of the crystal showed exactly the same arrangement of vicinal faces as the upper, but because of the fragile nature of the crystal, no attempt was made to measure the vicinal faces on the lower half. The side faces which correspond to the prism m (110) are slightly concave, causing distortion of the signals, and a fracture parallel to the base divides the crystal

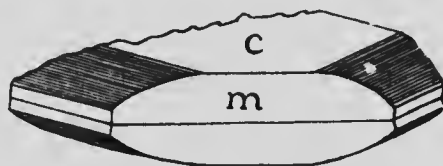


Fig. 29. Polybasite, O'Brien mine.

symmetrically in two equal parts, thus displaying perfect basal cleavage. This fracture was doubtless developed by cutting the argentite from around the crystal. Considered along with the re-entrant character of the prism faces, it suggests a twinning parallel to the base.

Polybasite has been considered by different authors to be either rhombic or monoclinic with twinning plane m , and probably also with a twinning like the micas, parallel to the base. Penfield, who is responsible for much of the later work on polybasite, considers it monoclinic, on both crystallographic and optical grounds.

Using the high power of the microscope, small, very thin particles of these crystals appear translucent and of a bright cherry red colour. This character distinguishes polybasite from the corresponding arsenic compound—pearceite, which is said to be "opaque even in the thinnest splinters."²² The crystals are very brittle and rather soft. $H = 2.5$ to 3. Colour and streak black, lustre metallic, cleavage basal.

In order to further confirm the identification of these crystals as polybasite, the broken fragments obtained in trying to remove the crystals from the argentite were combined with those crystals which had proved useless for measurement and about 20 milligrams of powder was thus collected for analysis. Weighings were made only to the usual four places of decimals on a good balance and the analysis was necessarily at the same time both qualitative and quantitative, so that no great accuracy was attained. The results, however, confirm the decision, reached by means of crystallographic methods, that the mineral is polybasite.

²² Hintze—Handbuch der Mineralogie.