EPIDOTE

$Ca_2(Fe^{3+},Al)_3(SiO_4)_3(OH)$

(see also clinozoisite)

An abundant and common mineral either of hydrothermal or metamorphic origin. In various greenschists with chlorite and actinolite; in silicate marbles; in veins cutting granites and metamorphic rocks such as amphibolite; and in vesicles in basaltic rocks. In the native copper deposits it is abundant in both veins and basaltic lodes and locally also in the Calumet and Hecla Conglomerate. It is especially abundant in the Evergreen and succeeding lodes of that series and in the Isle Royale lode (Butler and Burbank, 1929). Epidote forms a solid solution series with clinozoisite, and chemical analyses of Copper Country epidotes, though iron dominant, show a considerable compositional range between these two species (Stoiber and Davidson, 1959; Livnat, 1983). "Pistacite" is an obsolete name for green epidote-clinozoisite series minerals. Northern and Southern Peninsulas.

Gratiot County: Near Ithaca, T10N, R2W in Michigan Basin Deep Drill Hole in both altered basalt-gabbro units (McCallister et al., 1978).

Houghton County: **1.** *Calumet and Hecla mines*, Osceola lode: With copper in fractures and amygdules. Locally, the rock above the footwall is almost completely epidotized (Weege and Schillinger, 1962). **2.** *Centennial mine*. **3.** *Wolverine mine*: Crystals in cavities with copper, calcite, quartz, and microcline (Mihelcic, 1954). **4.** Baltic mine: Associated with copper sulfides, laumontite, and ankerite and also occurs as a very fine-grained massive epidote-quartz rock. **5.** Painesdale mine. **6.** Trimountain mine. **7.** Isle Royale mine: Associated with anhydrite and muscovite ("sericite"). **8.** *Osceola mine*: Fine microcrystals from the Number 10 shaft (Falster, 1978). **9.** Found in the Jacobsville Sandstone as a heavy detrital species (Denning, 1949). **10.** Champion mine, Painesdale. **11.** *Laurium mine*, Osceola. **12.** Tamarack mine, Calumet.

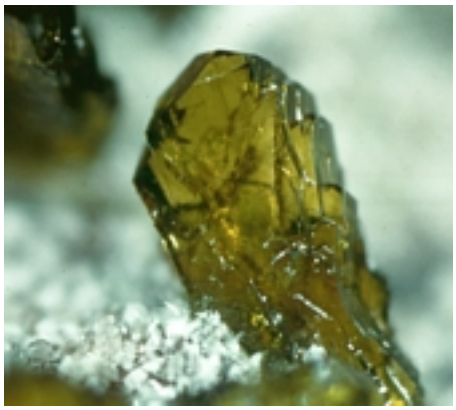

Figure 75: A 1.5 mm epidote crystal from the Osceola mine, Calumet, Houghton County. Dan Behnke specimen and photograph.

Keweenaw County: **1.** Mohawk mine. **2.** Seneca mines, Numbers 1 and 2: In fissure veins (Stoiber and Davidson, 1959). **3.** Ojibway mine. **4.** Along shore near Epidote Lake on Isle Royale: Massive, pale green band (Dustin, 1931). **5.** Jacobsville Sandstone: An accessory detrital species (Denning, 1949). **6.** Keweenawan lava flows in general: Widespread as a replacement mineral of plagioclase and pyroxene in both basalts and andesites, particularly in the pegmatoidal facies, and as crystals in amygdules (Cornwall, 1951b). **7.** Clark mine, Copper Harbor. **8.** Iroquois mine, Mohawk. **9.** *Cliff mine*: Superb crystals up to 25 mm long in vesicles with calcite or pumpellyite. One crystal, elongated on [010], showed forms {001}, {010}, {100}, {011}, {301}, {332}, {\s\up6(–13}, {\s\up6(–11}, {315}, {612}, {\s\up6(–13} and {\s\up6(–11} (Williams, 1966). **10.** South of Eagle Harbor in drill core D-54-1712, analyzed by Jolly and Smith (1972).

Marquette County: **1.** Marquette: a. North 6th Avenue: In parallel bands of epidote-clinozoisite along contact of a greenstone (Ayres and Higgins, 1939). b. Sugar Loaf Mountain, a few kilometers NW of Marquette: In veins in granite (Poindexter et al., 1939; Hawke, 1976). c. Between U.S. Coast Guard Lighthouse and Granite Point: In "diorite."

(Brooks, 1873). d. Dead River bridge on Lakeshore Drive north of Marquette: Veinlets in granite gneiss Hawke, 1976). e. Southwest corner of Lighthouse Point. f. On Ohio Street, east of Pine Street. g. East side of Middle Island Point: In veins in granite. **2.** Between Negaunee and Teal Lake: Small, imperfect crystals in quartzose veins in a chlorite schist and hornblende gneiss (Brooks, 1873). **3.** Near headwaters of Big Garlic River on M-35: In veins in amphibole schist.

Ontonagon County: White Pine: An accessory heavy mineral in the Nonesuch Shale (Doane, 1956).

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