Michigan's State Gemstone

pumpellyite

The State Gemstone is chlorastrolite, a variety of the mineral pumpellyite. It also goes by the common name of greenstone or Isle Royal greenstone. The term greenstone can be confusing in that it is both a rock and a mineral term.

Chlorastrolite is found chiefly as small rounded beach pebbles showing a finely radiating or stellated pattern of slender crystals. The masses, colored pink to green to black or mottled, are derived from nodular vesicle fillings in the amygdaloidal basalts of the copper country and were formerly found in relative abundance, particularly on Isle Royale beaches. Chlorastrolite was named the "Official State Gem" of Michigan by the Seventy-Sixth Legislature (Act 56, PA 1972, effective March 30, 1973).

Pumpellyite is closely related to the epidote family. It is widespread low-grade metamorphic mineral (particularly in glaucophane schists) and a hydrothermal mineral in altered mafic igneous rocks (like basalts, and diabases). Originally the mineral was described in 1901 by Murgoci under the name of lotrite from the southern Carpathian Mountains. The writer was enabled to examine the handwritten notes of his former Harvard professor, Charles H. Palache, who in 1920 made the first systematic study of the secondary minerals in the altered copper lodes for the Calumet and Hecla Copper Mining Company. Palache notes the widespread and abundant nature of a "green zoisite." Shortly after this initial study, Palache realized his green zoisite was not a zoisite but believed it to be a new mineral closely related to the zoisite-epidote family. Unfortunately he had not encountered Murgoci's (1901) description of lotrite. Palache submitted a manuscript to Calumet and Hecla describing the "new" mineral proposing to call it "kearsargeite." B. S. Butler didn't like the name and Palache changed the manuscript by crossing out kearsargeite and penciling in "pumpellyite," in honor of Raphael Pumpelly, a noted 19th century U.S. Geological Survey geologist who made many contributions to the knowledge and understanding of copper minerals and the copper deposits of the Keweenaw Peninsula. Chlorastrolite is now known to be a variety of pumpellyite. This was first verified by W. B. Griffiths at the University of Michigan in the late 1940's (personal communication) Previously, chlorastrolite had been considered 1) an independent species, 2) a variety of prehnite, or 3) a variety of thomsonite.

In general, pumpellyite is abundant in all the amygdaloidal lodes and in all fissures It is present but not abundant in the copper conglomerates and felsites It forms in vugs and, with quartz, has also replaced large volumes of the host rocks. It may occur in amygdules by itself, as needles in quartz, associated with chlorite, and in the same amygdules with epidote (from which it is not easily distinguished). Much of the pumpellyite is bluish-green in contrast to the epidote, which is yellow-green. Its most common occurrence is as a

replacement of rock in flow tops, yielding a hard, dense, greenish-gray to bluish-green lode material that makes up a large part of the mined parts of the Isle Royale amygdaloid (Butler and Burbank, 1929; Stoiber and Davidson, 1959).

Keweenawan pumpellyite has the following habits: 1) Radial Stout prismatic, euhedral crystals usually enclosed by quartz; in fragmental amygdaloidal flows and in veins. 2) Radial groups of needle-like crystals, either alone or with chlorite as amygdule fillings in "footy zones" of flows. 3) Felty masses of cryptocrystalline grains replacing parts of flow tops and ashy layers, with primary igneous textures preserved. (technical high formated text omitted)

Where to find Chlorastrolite

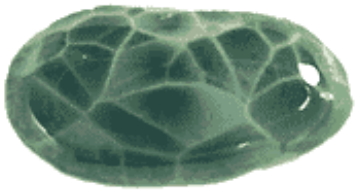
Houghton County:

- Calumet and Hecla mine
- Centennial mine
- LaSalle mine
- Baltic mine
- Quincy mine
- Hancock mine

polished and in matrix

Keweenaw County:

- Isle Royale mine
- Ahmeek mine
- Isle Royale
- Delaware mine
- Eagle River
- Central mine
- Copper Falls mines
- Iroquois mine, Mohawk
- Medora mine
- Northwestern mine
- Seneca (Gratiot) mine
- Clark mine, Copper Harbor
- South of Eagle Harbor



enlargement of a polished specimen