

DATOLITE



A borosilicate mineral whose most common occurrence is in vesicles of basaltic lavas; also present in some hydrothermal veins. In Michigan, datolite occurs only in the native copper deposits and their host rocks in the Northern Peninsula. It is present in most of the amygdaloids, especially in brecciated amygdaloidal lodes, including those found in the Pewabic, Osceola, Isle Royale, and Evergreen mines. It is also noted in some conglomerate lodes and fissure veins. Some superb datolite nodules also have been recovered from the floor of Lake Superior, and as pebbles on its beaches.

Michigan datolite occurs in two forms: nodules and crystals. Porcelaneous masses, or nodules, with botryoidal surfaces, range in size from a few millimeters to 30 centimeters in diameter. Commonly these are white, but the following colors also are known: pink, mauve, red, brown, yellow, orange, flesh, green, gray, and black. Some white and green types of datolite are translucent. Small specks of copper may appear as inclusions, commonly near the surface of the nodules. Inclusions of native silver and cuprite also have been noted. The color patterns may be mottled, gradationally zoned, or even dendritic. Some datolite may be fluorescent. Because of their unusual colors and compact crystalline nature, nodular datolite from the Keweenaw has been used in both the lapidary and fine arts (Robinson, 2000). A comprehensive reviews are given by Sukow (1991) and Rosemeyer (2003a, b).

Datolite crystals occur less commonly than the nodular form and are also found in both lodes and fissures. They are typically grayish white to pale green and may show complex forms. Some are pink, owing to minutely disseminated copper. Where the crystals are very small, they occur as loose, crumbly, granular aggregates (Butler and Burbank, 1929; Stoiber and Davidson, 1959; Zeitner, 1960; Dobell, 1966b).

Houghton County: 1. *Pewabic lode.* Nodules with centrally concentrated copper inclusions (Butler and Burbank, 1929). 2. *Franklin mine.* Abundant gray masses up to 30 cm across. Some

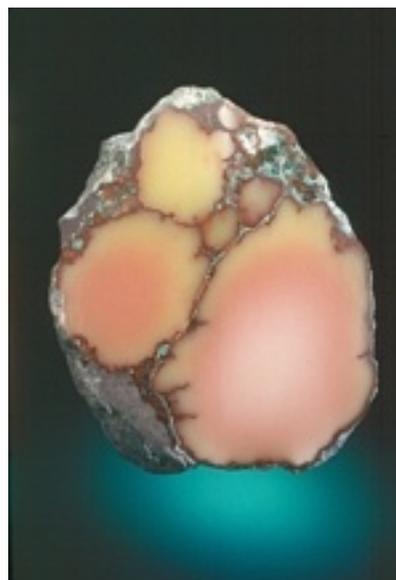


Figure 69: Datolite from the Mesnard mine, Hancock, Houghton County. 6.5 x 8 cm. A. E. Seaman Mineral Museum specimen No. DM 1489, Jeffrey Scovil photograph.

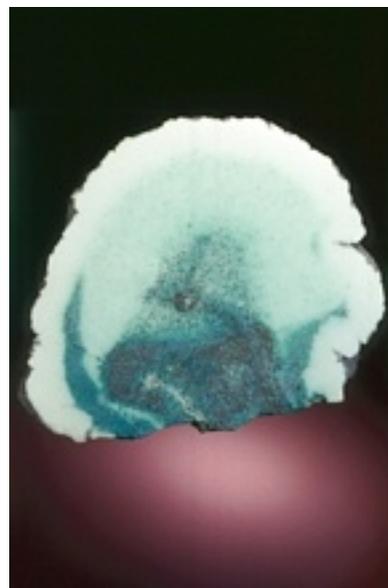


Figure 70: Datolite with oxidized native copper inclusions from the Phoenix mine, Phoenix, Keweenaw County. 7 x 9 cm. A. E. Seaman Mineral Museum specimen No. DM 23128, Jeffrey Scovil photograph.

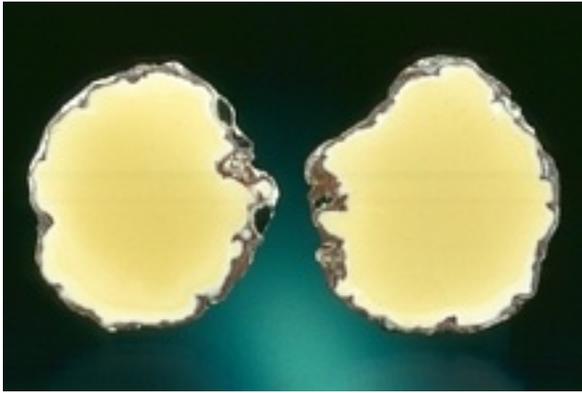


Figure 71: A rare, 3 cm yellow datolite nodule from Keweenaw Point, Keweenaw County. A. E. Seaman Mineral Museum specimen No. DM 21529, Jeffrey Scovil photograph.



Figure 72: A 4.5 cm aggregate of datolite crystals on prehnite from the Osceola mine, Calumet, Houghton County. A. E. Seaman Mineral Museum specimen No. JTR 1727, Jeffrey Scovil photograph.

have copper inclusions near their margins. **3.** Kearsarge lode: Locally. **4.** Osceola mine: Superb, lustrous pale green-to-colorless crystals to 5 cm associated with prehnite. Smaller crystals occur locally throughout the Osceola lode. **5.** Red Jacket crosscut of the Calumet and Hecla mine: Found as crystals from veins, a centimeter or longer, and with epidote in vugs. **6.** Quincy mine, Hancock. White masses with thin brown rims, yellowish veins, and brightly colored orange-red nodules. White masses of datolite with colorless acicular natrolite disseminated throughout were collected in the vicinity of the Quincy mine during highway construction (T. M. Bee, personal communication,

2000). **7.** Number 3 Tamarack mine. **8.** Mesnard mine: Pink, yellow-orange to red nodules. **9.** Centennial mine, No. 2 Shaft: In large white nodules stained green, due to oxidation of included copper. "Almost all of these datolites were recovered in 1962, from 48 level south. A zone from 4,800 to 6,900 feet south of the shaft was mined and all of the datolites were recovered from these stopes. In all about 700 pounds of datolites were recovered by miners. The largest was 12 inches in diameter and weighed 22 pounds. Quite a few were 3 to 6 inches in diameter, but most averaged from 1 to 2 inches. The datolites occurred in brownish-gray 'mud pockets,' and the miners would use a water hose to wash them out of the pockets. Some datolites were also found on 49 level south, but they did not contain much copper" (T. Rosemeyer, personal communication, 1999). **10.** Arcadian mine: Superb, large white, pink, red, and brown nodules. **11.** Isle Royale mine: White nodules with native copper inclusions, similar to those from the Centennial mine (Lane, 1911; Hawke, 1976). **12.** Winona mine: Nodules with inclusions of copper and enclosed in a thin copper film. **13.** Hancock mine, Hancock. **14.** Laurium mine, Osceola: Glassy, yellow, massive, filling amygdules in basalt. **15.** Wolverine mine, Kearsarge (14, 15, Morris, 1983). **16.** Old Colony mine: White nodules to 8 cm with prehnite.

Keweenaw County: **1.** a. Copper Falls mine: Abundant as both nodules (white, pink, and yellow, with inclusions of copper or silver) and complex crystals (gray-white to green) (Spiroff, 1938, 1964). Some porcelaneous masses with included euhedral copper crystals (Rominger, 1895). b. Owl Creek fissure, Copper Falls: Pink (due to inclusions), as breccia cement. **2.** Agency mine: pale yellow to white crystals; similar to Owl Creek fissure in occurrence. **3.** Delaware mine: As large pink, mauve, or red nodules with narrow white borders. **4.** Pennsylvania mine. **5.** Clark mine: As white nodules, and white to colorless glassy crystals showing complex combinations of forms. **6.** Central mine. **7.** North Cliff mine: Colorless, well-formed small crystals in prehnite-massive datolite rock with associated translucent adularia crystals (Moore and Beger, 1963). Well-crystallized datolite has been found in abundance both at the North Cliff mine and in many prospect pits to the south (Ossan, 1895; Williams, 1966). In some places the vein is composed almost entirely

of datolite. Colorless, complex crystals with associated prehnite, fluorapophyllite, analcime, and laumontite show the forms: {001}, {100}, {110}, {102}, {011}, {112}, $\{\bar{1}\bar{1}0\}$, {321}, and $\{\bar{1}\bar{1}0\}$ (Williams, 1966). **8.** Phoenix mine (Jackson, 1845): Transparent glassy datolite, some rose-colored owing to included copper scales, filling amygdules (Rominger, 1895). **9.** *Isle Royale*. a. Thomsonite Beach: As rare pebbles, white with some intergrown prehnite. b. SW ¼ section 10, T65N, R34W (Dustin, 1931). c. In the past, some of the largest and best nodules of datolite known were collected from the floor of Lake Superior in the vicinity of McGinty Cove (n.b.: Isle Royale is a National Park, and it is illegal to collect mineral specimens from its surface or beneath its waters). **10.** Ahmeek mine. **11.** *Keweenaw Point*: Mustard yellow nodules in a vein beneath Lake Superior. **12.** Northwestern mine, Central. **13.** Star mine, Copper Harbor (10-13, Morris, 1983). Some nodules are stained blue or green (T. M. Bee, personal communication, 2000). **14.** Allouez mine (Hawke, 1976). **15.** *Connecticut mine*: small, yellow-white nodules. **16.** Jacobs Creek: Pale yellow crystals up to 1.5 cm. **17.** *Iron City mine*: Pale pink-white nodules to 10 cm.

Ontonagon County: **1.** *Mass mine*: Abundant in Evergreen lode. **2.** Adventure mine: White, granular. **3.** Hilton mine. **4.** Ogima mine, Greenland: Gray-white to pale lavender nodules to 5 cm. **5.** *Michigan mine*: Pink nodules to 15 cm occurred on the 3rd level, approximately 200 meters west of the B Shaft (R. Barron, personal communication, 2000). **6.** Minesota mine: “Rusty brown cannon balls” (Whitney, 1859). **7.** *Caledonia mine*: in fine pink-to-mauve colored nodules and veins; also white, red and reddish orange. **8.** Bumblebee mine: Unusual pale lavender colored nodules to 2-3 cm (R. Barron, personal communication, 2000). **9.** Rockland mine: White chalky nodules to 2 to 3 cm occurred on the first level (R. Barron, personal communication, 2000). **10.** *Flintsteel (Nassau) mine*, near Rockland: Excellent specimens of datolite nodules up to 25 cm were collected from this mine in the 1970s (R. Whiteman, personal communication, 2000). These ranged in color from white (some with red spots and lines), to translucent orange, to pale lime green. **11.** Belt mine: Translucent white nodules.

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