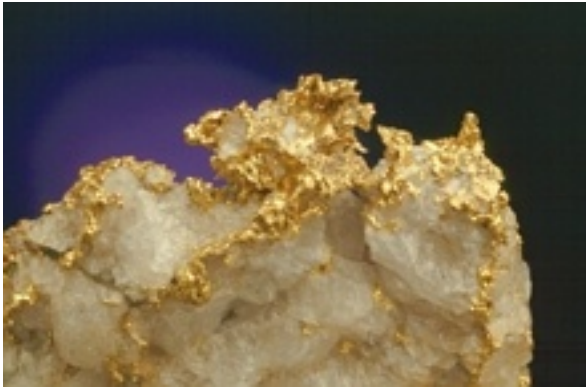


## GOLD

Au

The discovery of gold in Michigan is credited to Douglass Houghton, who, in the early 1840s at an unspecified Northern Peninsula site, panned enough placer gold from the bed of a small stream



*Figure 83: Native gold in quartz from the Michigan Gold mine, near Ishpeming, Marquette County. 2 × 3.5 cm. A. E. Seaman Mineral Museum specimen No. JTR 1807, Jeffrey Scovil photograph.*



*Figure 84: Native gold from the Ropes Gold mine, near Ishpeming, Marquette County. Largest piece is 1.5 cm across. Michael P. Basal collection, Jeffrey Scovil photograph.*

“to fill an eagle’s quill” (Allen, 1911, page 356). The site location was lost when Houghton drowned. In January, 1864, Dubois and Williams, analytical chemists from Philadelphia, reported gold in quartz assaying several hundred dollars per ton from specimens secured in the Holyoke silver district, 13 km north of Ishpeming. This report, for some unfathomable reason, failed to evoke the usual hysteria. Julius Ropes, an Ishpeming

chemist, who had noticed gold in numerous rock samples, finally located an auriferous quartz vein in 1880 in the S  $\frac{1}{2}$  NW  $\frac{1}{4}$  section 29, T48N, R27W. Here was opened in October 1881 the first gold mine in Michigan, not on the original find site, but on high ground about 250 meters further west. By 1897, when the mine closed, it had yielded about \$600,000 in gold and \$50,000 in silver (Jopling, 1897) from ore that averaged 0.192 ounces of gold and 0.9 ounces of silver per ton (Snelgrove et al., 1944; Broderick, 1945). Tailings were treated in 1900 and 1901, and in 1933 the Ishpeming Gold Mining Company treated 200 tons of old tailings from the mine with cyanide, but recovered a mere 9.67 ounces of gold and 1.4 ounces of silver valued at only \$247.00.

Shortly after the Ropes mine became active, further prospecting resulted in the discovery of some very rich specimens of gold-bearing quartz a few kilometers to the west in the NE  $\frac{1}{4}$  section 25, T48N, R28W on properties that became known as the Michigan and the Superior. One run of 28 tons yielded \$8,400. Along this same general belt some 10 or so other small mines and prospects had maximum activity prior to 1890. Gold-bearing veins were found in the early 1890s about 14.5 km north of Ishpeming, on the north side of the Dead River Valley. Several shallow shafts here encountered some high-grade material, but “the deposits were small and discontinuous,” (Broderick, 1945, page 117). At various times, other prospects in this general area north of Ishpeming yielded some spectacular specimens without yielding any significant amounts of ore.

The Ropes property and adjacent lands underwent renewed surficial exploration during the 1920s and 30s, but all properties were dormant by 1941. With the enormous increase in the price of gold in the 1970s and 80s, interest in the Ropes deposit was renewed, and in 1975 the property was purchased by the Callahan Mining Corporation, which reopened and worked the deposit from 1985 to 1989, producing 167,000 ounces of gold and 208,000 ounces of silver, valued at over \$68.4 million (Callahan Mining Corp. Annual Report, 1989). While there is no active gold mining in the area currently, exploration continues, with small but rich veins still being discovered (Quigley and Mahin, 1999; Duskin and Quigley, 1999). For additional information on gold mining in the

Northern Peninsula, see Maguire (1986), or Fountain (1992).

Placer gold from glacio-fluvial deposits has been found and reported from a number of localities in both the Northern and Southern Peninsulas. In most cases these finds are minimal, but a few nuggets have been recovered. As a result, there have been several “gold rushes” in the Southern Peninsula, unfortunately none based on geological or mineralogical evidence, but rather on promotion, fraud, greed, and ignorance. In 1924, Alpena County was the site of such ballyhoo when gold was reported in limestone there. Before the excitement subsided, considerable drilling was done, an experimental mill was erected, and a shaft was sunk to 69 meters at a cost of over \$200,000. The shaft found only water, but some dental gold was found “salted” in the rocks. The story has been recounted by Pardee (1964). During the depression of the 1930s this “gold field” was revived, followed by pronouncements of gold in “astonishing quantities” in the so-called gold fields of Vernon, Ortonville, Perry, Montrose, and Grand Rapids. Needless to say, none had any gold at all (Pardee, 1964).

In the summer of 1970, there was considerable newspaper publicity on attempts to recover placer gold from gravel pits in Washtenaw, Oakland, and Clinton Counties (*Ann Arbor News*, November 1, 1970, page 21). It was announced that the Au-Min-Co-Inc. had recovered 18 grams of gold and 100 grams of mercury (q.v.) from test operations in three gravel pits.

Both relatively pure gold as well as “electrum” occur in Michigan. “Electrum” is a natural gold-silver alloy.

**Allegan County:** Allegan: Placer (Allen, 1911).

**Antrim County:** Antrim River: Placer nuggets (Allen, 1911).

**Baraga County:** An “old gold pit” is shown on the county map in section 10, T50N, R30W.

**Charlevoix County:** Boyne River: Placer (Allen, 1911).

**Dickinson County:** Bayley (1904, page 185) reports that the Sturgeon Quartzite in the northwestern part of T40N, R30W and the southwestern part of T41N, R29W contains numerous quartz veins. “Some of these quartz

veins contain small quantities of free gold, as does also the quartzite in their vicinity. An attempt was made a few years ago (presumably in 1900) to work them, but the venture was not profitable and was therefore abandoned.” Fountain (1992) also reports gold in quartzite near Pine Creek.

**Emmet County:** Little Traverse: Placer (Allen, 1911).

**Gogebic County:** 1. Eureka mine in sections 12 and 13, T47N, R46W: In small amounts in quartz veins along contact between granite and Palms Slate with pyrite and chalcopyrite (Dickey and Young, 1938). 2. South of Gogebic iron range: In glacial gravels (Allen, 1911).

**Ingham County:** Williamston: Nugget on bedrock (Allen, 1911).

**Ionia County:** 1. Maple River: Placer. 2. Grand River, below Lyons: Placer, 4 to 30 colors per pan. Some grains were the size of mustard seeds (Allen, 1911).

**Iron County:** 1. Iron River: Placer (Allen, 1911). 2. Anomalous placer gold occurs in several drainages southwest of Gibbs City, most notably in Cook’s Run and in the south branch of the Paint River (S. M. Carlson, personal communication, 2000). Several exploratory pits in section 14, T44N, R36W and a collapsed shaft and mine dump in section 13, T44N, R36W lie within the center of the placer gold occurrences. These prospects are known locally as “Peter Paul’s gold mine” (Fountain, 1992), although it is not known if any gold was ever recovered from these bedrock explorations. The placer gold in nearby streams may represent a glacial or pre-glacial paleoplacer with no local source.

**Kalkaska County:** 1. Walton: Placer. 2. Rapid River at Kalkaska: Placer. (1, 2, Allen, 1911).

**Kent County:** 1. Lowell: Placer. 2. Ada Creek: Placer (1, 2, Allen, 1911).

**Leelanau County:** Near Lake Leelanau.

**Livingston County:** In the Winans Lake fulgurite (q.v.): As rare micro-blebs in metallic globules with native silver, silicon, and graphite, iron silicides, and phosphides (q.v.), all enclosed in lechatelierite (q.v.) (Essene and Fisher, 1984; Essene, 1985).

**Manistee County:** 1. Little Sable River: Placer (Allen, 1911). 2. Manistee River: Placer (Allen, 1911).

**Marquette County:** 1. *Ropes mine*, NW ¼ section 29, T48N, R27W: The gold is found in vertical quartzose lenses in a tabular, nearly vertical mass of Keewatin Schist in a shear zone between two peridotite bodies. Associated minerals are pyrite, tetrahedrite, chalcopyrite, scheelite, and silver (Snelgrove et al., 1944; Broderick, 1945). The Michigan gold belt, and particularly the Ropes deposit, have been described in detail by Maguire (1986). In addition to the species previously listed, Maguire adds galena, molybdenite, pyrrhotite, and sphalerite, and minor amounts of dyscrasite, millerite, rutile, and “bravoite” are noted by Bornhorst et al. (1999). Dolomite, talc, and schorl are accompanying minerals. One specimen of gold checked by qualitative energy dispersion X-ray spectrometry was shown to contain a substantial amount of silver, thus making it “electrum.” This mineral also has been reported by Brozdowski (1990) and Bornhorst et al. (1999). 2. *Michigan mine*, NE ¼ section 35, T48N, R28W: In a series of quartz veins cutting felsite and diorite. Allen (1911, pages 359 to 360) relates, “This property has produced some of the finest specimens of free gold ever seen.” Accessory minerals are pyrite, chalcopyrite, galena, sphalerite, pyrrhotite, molybdenite, scheelite, silver, tourmaline, powellite, a reddish feldspar, possibly bismuthinite, and an unidentified Pb-Bi-Te-S mineral (Part III) (Snelgrove et al., 1944; Broderick, 1945; Duskin and Quigley, 1999). 3. Peninsula (also known as Peninsular) mine, SW ¼ SW ¼ section 25, T48N, R28W: Visible gold associated with pyrite and sphalerite occurs in quartz-carbonate veins (Duskin and Quigley, 1999). 4. Billings (Ten Kilns) mine, section 21, T48N, R27W: Found in quartz vein in quartzite of Middle or Upper Huronian age (Broderick, 1945). 5. Gold Lake mine adjoining the Michigan mine on the west: In quartz veins in diorite. Some rich specimens compared favorably with those from the Michigan mine (Allen, 1911). 6. Superior mine, NW ¼ section 35, T48N, R28W: In quartz vein in diorite. 7. Suneson prospect near the SW corner section 8, 46N, R29W: In a 0.6 to 1.2 meter quartz vein (Snelgrove et al., 1944). 8. Grummet prospect, NW ¼ section 36, T48N, R28W: Rare in a quartz vein with pyrite and scheelite (Snelgrove et al.,

1944). 9. Other mines and prospects in the Michigan-Ropes belt include: Grayling, Gitchigame, Giant, Brown, and Case. 10. Dead River Valley about 14.5 km north of Ishpeming. a. Fire Center mine in section 35, T49N, R27W: In quartz veins associated with galena along quartz porphyry and granite contacts. Worked 1892 to 1898 (Allen, 1911; Broderick, 1945). b. Beaver mine. c. Crescent mine: The small quartz veins in this district also contain pyrite, copper sulfides, galena, and in places, sphalerite (Allen, 1911). Gold values up to 0.6 oz. per ton are reported by Puffet (1966). 11. *Gold Bluff prospect*, SE ¼ section 28, T49N, R27W: The Gold Bluff prospect was investigated by Minerals Processing Corporation in 1997. The main showing consists of a quartz vein that carries visible gold associated with pyrite and a suite of rare telluride species (Quigley and Mahin, 1999). The deposit is currently under lease by Minerals Processing Corporation, and collecting without permission is prohibited. 12. High Point prospect, NW ¼ section 23, T49N, R28W: Gold (“electrum”) occurs in gray quartz veins in porphyry. Associated minerals include minor pyrite, chalcopyrite, galena, sphalerite, and various bismuth telluride minerals (Quigley and Mahin, 1999). As with Gold Bluff, this prospect was discovered and is under claim by Minerals Processing Corporation; collecting without permission is prohibited. 13. Champion iron mine: Small pieces of gold are reported in manganese iron formation by Babcock (1966a, b). 14. “Two miles north and east” of the Ropes mine: “Many fine specimens ..[are] associated with the iron ore-bearing formation” (Allen, 1911, page 363). 15. Ishpeming district: Placer gold is found in various streams near the gold district. 16. Huron Mountains: Placer recovered from drift. As many as 20 colors to a pan were found (Allen, 1911). 17. Holyoke mine on the north side of the Dead River, about 13 km north of Ishpeming: Maguire (1986) reports that DuBois and Williams, Philadelphia analytical chemists, found gold (assay of several hundred dollars/ton) in 1864 in Holyoke ore. The mine and other nearby prospects closed in 1866 owing to lack of geological knowledge and poor management. Several years later the Fire Center Gold Mining Company prospected near the Holyoke mine, recovering several thousands of dollars of gold from a shaft that intersected many small veinlets of gold-bearing quartz in granite. 18. Three gold prospects near the Ropes mine

(Boben et al., 1986) are the Bjork Lundin, 1.6 km west of the Ropes; the Ford, 5 km northeast of the Ropes; and the Peppin, 5.6 km northwest of the Ropes. The anomalous gold concentrations are in pyritiferous quartz veins spatially associated with mafic metavolcanics. Wallrock alteration minerals are quartz, muscovite (“sericite”), chlorite, “carbonate,” K-feldspar, and hematite. **19.** Silver Creek-Rocking Chair Lakes area, sections 10, 15, 23, 24, 25 and S ½ section 14, T49N, R28W, northwest of Marquette: Locally abundant, multi-generation quartz veins contain anomalous gold concentrations associated with pyrite, chalcopyrite, pyrrhotite, arsenopyrite, and local galena and sphalerite (Johnson et al., 1986). In section 23 one vein reaches a thickness of over 20 meters! **20.** Clark Creek region: A limited number of anomalous gold assays were obtained from sulfide mineralization in the Upper Pillowed Basalt, the Willow Creek Pyroclastic, and the Iron Formation Members of the Silver Mine Lakes Formation in the Ishpeming Greenstone belt (Baxter et al., 1987). The sulfides include arsenopyrite, pyrite, pyrrhotite, chalcopyrite, and local galena and sphalerite.

**Montcalm County:** **1.** Greenville: Placer. **2.** Howard City: Placer (1, 2, Allen, 1911).

**Newaygo County:** **1.** County Line: Placer. **2.** Muskegon River: Placer (1, 2, Allen, 1911).

**Oakland County:** Birmingham: Placer from glacial gravels (Allen, 1911).

**Oceana County:** **1.** Whitehall: Placer. **2.** Hart: Placer. **3.** White River: Placer (1-3, Allen, 1911).

**Ontonagon County:** **1.** Flat River: Placer. **2.** Victoria copper mine: Large nugget was found (1, 2, Allen, 1911).

**Ottawa County:** Grand Haven: Placer (Allen, 1911).

**St. Joseph County:** Marcellus: Placer (Allen, 1911).

**Wexford County:** **1.** West Summit: Placer. **2.** Manistee River: Placer (1, 2, Allen, 1911).

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## UPDATE

**Alger County:** Approximately 7 kilometers east of Grand Marais: Black sands along the Lake Superior shore in this area contain micro nuggets of native gold (“gold dust”) and rare grains of platinum (q.v.) and other heavy minerals (M. J. Elder, personal communication, 2006). Verified by energy dispersion X-ray spectroscopy.

**Dickinson County:** Unnamed prospect near Channing, section 29, T44N, R29W: As microscopic grains in native bismuth. Verified by wavelength dispersion electron microprobe analysis.

**Houghton County:** Champion mine, Painesdale: As microscopic coatings of electrum on native silver in chalcocite with calcite (T. Buchholz, personal communication, 2005). Verified by energy dispersion X-ray spectrometry.

**Menominee County:** Aquila Resources, Inc. Back 40 Project: A diamond drilling program undertaken by Aquila Resources, Inc. has resulted in the discovery of a polymetallic volcanogenic massive sulfide deposit located in sections 1 and 12, T35N, R29W. Drilling has delineated zones of significant sulfide and gold mineralization. The deposit is hosted by early Proterozoic (Penokean) rocks of the Wisconsin Volcanic terraine, and contains primary ore minerals (Cu) chalcopyrite, bornite, and (Zn) sphalerite. Arsenopyrite, galena, pyrite, and pyrrhotite are also present. Substantial gold and silver values have been recorded in some intersections, and rich masses of native gold have been observed in some drill cores (for additional information see Mahin et al., 2004a,b; Quigley and Mahin, 2008; and Aquila Resources website at <http://www.aquilaresources.com/projects.html>).

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