

## MICHIGAN'S GEM STONES

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Ordinarily when we think of native Michigan minerals suitable for cutting and polishing, we think first of the minerals of Isle Royale and the Keweenaw Peninsula. Here can be found a number of minerals which are attractive enough when cut and polished to be classed as gem stones. These minerals are found associated with the copper-bearing rocks of the district.

Mineralization has taken place in the porous and fragmental tops of lava flows (amygdaloids) and in the conglomerates. The most important mineral deposited, insofar as economic value is concerned, is, of course, copper, but associated with the copper are minerals which have gem value. More than 60 minerals occur in this area; and at any rock pile at least 20 different ones can easily be gathered.

Isle Royale is well known for its gem minerals. The best collecting places are along the beach where the lava flows and conglomerates are constantly being eroded and thus forced to give up their caches of minerals and also in the beach rubble where the material has been concentrated and cleaned, to an extent, by wave action.

A few of the more readily collectible minerals and their localities follow:

Chlorastrolite - commonly called "greenstone" - rich light and dark shades of green, with mosaic and radiate patterns. It takes a high polish. This is distinctly an American gem, since Isle Royale is the only known place where specimens of gem quality have been obtained, although imperfect nodules have been reported from the trap rock of Keweenaw Peninsula.

Localities - beaches of Smithwick and Mott Islands; south shore of Siskowit Lake; and occasionally on other beaches on north half of Island.

Thomsonite - a pink and white stone, often showing green color. These can be found on nearly every beach, but the amygdaloid of the north shore, from the north end to Thomsonite Beach, furnishes the best gems. They are found as pebbles on the beach, often having received a considerable polish by wave action.

Carnelian - a red quartz mineral, usually deep red but occasionally showing pale orange tints. Collected from water-worn beach material at west end of Siskowit Bay.

Agates - a variety of agates can be found on practically all the beaches. Probably the best are on the north side. McGinty Cove, "Agate Beach", is a well known collecting spot. The finest small agates are found at the head of Siskowit Bay.

Other gem minerals found on the Island, but less commonly, are prehnite, amethyst, rose quartz, chalcedony, datolite and epidote.

On the Keweenaw Peninsula, gem minerals likewise are associated with the copper-bearing rocks. Here the old mine dumps of abandoned copper mines afford excellent collecting sites for minerals.

At the Baltic #2 shaft, near the town of South Range, about seven miles southwest of Houghton, copper sulphide minerals can be collected from the dump. These include chalcocite, bornite and chalcopyrite. While not gem minerals, they are worthwhile additions to a mineral collection.

From the dumps of the various Isle Royal Mine shafts, located about two miles south of Houghton, prehnite and massive epidote can be collected, as well as clear, quartz crystals one-half inch or more in length. These were deposited in amygdules in the lava and in geodes. On the dump of the Wolverine Mine near Kearsarge, epidote crystals and agates can be found. These are also from the amygdaloids in the lava flows.

Near Allouez, from the dump of a mine which was in the conglomerate, chrysocolla can be collected.

Copper arsenide minerals - domeykite, algodinite and whitneyite - are found on the dumps of the Mohawk, Seneca and Ahmeek #2 mines, -- not gem materials.

From the dumps of the fissure mines in the vicinity of Phoenix, prehnite and native copper can be collected.

Near Copper Falls (between Eagle River and Eagle Harbor) an old mine dump contains natrolite and datolite. The datolite is mostly porcelainic white, but occasionally delicate tints of pink and yellow and copper and silver inclusions are found. Datolite takes a beautiful polish.

Agates can be collected along the Lake Superior shore where they have been worn away from the lava flows by wave action. The shore road from Eagle Harbor to Copper Harbor provides access to a number of collecting localities. For the most part, these agates are not large or showy. The concentrically banded variety predominates; the mass type is extremely rare. Occasionally greenstones (chlorastrolites) are found.

The iron country offers some mineral and rock specimens suitable for cutting and polishing, but more for mineral collecting. Many of the minerals found here are associated with igneous intrusive rocks or with sedimentary rocks that have undergone intense metamorphism.

Between Negaunee and Ishpeming is a knoll known as Jasper Hill. It is made up of Jaspilite — brilliant light red bands of jasper alternating with bands of hard, bluish-black, specular hematite. The Jaspilite is folded, bent and twisted in a most fanciful fashion. When polished, specimens assume a very beautiful polish.

Various other outcrops of the iron-formation in the Marquette Range furnish interesting rock for polishing; i.e., banded ferruginous chert.

The old dumps and open pits in the area afford an opportunity to collect iron minerals. Although not suitable for polishing, they should be in every Michigan mineral collection. These include the iron minerals limonite, goethite and hematite (kidney ore, pencil ore, specular) and the manganese minerals manganite, pyrolusite and psilomelane, as well as associated minerals barite, apatite, and others. The mine dumps occasionally yield bright red crystals of quartz colored by iron oxide.

In the Ropes Gold Mine area, north of Ishpeming, verde antique marble can be collected from the old marble quarries. This rock consisting of serpentine, mottled and streaked with calcite and dolomite, is very attractive when polished.

Near Champion, at the old Beacon Mine dumps, the following minerals can be collected: Martite, magnetite, grunerite, garnet and tourmaline. Some of the garnets are more than one inch in diameter (at Michigamme, garnets over two inches are not uncommon) but are not of gem quality. The tourmaline is found as slender black prisms embedded in crystal quartz.

The pegmatite rock, such as is found near Republic, often contains crystals of quartz, tourmaline, beryl, topaz and other minerals which if large enough can be used as gem minerals.

In the marble quarry near Felch, satiny prisms of tremolite and grass-green blades of actinolite are found in the white crystalline marble.

When we leave the western half of the Northern Peninsula, opportunities for collecting minerals and rocks suitable for cutting and polishing diminish. The chert, which is found in a number of formations is sufficiently hard to be of interest, but for the most part lacks color. Perhaps the most attractive is a reddish, mottled and banded chert found in the Traverse limestone north of Norwood in Charlevoix County. Chert nodules are abundant in the Bayport limestone quarries in Arenac and Huron counties. Chert and flint are present in the Niagaran dolomite in the Northern Peninsula — Scott's Quarry, near Trout Lake, and the old quarries at Manistique.

Mineral specimens, not suitable for polishing, include pyrite from the Antrim shale near Alpena and from the Bell shale near Rogers City; calcite crystals (dog-tooth spar) in the dolomite quarries near Monroe; celestite and yellow calcite in geodes in the Sylvania sandstone quarry near Rockwood; brown calcite crystals in the Bayport limestone at Bayport, Huron County, and at Omer, Arenac County; and gypsum at Alabaster, National City and Grand Rapids.

The numerous gravel pits in the Southern Peninsula often yield both rock and mineral specimens which make excellent polishing material. Of these, the various forms

of quartz are most abundant. Included are clear crystal quartz, rose and smoky quartz, agate, banded chert and jasper. Occasionally, some of the larger boulders will have other minerals, such as tourmaline. Some of the rocks found in these gravel pits also polish very well.

We have other material in this state which should prove of interest to those engaged in cutting and polishing. This is the wealth of fossils found in some of our sedimentary rocks. Although much of our fossilized material is composed of calcium carbonate and therefore relatively soft, many of the specimens do take a polish. This is well demonstrated in the case of the "Petoskey Agate" or "Petoskey Stone". This is a fossil compound (colonial) coral, genus Hexagonaria, common in the Traverse formation. The attractive appearance of the Petoskey stone is due to the internal structure of the coral. Each individual coral, or corallite, forms a rough hexagonal pattern. The radiating lines within each corallite are the septae. This fossil is common in the beach rubble along the south shore of Little Traverse Bay from Petoskey to Charlevoix. Here wave action has worn down the fossil and partially polished it. Unweathered specimens can be collected from the old limestone quarries along the shore bluff from Petoskey to west of Charlevoix.

On the east side of the state, the same fossil can be collected from Traverse outcrops and quarries in Alpena County and in the Afton-Onaway area in Cheboygan and Presque Isle counties. The best place to collect them here is the old Rockport Quarry dumps, about eleven miles northeast of Alpena, just south of the Presque Isle County line along Lake Huron.

In addition to the colonial Hexagonaria, another colonial coral known as Favosites should furnish polishing material. This is the common "Honeycomb" coral. They are especially abundant in the Alpena area.

Simple (solitary) corals also make interesting cutting and polishing material. These are the cup or horn corals. Practically any of the Traverse outcrops will have some, but the easiest collecting place is the old Rockport Quarry dumps. Both cross-sections and longitudinal cuts of the simple and compound corals could be made.

Other fossil forms in the Traverse are massive bryozoans and stromatoporoids (extinct coral-like organisms).

The Niagaran dolomite has a large assemblage of fossil corals that have been silicified. These would be harder to work with but should prove satisfactory. Excellent specimens may be obtained near Raber, Mackinac County; in the vicinity of Scott's Quarry, east of Trout Lake, Chippewa County; and in the vicinity of Whitedale, Schoolcraft County.

Other formations also contain fossils such as corals and bryozoa which might be acceptable material, but not in the abundance of the above.