# MICHIGAN'S GEM STONES

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Mineral and rock material suitable for lapidary work can be found in a number of areas of Michigan, but ordinarily we think first of the minerals of the Keweenaw Peninsula.

## COPPER COUNTRY

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 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 economic mineral deposited is copper, but associated with the copper are minerals which have gem value. More than sixty minerals are in this area; and at almost any mine rock pile at least twenty different ones can be collected.

### Beaches

Some of the best collecting places are along the shores where the lava flows and conglomerates are constantly being eroded and thus forced to give up their caches of minerals which collect in the wave-piled beach gravel. In the beach rubble the material has been concentrated, cleaned, and frequently polished by wave-action. Some of the most-sought stones are:

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--and a Michigan gem--but mostly imperfect nodules have been reported from the trap rock of Keweenaw Peninsula.

Thomsonite--a beautiful pink and white stone, often showing a green color. The amygdaloid of the shores north of Ahmeek have yielded fine gem stones.

Agates--many kinds of agates can be collected along the Lake Superior shores where they have been worn 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. Agates also occur along the Lake Superior shores of Ontonagon and Gogebic counties.

Mines

The old mine dumps of abandoned copper mines afford excellent opportunities for collectors.

At the Baltic No. 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. Although not gem minerals, they are worthwhile additions to a mineral collection.

From the dumps of the various Isle Royale 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 amygdaloidal lava flows.

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

Copper arsenide minerals--domeykite, algodonite and whitneyite - not gem materials - are found on the dumps of the Mohawk, Seneca and Ahmeek No. 2 mines.

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 porcelanic white, but some delicately tinted pink and yellow datolite with copper and silver inclusions may be found. Datolite takes a beautiful polish.

Many uninteresting "stones" from the copper-bearing rocks exhibit beautiful colors when polished, and can be cut and polished to semi-gem quality.

## IRON COUNTRY

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

Between Negaunee and Ishpeming a knoll known as Jasper Hill is made of jaspilite--brilliant 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. Polished specimens are beautiful.

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

The old dumps and open pits in the area are good collecting spots for iron minerals. Although not suitable for polishing, they should be in every Michigan mineral collection. The iron minerals are limonite, goethite and hematite (kidney ore, pencil ore, specular), the manganese minerals manganite, pyrolusite and psilomelane, and associated minerals barite, apatite, and others. Bright red crystals of quartz colored by iron oxide may be found in some mine dumps.

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, on Beacon Hill at the Champion Mine, the following minerals can be collected: Martite, magnetite, pyrite, grunerite, garnet, siderite, titaniferous hematite, sericite, and tourmaline. Some of the garnets are more than one inch in diameter (at Michigamme, garnets more than two inches in diameter are not uncommon) but are not of gem quality. Black pseudo-garnets are rather common and interesting. They are twelve-sided masses of iron ore which replaced true garnets. The tourmaline is found as slender black prisms embedded in crystal quartz.

Some pegmatite rocks, such as those found near Republic, contain 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 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 generally diminish. Many beautiful agates, however, have been found along the Lake Superior shores of Alger, Luce and Chippewa counties in the eastern end of the Northern Peninsula.

## SOUTHERN PENINSULA

The chert, which is in a number of formations, is sufficiently hard to be of interest, but most of it lacks color. Perhaps the most attractive chert is the mottled and banded variety 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 in the Niagaran dolomite in the Northern Peninsula, exposed in 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.

In the numerous gravel pits in the Southern Peninsula can be found both rock and mineral specimens which make excellent polishing material. The various forms of quartz are most abundant. Included are clear crystal quartz, rose and smoky quartz, agate, banded chert and jasper. Some of the larger boulders have other minerals, such as tourmaline. Some of the rocks found in these gravel pits also polish very well.

## FOSSILS

Other material in this state which should prove of interest to those engaged in cutting and polishing is the wealth of fossils in some of our sedimentary rocks. Although much of the fossilized material is composed of calcium carbonate and, therefore, relatively soft, many of the specimens do take a polish. This is well demonstrated by the "Petoskey Stone", a fossil 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 and in gravel pits to the south.

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 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, which may be found in nearly all the Traverse outcrops, 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 are harder to work but should prove satisfactory. Excellent specimens may be obtained near Raber, Chippewa County; in the vicinity of Scott's Quarry, east of Trout Lake, Chippewa County; and in the vicinity of Whitedale, Schoolcraft County.

Other formations contain less abundant fossils such as corals and bryozoa which might be acceptable material for cutting and polishing.