ALL ABOUT PETOSKEY STONES

(Hexagonaria pericarnata; Sloss)





Michigan's Official State Stone

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PETOSKEY STONE - A PETRIFIED CORAL FOSSIL

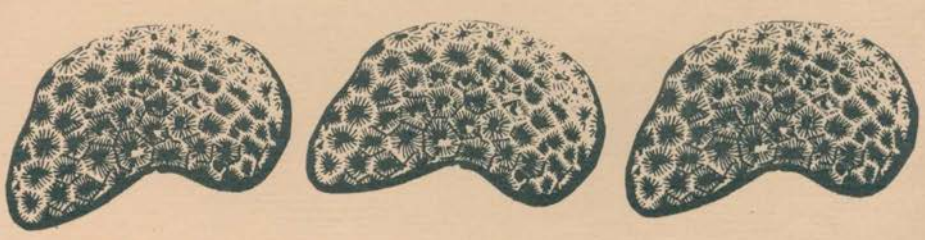
MICHIGAN'S OFFICIAL STATE STONE

The PETOSKEY STONE is composed of the fossilized skeletons of "Colony Coral" (Hexagonaria Pericarnata; Sloss) which lived their life span in the warm waters that covered Michigan during the Devonian Period some 350 million years ago. Each hexagonal chamber contains the prehistoric remains of a salt water marine life.

What is often referred to as the "eye" of the hexagonal chamber is, in reality, the mouth of the coral. The radiating lines from the mouth were the tentacles which drew microscopic food to the coral's mouth.

Flecks in the mouth or on the tentacles of the coral is this prehistoric food which has petrified with the coral through the millions of years.

Dark streaks sometimes found in the stone is the silt which buried the coral when Michigan's warm, salt water sea retreated and mostly serves to enhance the natural beauty and history of the stone.



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ALL ABOUT PETOSKEY STONES

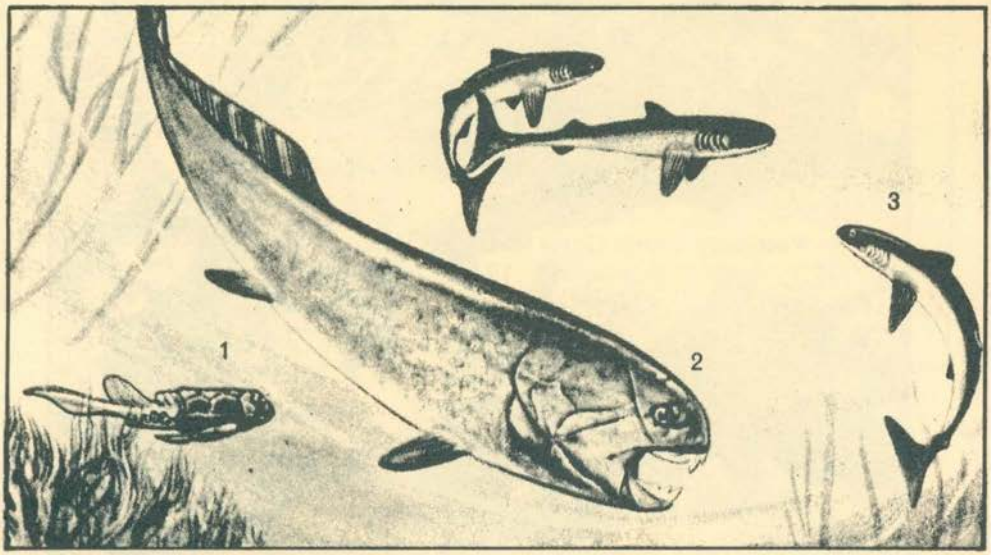
THE DEVONIAN TIME PERIOD . . . . .
WHEN THE STONE WAS LIVING CORAL

The Petoskey stone was once a living section of colony coral some 350 million years ago during the DEVONIAN period of the Earth's formation in the middle of the Paleozoic Era (see Geological Time Scale Chart).

Popularly called the "Age of Fishes", the Devonian period lasted about 50 million years and derived its name from the English county of Devon, where formations of this period were first studied about 1840.

The fishes included several varieties of jawless fish (ostracoderms), plate-skinned fish (placoderms), sharks and the first bony fishes (osteichthyes). From one species, the lobe-fin fishes (crossotperygian), the first amphibia (ichthyostegids) evolved and clearly show characteristics of both fish and amphibian.

THE DEVONIAN SEA



Devonian fishes. A composite diorama showing 1. *Bothriolepis*, a placoderm about 14 in. long, 2. *Dinichthys*, a giant 30-ft. marine placoderm, largest vertebrate of this period, and 3. *Cladoselache*, a 3-ft.-long primitive shark.

At the beginning of the Devonian period, North America had much the same shape as it has today. Then, an arm of the Atlantic ocean covered much of the East coast and extended as far south as Oklahoma, leaving a large sub-continent on the high ground known as Appalachia. In the middle of the period, this warm Devonian sea spread northward and westward covering Michigan and most of the middle west.

The chief animal forms of the period, however, were marine invertibrates including coral (a species of which was Hexagonaria, the animal destined to evolve into Petoskey stones), echinoderms, trilobites and brachiopods. Devonian coral reefs featured large cup corals, two feet high, and compound corals eight feet across.

THE DEVONIAN CORAL REEF



A Devonian coral reef. Corals 1. *Heliophyllum*, 2. *Cylindrophyllum*, 3. *Hexagonaria*, 4. *Synaptophyllum*, 5. *Heterophrentis*, 6. *Pleurodictyum*, 7. *Chonophyllum;* 8. bryozoan *Fenestrellina;* brachiopods 9. *Leptaena*, 10. *Atrypa;* 11. gastropod *Platyceras;* 12. cephalopod *Michelinoceras;* trilobites 13. *Calymene*, 14. *Anchiopsis;* 15. crinoid *Dolatocrinus*.

GEOLOGICAL TIME SCALE

Read from bottom to top.

ERAS	TIME PERIODS ROCK SYSTEMS	TIME EPOCHS ROCK SERIES	APPROX. DURATION MILLION YEARS	APPROX. PERCENT TOTAL AGE	LIFE FORMS
CENOZOIC	QUATERNARY	RECENT PLEISTOCENE	1	2	Rise and dominance of Man.
	UPPER TERTIARY	PLIOCENE MIOCENE	65		Modern animals and plants.
	LOWER TERTIARY	OLIGOCENE EOCENE PALEOCENE			Rapid development of modern mammals, insects, and plants.
MESOZOIC	UPPER CRETACEOUS		75	5	Primitive mammals; last dinosaurs; last ammonites.
	LOWER CRETACEOUS				Rise of flowering plants.
	JURASSIC		45		First birds, first mammals. Diversification of reptiles; climax of ammonites; coniferous trees.
	TRIASSIC		45		Rise of dinosaurs; cycadlike plants; bony fishes.
PALEOZOIC	PERMIAN		45	9	Rise of reptiles. Modern insects. Last of many plant and animal groups.
	PENNSYLVANIAN (CARBONIFEROUS)		75		First reptiles. Amphibians; primitive insects; seed ferns; primitive conifers.
	MISSISSIPPIAN (CARBONIFEROUS)				Climax of shell-crushing sharks. Primitive ammonites.
	DEVONIAN		50		First amphibians, first land snails. Primitive land plants. Climax of brachiopods.
	SILURIAN		20		First traces of land life. Scorpions. First lungfishes. Widespread coral reefs.
	ORDOVICIAN		70		First fish. Climax of trilobites. First appearance of many marine invertebrates.
	CAMBRIAN		50		First marine invertebrates, including trilobites.
PROTEROZOIC (PRECAMBRIAN)			About 3000	84	First signs of life. Algae.
ARCHEOZOIC (PRECAMBRIAN)					

Age of oldest dated rocks: about 3,500,000,000 years.

Geologic history falls into major divisions called eras. The names of eras are based on the state of the organic evolution present: Archeozoic (primitive); Paleozoic (fossil); Mesozoic (medieval); Cenozoic (recent). A period embraces one or more incursion of land by sea.

THE DEVONIAN FOREST



A Devonian forest with 1. a tree fern, *Eospermatopteris;* 2. a small primitive leafless plant, *Psilophyton;* 3. a scouring rush, *Calamophyton;* 4. a primitive lycopod *Protolepidodendron;* and 5. the oldest-known amphibian and first land vertebrate, *Ichthyostega*, 2½ ft. long.

The oldest spiders, millipedes and insects appear in this period as well as fresh-water clams. Early land plants were simple, lacking true roots and leaves, but with a veinlike conducting system found in all future land plants. Toward the end of the Devonian period, huge forests of scale trees and seed ferns grew profusely.

Through the millions of years, silt, black mud and sediments fell to the bottom of the warm sea, covering the calcium carbonate remains of the dead coral and eventually filling the Michigan basin as the warm sea receded. Heat and pressure through the millenia transformed the corals and sediments into rock.

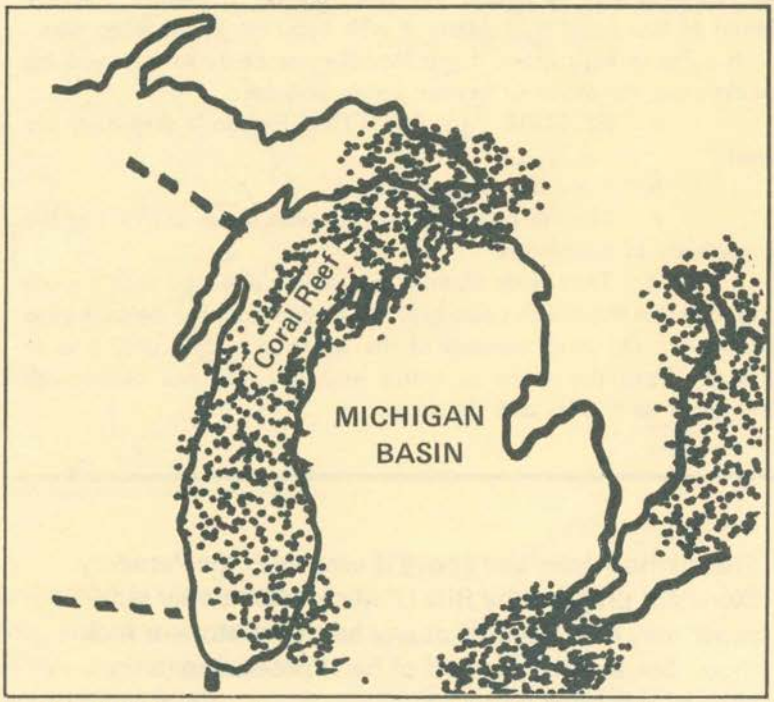
Since the sedimentary deposits were greatest in the center of the Michigan basin, it was forced downward by sheer weight, bringing the Devonian fossils nearer the surface. The Ice Age which formed the Great Lakes scraped away even more of the burying layers away to expose the Petoskey Stones and pushing them Southward even as far as Ohio.

Since the majority of the fossilized Hexagonaria are most plentiful near the northwestern Michigan community of Petoskey, the stone was so named. Incidentally, Petoskey derived its name from the Ottawa Indian Chief, Ignatuis Pet-o-Sega or ""Bidisiga", which means "Rays of the Rising Sun" or "Rising Sun" in the Ottawa language. The stone is aptly named, for if the eye of each hexagonal chamber is examined and considered as the sun, there are indeed rays extending from it to the wall.

The Petoskey stone is easily identified. When dry, it is a whitish gray, generally oval in shape and powdery to the touch. When wet, the hexagonal pattern of the fossil is clearly visible. It can be almost any size or weight. Each hexagonal chamber was once an individual form of marine life all clustered into a colony.

It can most readily be discovered along the shoreline of Little and Grand Traverse Bays of Lake Michigan on the beach and in the shallows, and much of the stone is found in gravel pits and excavations in the Petoskey area.

Good Petoskey stones are determined by the consistency and clarity of the eye, rays and hexagonal shape . . . though when made into jewelry the presence of solidified Devonian mud and silt can serve to enhance the design.



The Michigan Basin, once covered by a warm, salt water Devonian sea. Shown is an approximation of the coral reef where the Hexagonaria existed.

HAND PROCESSING PETOSKEY STONE SPECIMENS

Hand polishing a Petoskey Stone specimen:

1. The raw stone may be cut with a hacksaw. Shaping can be accomplished with a file, grinding wheel or whetstone . . . or, simply wetting a cement surface and grinding.

2. Once the basic shape has been achieved, get a container with clean water and using the roughest sandpaper (150 or 180 grit wet-or-dry silicon carbide sandpaper) wet both stone and sandpaper and begin sanding. A whitish residue will appear on the sandpaper. Wash this off sandpaper and stone frequently. Grind in a circular motion.

3. Once the stone is as smooth as possible, repeat the step above using 240 or 260 grit. Be sure your hands are free of the grit from the previous step. WASH STONE, SANDPAPER AND HANDS FREQUENTLY.

4. Repeat the step previous using 340 or 360 grit sandpaper.

5. Repeat the step above with 600 grit silicon carbide wet-or-dry sandpaper. Take care before this step being sure everything is clean. Sand until the stone is dry. It should have a dull luster and with no spots or scratches. If there are imperfections, it may be necessary to repeat the steps above. The stone may be shined at this point by rubbing it with baby oil or furniture wax.

6. For a high gloss, if the Petoskey stone is to be used for jewelry, use tin oxide or cerium oxide powder.

   a. BE SURE ALL MATERIALS (hands included) are clean.

   b. Place the stone in water.

   c. Mix the polishing powder with water until it has the consistency of toothpaste.

   d. Take cloth (flannel, felt, velvet--any type with a tooth in it), dab it in the polish paste and rub briskly until the desired glass is achieved. Do small sections of the stone at a time until it is all glossed. Wash the stone in water and dry. Do not clean with detergents as it may dull the gloss.

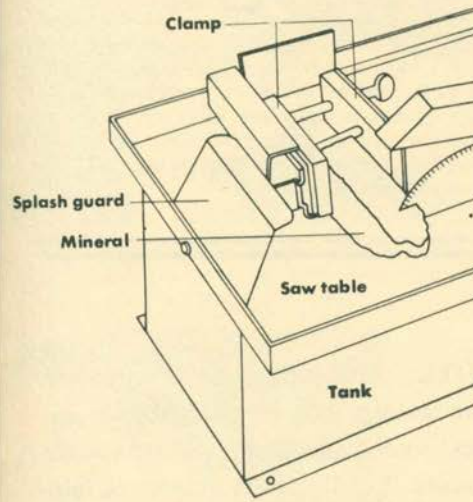
The method described above is used with the Petoskey Stone Kit prepared by Bits O' Mich. Additional sandpaper may be purchased at any hardware store or rock shop. See another method of hand processing in the back of this book.

PROCEDURES FOR CUTTING AND POLISHING PETOSKEY STONES BY MACHINE METHODS - -

The Petoskey stone is relatively soft, therefore "tumbling" is not recommended for polishing, and it is better hand or machine cut and polished.

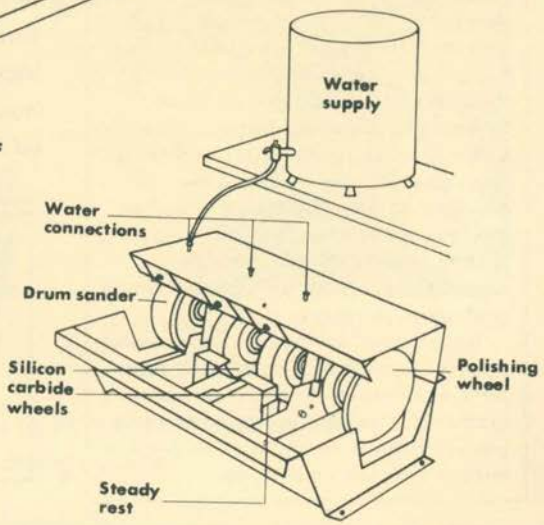
The process for converting a Petoskey stone into fine jewelry by machine methods is illustrated below:

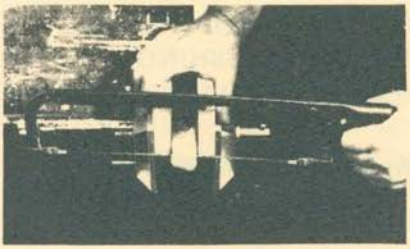
1. The stone is found.
2. It is slabbed cross-cut by diamond blade saws to bring out the fossilized hexagonal chambers individually.
3. Stones for jewelry mountings (findings) are traced and rough sawed from the slabs.
4. The smaller rough slabs are sanded to size, then the face is sanded using rough to fine sanding belts to bring out the fossil's design.
5. Final buffing on felt or cotton wheels treated with jeweler's rouges brings out the true luster of the stone. Finished at last, it is ready to be set into fine jewelry mountings.



Steps 1, 2, 3 are performed on this unit.

Steps 4 and 5 are performed on this unit. See pictorial step - by - step procedure in the back of this book.





To cut and polish gemstones by hand you need a tungsten carbide blade that fits in a hacksaw frame (above); small metal file; nylon brush; 4 small panes of glass; small quantities of 100-, 220-, 400- and 600-grit silicon carbide abrasive powders and cerium oxide polishing agent; and a square of plywood and pieces of sponge rubber and leather to cover it.

Saw the mineral to the shape you want, as above, and file off any projections. Sprinkle 100-grit abrasive onto a pane of glass and add water to form a

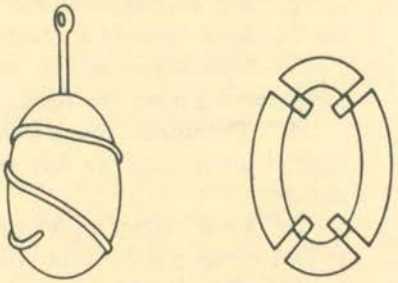


slurry. Work the mineral over this slurry in a V motion, as above. When the worst scratches and pits are gone, clean the stone with warm water and detergent. Move to a new pane of glass and the 220-grit abrasive and repeat the grinding process. Follow this with the 400-grit and 600-grit abrasive, cleaning between each step, until all scratches and pits have been removed. Then glue sponge rubber to the plywood square and tack the leather over the sponge rubber tautly. Apply a watery mixture of cerium oxide and water to the leather with a small brush, and polish the stone.

For a curved surface such as a round pebble, smooth and polish with dampened, abrasive-loaded cloths and leather scraps held in one hand while you work the stone against the cloth or leather with the other hand.

ANOTHER METHOD OF HAND-FINISHING PETOSKEY STONES USING ABRASIVE POWDERS

IDEAS FOR MOUNTING FINISHED PETOSKEY STONES .....



Two ways to mount a cabochon without gluing: Left, form a cage of 16- or 18-gauge gold or silver wire around the stone, then bring wire up the back of the stone and form a small loop for hanging stone on a pendant; Right, cut an oval of copper or silver larger than the cabochon, then cut small flaps in the metal and fold them up over the stone to hold it in place.

NOTE: Fine chains, silver wire, and fine settings may be purchased from local rock shops and jewellers supply houses. Sanding grits may be obtained from any rock shop.

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PICTORIAL STEP - BY - STEP PROCEDURES FOR CUTTING AND POLISHING PETOSKEY STONES - MACHINE METHOD



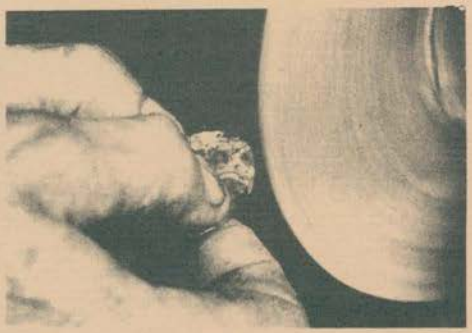
To mark an outline on stone, hold the pencil with tip touching bottom of template opening. Clear spray lacquer protects the marking as you saw, but remove it with alcohol before dopping.



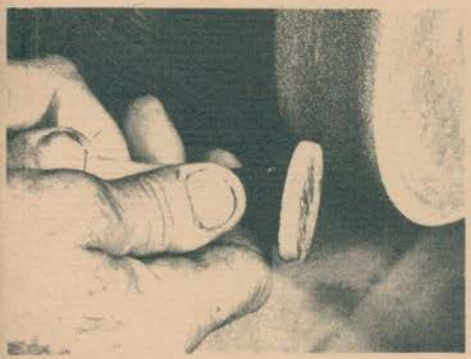
Holding the stone flat on the saw table, move it slowly into the blade until a notch is made. Although the blade doesn't have teeth, keep your fingers clear of it to avoid a burn or abrasion.



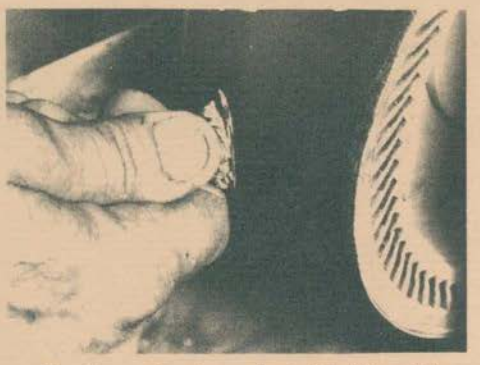
After notching edges on the saw, use nippers or tile pliers to nibble (break) off the small bits of excess material between the notches.



To grind down to the cabochon oval, apply the edge of the gemstone to the wheel with a wiping action that keeps the stone moving along the curvature of the oval. Keep the side of the stone at right angles to the wheel.



To grind bevels on the top of the cabochon, hold dopstick close to wax area and use wiping action to keep stone moving around each bevel.



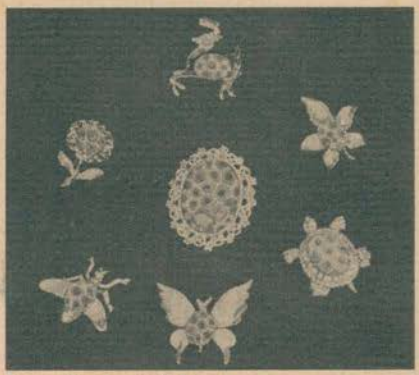
Use the sanding drum, first with 400- and then 600-grit wet sanding belts, to remove pits and scratches left from grinding the cabochon.

Final polishing is done on cotton or leather polishing wheels treated with jeweller's rouge or cerium oxide.

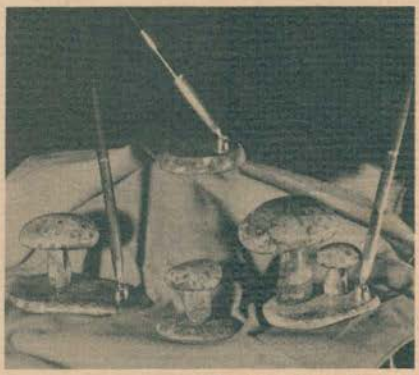
EXAMPLES OF FINISHED PETOSKEY STONES MOUNTED IN FINE JEWELRY SETTINGS



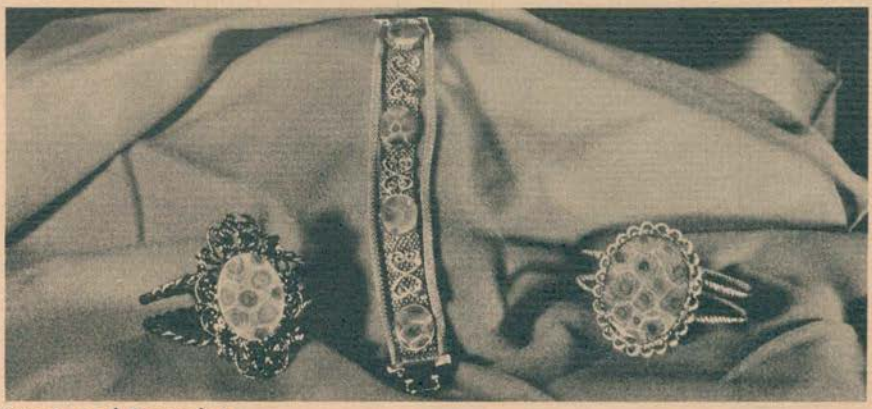
Necklaces and Pendants



Brooches and Pins



Decorative Items



Rings and Bracelets