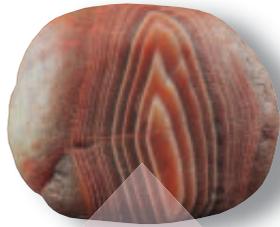


## Agate Hounds

Like prospectors panning for gold, **rockhounds** search for the state gemstone.



By **Kate Redpath**



**“Look at this one!”** Rob Grinde calls. “I found another billion-year-old beauty.”

Rob is a 14-year-old *agate hound*—someone who hunts for agates. Agates are rocks, and rocks are made of minerals such as quartz and hematite.

Rob and his friends are looking for Lake Superior agates in northeastern Minnesota along the Kettle River. They follow the winding shoreline, stopping to dig through gravelly beaches and pull stones from shallow water. Carrying small shovels and sacks, they crawl along the water’s edge to get a closer look. Sometimes they reach down into the mucky river bottom to see what they find.

The agate Rob just found really is 1 billion years old. Because it has been buried under ice or water or soil for most of that time, Rob might be the first human to touch it.

Whether young or old or in-between, agate hounds get excited when they find a Lake Superior agate, named the state gemstone in 1969. Agates are called gemstones because people cut and polish them for jewelry. These remarkably beautiful rocks are part of the history of the volcanoes and glaciers that shaped Minnesota’s landscape.

TOP LEFT: AGATE BY DAVID ENGLUND. RIGHT: J.D. CRIGGS, USGS HAWAIIAN VOLCANO OBSERVATORY/AGI EARTH SCIENCE WORLD IMAGE BANK



## Natural History of Agates

More than a billion years ago, an enormous crack formed in the middle of the continent. It stretched from the area now called Lake Superior all the way to Kansas. Molten lava spewed from this massive split in the earth and spread in layers across the land. When the lava cooled, millions of air bubbles formed near the surface. Some bubbles were big, but most were about the size of a pea or gumball.

Later, hot water percolated into the lava rocks and air-bubble pockets. The water contained the elements iron and silica. When the water drained out of the air pockets, it left behind the mineral chalcedony, a kind of quartz. Small amounts of iron from the water usually turned the chalcedony various shades of red. The chalcedony formed colorful bands and patterns, creating the rocks we call agates.

“All of the agates in Minnesota are called Lake Superior agates because they were formed from this same geological event,” says Laurel Woodruff, a geologist with the United States Geological Survey. Other kinds of agates occur all over the world, but Lake Superior agates have unique colors from iron—rich shades of red, orange, and yellow.

## The Rock Tumbler

Most of these agates sat locked inside lava rock during hundreds of millions of years of weathering and 2 million years of on-and-off glacial movement. Then about 15,000 years ago, toward the end of the last ice age, a glacier called the Superior lobe moved south from what is now Canada. This mountain of ice spread across north-central and northeastern Minnesota and part of northwestern Wisconsin.

As it moved across the land, the glacier scratched and dug and pulled many agates loose from the lava rock. It cracked and broke many of the agates. Like a rock tumbler, it polished some agates, making them shine like marbles.

As the glacier advanced and retreated, it dropped agates along its path. Lots of agates ended up along the North Shore of Lake Superior.



### Clues for Finding Agates

A red or orange glimmer on the ground could turn out to be an agate. Some agates are rough and dark on the outside and give only a hint of the treasure locked inside. One of Rob Grinde's agates looks like any other brown rock until he turns it over. Then he sees where the outer layer has eroded and exposed an amazing pattern of red, orange, and white stripes.

#### When agate hunting, look for these clues:

- Small rocks. Most agates weigh just a few ounces.
- Tiny holes on outside.
- Layers inside. They look like a sliced onion.
- Iron-red color. But not all agates are red.
- Rich color when wet. Look after a rain or squirt the rocks to see the richer color of agates.
- See-through layers. They may look clear in sunlight.
- Glassy shine. Compared with other rocks, agates may appear to be polished.

TOP LEFT: GARY ALAN NELSON. BELOW: DENNIS O'HARA. RIGHT-HAND PAGE: FORTIFICATION AGATE BY SCOTT WOLTER. EYE AGATE BY DAVID ENGLUND

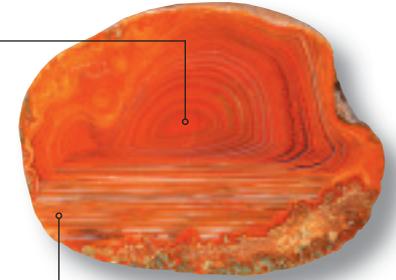


### Various Names

As agate hounds become more familiar with Lake Superior agates, they begin to notice various groups of rocks with similar banding and layers. Geologists have described many of these varieties. Here are a few examples.

#### Fortification agate

The most common agate, it has bands that look like the rings on a tree stump or the walls of a fort. These bands follow the shape of the cavity where the agate formed. Rob has nearly a hundred fortification agates in his collection.



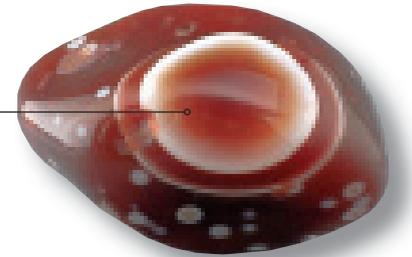
Above: This rock has both the rings of a fortification agate and the lines of a water-level agate. The agate formed as mineral water leaked into the cavity over and over again, creating ring bands and parallel lines.

#### Water-level agate

A stack of parallel lines shows how this agate was formed. As puddle after puddle of mineral water dried up, the quartz and iron minerals hardened one layer at a time.

#### Eye agate

This agate has small circular patterns, like a bull's-eye, on the outside. Rob and his friends are anxious to spot an eye agate because it is rare.





LAKE SUPERIOR BEACH BY GARY ALAN NELSON

## Where to Look

You can find agates wherever the Superior lobe traveled and left them behind. A rocky beach along Lake Superior is a favorite hunting place for agate hounds. Agate hounds also search in gravel pits and along lakes and rivers, especially in northeastern and north-central Minnesota. Rob and his friends look along rocky roads and in rock piles in fields. But they always ask permission to agate hunt on private property.

An agate hunt is like a treasure hunt. Every agate Rob finds—no matter how small—adds to his growing collection. Ask him about his best hunting spot, and he'll say he can't tell you. Rob and his hunting buddies have agreed to keep their spot a secret. But don't worry. There are multitudes of agates on the ground and along shorelines. Some have been waiting a billion years to be found. 



## Agate Center

The Agate and Geological Center in Moose Lake State Park displays agates and pictures that describe earth's geological history, including the formation of Lake Superior agates. The center's most famous agate, nicknamed Agzilla, weighs 49 pounds. A fisherman found it in the nearby Moose Horn River. For tour information, call 218-485-5420.

Taking agates from the state park is prohibited, but the Moose Lake Chamber of Commerce can grant permission for agate hunters to collect in local gravel pits. Call 218-485-4145.

AGATE CENTER, DNR PHOTO AGATES BY DENNIS O'HARA

## A NOTE TO TEACHERS

Find links to teachers guides to this and other stories online at [www.mndnr.gov/young\\_naturalists](http://www.mndnr.gov/young_naturalists).

## More Rockhound Attractions

The Geological Society of Minnesota displays lots of rocks, including agates, at the State Fair. For information on field trips and educational programs, visit [www.gsmn.org](http://www.gsmn.org).