

Precious Gems of the Appalachian Mountains

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Rocks and Minerals

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Abstract

The metamorphic rocks of the Appalachian Mountains were all made many thousands of years ago before mankind had ever thought about science or the formation of rocks. Mankind discovered early that we can use these minerals to our advantage so therefore the industry of mining was created. Minerals such as emeralds, gold, and other beryl's where considered precious and where sought after because of their beautiful looks. After these gems or precious stones were found they had to be cleaned and cut in specific ways but finding them was the hard part. The precious minerals and sought after not just because they are beautiful but also because they are rare. You can only find some gems in certain location in veins or isolated patches of land but after you find and treat these gems they can be among the most beautiful sights in the world.

Gems are crystals that are formed when rocks are put under extreme pressure or heat and are made into a glassy looking stone. These gemstones are spread out through thousands of tons of rock and are often very small. Finding these gems is not an easy task. The North Carolina mountains are known for their abundance of minerals such feldspar, mica, and quartz but they are also known for their gems. Emeralds, aquamarine, beryl, tourmaline, garnet, rubies, and sapphires have been found in this region of North Carolina, each one in their own specific location or together in one cluster. The three main gemstones that the Appalachian Mountains are known for are emeralds, garnets, and quartz crystals. The Appalachian Mountains are also known for their pegmatite rock composition. Pegmatites allow room for crystals and gems to form, this is why some of the largest emeralds in the world have been found in North Carolina. (Steve Teeter, 2010)

Emeralds

Emeralds are North Carolina's state gem for a reason. Some of the largest emeralds in the world have been found in North Carolina, such as the Carolina Queen which is part of the largest emerald ever found in North America. The emeralds of the North Carolina mountains where most likely formed when magma was forced up into the rock and allowed to cool. An emerald needs room to grow, if it is in perfect conditions and is allowed the time needed to grow, after many long years of formation and cooling you will have a large gemstone quality emerald. (Alex Glover & Kenneth B. Taylor 2008)

Mining and prospecting for emeralds is very difficult to do because the emerald clusters are spread out in the pegmatite throughout the mountains. To mine for emeralds various

companies do it differently. The once working Crabtree Mine in Mitchell County blew holes in the side of the mountain and tunneled in shafts throughout the surrounding area. The NAEM mine in Hiddenite, NC is an open pit mine where the miners dig the ground below them and look for open clusters of crystals. Both ways have proven to be efficient enough to produce some of the largest emeralds ever found. After these emeralds are mined they are not sold right away, they are cut and polished to maximize their value and their looks. (*Wade Edward Speer 2008*)

Garnets

Garnets are crystals that are common in the mountains in small sizes but to find a big crystal is really rare. Garnets are formed in the same way emeralds and other crystals present in the pegmatite of the Appalachian Mountains are formed. Garnets rate a 6.5 to 7.5 on Mohs Scale and can vary in color, some can be a dark red or some can be a bright cherry red but the ones in the North Carolina mountains tend to be more dark red and blackish in color. In other countries garnets can be found in a green uvarovite variation, a yellow grossular variation, and an andradite garnet that can be a solid black color. (*Geological Sciences at University of Texas, Austin 1998*) The problem with garnets is that most of the time when they are found they are in micro crystal forms which are so small they can't be cut into an actual gem, these garnets are referred to as industrial grade garnets. (*P. C. Rickwood 1981*). Unlike emeralds, garnets are mined not just for jewelry but for industrial use as well. Garnets can be made into inexpensive sandpaper which is sold in mass. While mining for the industrial grade garnets gemstone quality

garnets are often found. These go through the same process as the emeralds and are cut and polished to form the gemstone we see as garnet. (*University of Colorado 2007*). Garnets are not as valuable as other gemstones for a few reasons, they are found in abundance in the mountain area, and people do not find it as good looking as emeralds or rubies. However garnets are one of the most important gemstones you can find in the mountains.

Quartz

Quartz is the most well know gemstone there is. Quartz can be found in many places and is know for the large crystals that have grown. Quartz can be found in many different colors and sizes. Each variation of quartz has its own name, there are 6 main types. There are four types of quartz that can be found in the Appalachian Mountains, Amethyst, Smokey Quartz, and Rock Crystals along with traces of some other variations of quartz. (*Heaney, Peter J 1994*). Other than having good looks quartz is also has many types of industrial purposes. Quartz is used in the oscillation in many electronic devices, the inferred spectroscopy, as a light source in motion picture lighting, piezoelectric devices, and is used in time keeping. Quartz is as important in industry as it is as a beautiful gemstone. (*Encyclopedia Britannica 2010*)

Amethyst

One form of quartz is amethyst. Amethyst is a purple form of quartz. The **cause of this** violet color is attributed to iron and aluminum being added to the mix of the crystal. Amethyst can be found in its natural form in many different places, some of which being North Carolina, Brazil, Uruguay, and Ontario. (*Encyclopedia Britannica 2010*).



Low grade amethyst that is not of gemstone quality is turned into citrine. Citrine is a yellowish brown type of quartz crystal. It is one the rarest form of quartz there is. Very rarely are crystals of citrine found and not made. When amethyst and smokey quartz are exposed to really high temperatures its natural color changes to the yellow brown color of citrine. This creates controversy because citrine is so much alike topaz, which is a much more expensive gemstone, some sell it for the same price and get more money than the citrine is actually worth. The way to tell a topaz and a citrine apart is a hardness test. Citrine has a hardness of 7 like all quartz variations while topaz's hardness is 8. (*Encyclopedia Britannica* 2010).



Rock Crystal

Rock Crystals are a clear colorless form of quartz. It is a six sided prism ending in a six sided pyramid; it has no cleavage, a glassy texture, and is transparent. These clear crystals can be found in sizes of up to several meters long and can weigh hundreds of kilograms. (*Berti G.1994*)



Conclusion

Finding, mining, and discovering minerals has always been a difficult job, and isn't getting much easier. We as mankind will always depend on the minerals that the earth gives us. They give us millions of jobs and the resources we need to make the way we need life possible. Research will always need to continue on how we extract, process, and mine. Discoveries will continue to be made and people will still want some of the natural beauty of gems for years to come.

Bibliography

Alex Glover & Kenneth B. Taylor *Carolina Geological Society 2008 Fieldtrip and Annual Meeting Spruce Pine Mining District North Carolina*

amethyst. (2010). In *Encyclopædia Britannica*. Retrieved July 15, 2010, from Encyclopædia Britannica Online: <http://www.britannica.com/EBchecked/topic/20466/amethyst>

citrine. (2010). In *Encyclopædia Britannica*. Retrieved July 15, 2010, from Encyclopædia Britannica Online: <http://www.britannica.com/EBchecked/topic/118861/citrine>

[Gemological Institute of America](#), *GIA Gem Reference Guide* 1995, [ISBN 0-87311-019-6](#)

Heaney, Peter J. (1994). "Structure and Chemistry of the low-pressure silica polymorphs". *Reviews in Mineralogy and Geochemistry* **29** (1): 1–40.
<http://rimg.geoscienceworld.org/cgi/content/abstract/29/1/1>.

Marshall, Royal R. (1955), Absorption spectra of smoky quartz from an Arkansas vein deposit and from a Sierran miarolitic granite. *Am. Min.*: 40: 535-537.

P. C. Rickwood (1981). "The largest crystals". *American Mineralogist* **66**: 885–907.
http://www.minsocam.org/ammin/AM66/AM66_885.pdf.

quartz. (2010). In *Encyclopædia Britannica*. Retrieved July 15, 2010, from Encyclopædia Britannica Online: <http://www.britannica.com/EBchecked/topic/486427/quartz>

Smyth, Joe. "Mineral Structure Data". *Garnet*. University of Colorado.
<http://ruby.colorado.edu/~smyth/min/garnet.html>. Retrieved 2007-01-12.

Wade Edward Speer (2008) *The Geological Society of America, Fieldtrip Guidebook, Hiddenite District Alexander Co, NC* April 2008 Published by Speer Minerals, Inc Marion, NC