

GEM SCOOPS



Vol. 48, No. 10

Pendleton District Gem and Mineral Society

September 2010

Rappings of the Gavel

Our last meeting of the PDGMS got off to a rocky start when we were unable to get projection equipment to work so a video on Faceting could be displayed. Fortunately, Ted Wallenius had brought the Club faceting machine to the meeting and Ted and Fred used it to demonstrate the general approach to faceting. We plan to return the machine to the Graves factory in Florida for refurbishing so that it will be available for Club use next year.

The Nominating Committee has met and is in the process of putting together a slate of Club officers for next year. We very much need a candidate for President. If you have had experience conducting meetings, please let Chris Cicimurri know. To be an officer you do not have to be a mineral or jewelry expert. Ted and I will be available to help and we hope that we can get the whole club involved in planning all of next year's programs.

Fred

NEXT MEETING November 16, 2010

The speaker for November will be Connie Compton who will demonstrate "lampwork" glass bead making. She will also show additional samples of her work.

The November meeting will also be our annual election of officers for the following year.

OCTOBER CLUB MEETING

The October meeting of the Pendleton District Gem and Mineral Society will be held in Room 127 at the Industrial & Business Development Center at the main campus of Tri-County Technical College on October 19th at 7:00 p.m.

TOPIC: Diamond Hill Quartz Prospect

SPEAKER: Chester Karwoski

PROGRAM: The Diamond Hill Quartz Prospect is one of two active properties in SC where guests can dig for amethyst and other varieties of quartz. Near Antreville, it is by far the most productive quartz mine in the state. Chet will give an overview of mine operations and bring some samples for viewing and sale. The samples will include crystal specimens, and also things made from the crystals, such as animal carvings and gemstones/jewelry. An amethyst crystal will be raffled off during the meeting.

As an added treat, award-winning author Gail Karwoski will bring along some of her nine children's books. Her unique approach to writing books weaves a story, and a topic from science or history, into a fabric of learning and having fun at the same time. You can learn more about Gail at www.gailkarwoski.com.

Dale Boughman will serve refreshments. Visitors are always welcome.

Pendleton District Gem and Mineral Society

Minutes of General Meeting 9/21/2010

Location: Room 127 at Tri-County Technical College.

Attendance: Approximately 20.

The September meeting of the Pendleton District Gem and Mineral Society was brought to order a few minutes after 7:00 p.m. The topic for the meeting was Faceting to be based on a video obtained from the SFMS library.

There was some delay in getting the meeting started because the video projection equipment that was usually ready for use in the classroom had been disconnected during the renovation work. Meanwhile approximately

20 members and visitors enjoyed the refreshments provide by Dan Crawford. After a futile effort to set up projection equipment Fred Sias and Ted Wallenius presented an impromptu discussion on faceting using the club faceting machine. Several members and guests showed samples of gemstones they had faceted. The meeting was adjourned around 9:00 p.m.

2010 Officers

President: Fred Sias	864-654-6833
V.P. : John Palmer	941-545-3713
Secretary: Linda Rakey	864-224-4245
Treasurer: Phyllis Phillips	864-654-8514

2010 Directors

Larry Boller	864-296-8077
Chris Cicimurri	864-650-7115
Dr. Richard Warner	864-654-0913

Diamond Hill Quartz Mine

By Mike Streeter

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I have spent a great deal of time at the Diamond Hill Quartz Mine near Antreville, South Carolina over the past several months. Chester Karwoski, who purchased the property in 2003, brought in some heavy earth-moving equipment last fall and has opened up some new collecting opportunities. Since it is no secret that that I am a geologist by trade, I am often asked geological and mineralogical questions about collecting locales.

While digging at Diamond Hill, I was asked to explain how the rocks and crystals formed. Now there's a \$64,000 question for you! I answered the question as best I could at the time. Since then, I have researched the literature to obtain a more detailed explanation that I would like to share with you.

Diamond Hill has an amazing variety of different quartz crystals including amethyst, smoky, skeletal, milky, clear, and phantom. The mine has also become known for the relatively scarce phosphate mineral, cacoxenite first discovered at the mine by chance in late 2002.

The quartz crystals are generally found in clay filled pockets in a series of large quartz veins that trend in a northeast to southwest direction. The quartz veins were emplaced into a granitoid pluton (Antreville Pluton) as a result of series of late Paleozoic Era tectonic events. The Antreville pluton, itself, was intruded during the Taconic orogeny that extended from late Ordovician to Early Silurian Periods. Heat and pressure from Paleozoic regional metamorphism transformed the rock into granitoid gneiss.

Silica-rich hydrothermal fluids entered fractures within the metamor-



Large Amethyst Crystal from the Diamond Hill Mine in Antreville, SC.

phosed pluton and deposited the quartz veins. These veins must have contained voids that would later become sites for quartz crystals to form during a series of subsequent hydrothermal events.

All of these geological processes took place miles beneath the present earth's surface. It took over several hundred million of years of erosion to uncover the rocks. The granitoid gneiss has been deeply weathered resulting in the development of a thick soil zone made up of rock weathered in place. Such in situ weathered rock is called *saprolite*. Oxidation of iron bearing minerals formed clay that was transported by infiltrating meteoric water into the quartz-lined pockets. Much of the quartz and saprolite is heavily stained with red, brown, yellow and black iron and manganese oxides.

The number of different quartz crystal varieties that exists at Diamond Hill is nothing short of remarkable when you consider that the actual col-

lecting areas occupy a total of less than 3 acres and that each quartz type requires its own unique set of conditions to form. The three most sought after varieties of quartz at the mine are skeletal, smoky and amethyst.

Skeletal quartz (also known as elestial quartz) exhibits a layered or ribbed pattern. Its appearance gave rise to the term "skeletal" as the crystals resemble what someone with a good imagination would expect the skeleton of a quartz crystal to look like (not that they exist). The patterns exhibited by skeletal quartz represent internal and external dissolution-growth features resulting from unstable conditions during crystallization.

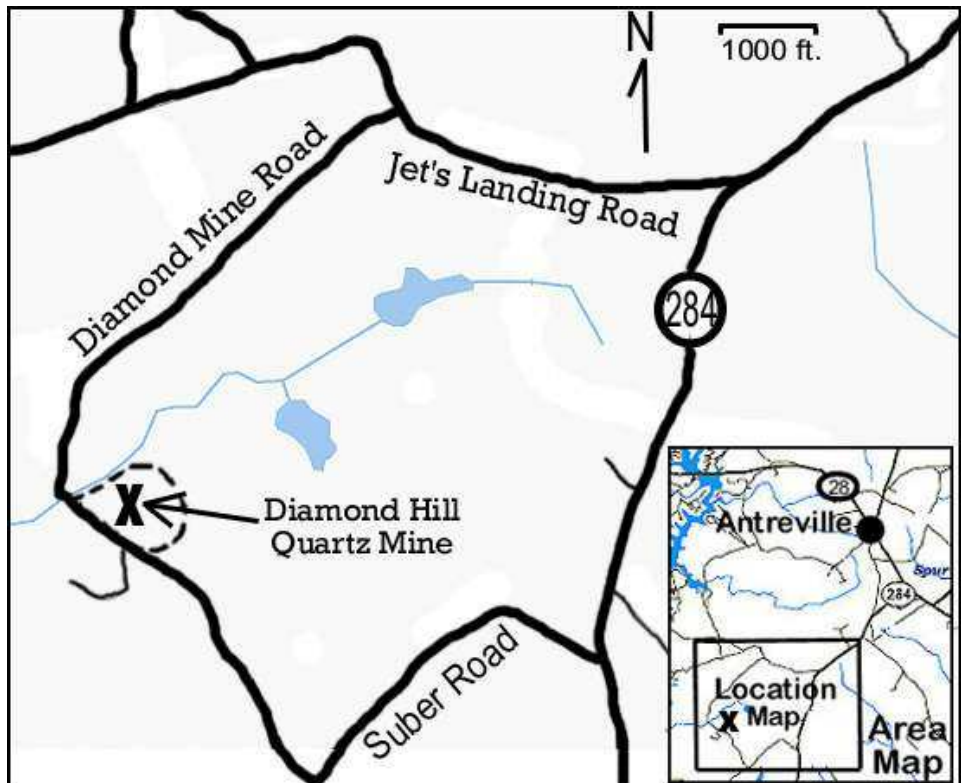
At the time that the crystals were forming, the conditions were such that the crystals would alternate between growing and dissolving. This "two-step forward and one-step backward" process resulted in the unusual step-like appearance. Very large plates and clusters of skeletal quartz can be recovered from quartz veins in

the eastern end of the upper pit at Diamond Hill. Like much of the other quartz varieties at Diamond Hill, many of the skeletal quartz crystals exhibit an overgrowth of clear quartz indicating a later phase of crystallization. This later crystallization forms "phantoms" where you can see the tips of skeletal quartz crystals beneath a clear crystal overgrowth that exactly mimics the underlying crystal.

Smoky quartz is generally transparent to translucent quartz that is gray to black in color. The characteristic color of smoky quartz occurs when rock crystal quartz is exposed to natural radiation from radioactive elements or adjacent radioactive rocks over long periods of time. The process by which this occurs is not completely understood but it has been theorized that the color is the result of altered oxidation states of the silica molecules caused by radiation. The granitoid pluton would be the most likely natural source of the radiation.

Smoky quartz seems to be most concentrated in the lower or western pit at Diamond Hill. Much of the smoky quartz appears to have grown in phases represented by larger blocky crystals growing on top of smaller crystals. Thin films of silica overgrowths are commonly found on top of the smoky quartz plates. In some cases, it appears that the overgrowths have been partially to completely dissolved, indicating an unstable environment during or after crystallization.

Amethyst is translucent to transparent purple quartz. The purple color is thought to be the result of two factors: 1) small amounts of iron impurities at specific sites in the crystal structure and, 2) exposure to natural radiation in a manner similar to smoky quartz. Again, the process by which this occurs is not fully un-



Map showing location of the Diamond Hill Quartz Mine near Antreville, SC. The mine is not open to drop-in visitors so mining permission should be arranged with the owner.

derstood but it is known that exposing amethyst to sunlight for a long period of time will cause the purple color to fade. Therefore, it can be concluded that it isn't the presence of iron alone that causes the purple color or else the mineral would not fade simply due to sun exposure.

Amethyst at Diamond Hill generally occurs as larger secondary crystals on top of translucent to transparent smaller quartz crystal druses in quartz vein pockets in the central portion of the mine. Local rockhounds use the term "jumping bigger" to refer to this phenomenon and as a key to finding amethyst while digging.

My experience has shown that amethyst crystals are almost always found pointed downward in a pocket and that a hint of purple color can sometimes be found in smoky quartz crystals.

If you are looking to find a collecting location that offers a rare opportunity to collect a variety of quartz types in one place, then the Diamond Hill Quartz Mine is your ticket. You can obtain more information and pictures of the Diamond Hill Quartz Mine by clicking on the Internet links below:

www.gaminal.org/diamond-hill-pics.htm
www.gaminal.org/DHAmethystPage.html
www.gaminal.org/DHSkeletalPage.html
www.gaminal.org/DHMilkyPage.html
www.gaminal.org/DHSmokyQuartzPage.html
www.gaminal.org/DHCacoxenitePage.html
www.gaminal.org/DHMiscellaneousPage.html

Membership Application Form

Pendleton District Gem and Mineral Society
Phyllis Phillips, Treasurer
Bob Campbell Geology Museum
Clemson University
140 Discovery Lane
Clemson, South Carolina 29634-0130

Please print:

Name _____ Residence Phone _____
(Last) (First) (Spouse's First)

Address _____ Zip _____

Email address _____

Individual membership \$15.00; Family membership \$20.00. (Please Circle which and amount enclosed.)
If Family membership, please print children's names below:

The Pendleton District Gem and Mineral Society serves refreshments at 7:00 p.m. and the meeting is called to order at 7:15 p.m. on the 3rd Tuesday of each month. The club meeting location is in Room 127 in the Industrial & Business Development Center at Tri-County Technical College in Pendleton, SC. The society is affiliated with the American Federation of Mineralogical Societies and the Southeast Federation of Mineralogical Societies. Individual and Family memberships are available at \$15.00 and \$20.00.

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