

Bulletin of the Mineralogical Society of Southern California

Volume 76 Number 7

July 2006

The 821st Meeting of The Mineralogical Society of Southern California

"Minerals Fakes, Frauds and Fantasies"

by Dr. Tony Kampf

Friday, July 14, 2006, at 7:30 p.m.

Geology Department, E-Building, Room 220
Pasadena City College
1570 E. Colorado Blvd., Pasadena

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"Mineral Fakes, Frauds and Fantasies"

Dr. Tony Kampf will be the featured speaker at the July 14, 2006, meeting. His presentation on "Mineral Fakes, Frauds and Fantasies" will begin at 7:30 p.m. One of the questions most asked by people who have never seen a beautifully crystallized mineral is "What did you do to make it so pretty?" The stock answer is "Nothing, it just grew that way." After years of experience and observation, the perceptive mineral collector must admit that in many cases that answer is flat out wrong. Many mineral specimens (and indeed most gemstones) have been

"doctored" in some way to improve their appearance and their salability. In this recently updated program, Dr. Kampf will take a critical and often humorous look at many different "enhancement" techniques and the clues to look for in detecting whether they have been used. Anyone who makes even occasional purchases of minerals won't want to miss this insightful presentation. Be prepared to judge the authenticity of the next specimen that you encounter that looks simply "too good to be true."

Tony Kampf is Curator and Department Head of Mineral Sciences at the Natural History Museum of Los Angeles County, an institution with which he has been affiliated since 1977. He holds a B.S. in Chemistry and an M.S. in Mineralogy and Crystallography from the University of Illinois and a Ph.D. in Mineralogy and Crystallography from the University of Chicago. He is a Fellow of the Mineralogical Society of America and has served The Mineralogical Record in many capacities. Kampfite, a barium silicate carbonate mineral was named in his honor. He is also known for leading great field trips for mineral and gem enthusiasts and is always a popular speaker.

July MSSC Board Meeting

The MSSC Board of Directors will meet on Sunday, July 9, 2006, at 2:00 p.m. at Jim Imai's home. All members are invited to participate in this event.

Minutes of the June 9, 2006, Meeting

The 820th meeting of the Mineralogical Society of Southern California was held on Friday, June 9, 2006. President Ilia Lyles brought the meeting to order at 7:30 p.m.

She then introduced the speaker of the evening, Dr. Robert Housley, currently affiliated with the Caltech Physics Department and a long-time contributor to the mineral community. Dr. Housley's presentation was entitled: "Minerals of the Santa Monica Mountains."

Dr. Housley described the distinctive features of rift rock, including massive calcium carbonate veins, calcium silicate veins, oil in mineral-lined cavities, and the presence of petrified wood and marine and leaf fossils. He also presented a chronological listing of publications documenting minerals found in the Santa Monica Mountains.

He further discussed the specific minerals found in different deposition environments and kindly provided his own map of the locality. Numerous slides of minerals found in the Santa Monica Mountains, as well as pictures of identified areas, were included in the presentation.

Dr. Housley announced that the field trip to the CryoGenie Mine would take place on June 18, 2006.

At show and tell, Ed Imlay displayed fluorescent minerals he collected at the Princess Pat Mine and in the areas around Kramer Junction. Janet Gordon provided Chalk Mountain, N.C. minerals she obtained during the recent Industrial Minerals Conference she attended.

The door prize was won by James Imai. The meeting was brought to a close at 9:00 p.m. by Ilia Lyles.

Respectfully submitted,
Pat and Geoff Caplette

Note: The author attended the 42nd Forum on the Geology of Industrial Minerals in Asheville, North Carolina, during May of 2006. Living up to the reputation of generous southern hospitality, the geologists, mining companies, universities, and mineral museums of the region hosted excellent technical sessions and field trips. Most of the information presented in the following article was learned while participating in the Forum.

The Remarkable "Granite" Deposits of Western North Carolina and Their Valuable Minerals

by Janet Gordon

Introduction

Geologically speaking, Western North Carolina lies in the southern Blue Ridge Province of the Appalachian Mountains. This area has a complicated geologic history resulting from the repeated assembly and rifting of continents. Major metamorphic episodes, huge thrust sheets, and rift basin sedimentary rocks are all important parts of the scene, but it is the relatively minor bodies of undeformed igneous rocks that are of special interest. As the youngest rocks in western North Carolina, they range in composition from granite to granodiorite to trondhjemite.



Typical pegmatitic texture of western North Carolina granitic intrusions.

Large white mineral crystals are feldspar, light gray is quartz, darker gray is muscovite. Much of the quartz and feldspar is intergrown in classical graphic texture, Archdale mine, Kings Mountain district.

Paul Gordon photo.

The most notable of these occur in the Spruce Pine mining district, which is known for its granitic pegmatites. At Spruce Pine the intrusions are about 380 million years old and consist of about 60% feldspar, 25% quartz, and 15% mica. The feldspar is principally sodium-rich plagioclase with lesser amounts of microcline (potassium feldspar). It is estimated that the crystals grew from the magma at temperature of 575 to 650(C at pressures of 5 to 8 kilobars, equivalent to a depth of 15-25 kilometers. These intrusions also display textures indicating recrystallization during a later heating event.

Mineral collectors who are acquainted southern California gem-bearing pegmatite dikes may imagine pockets filled with emeralds, and yes, these are the rocks that host vivid green beryl in some locations, but North Carolina pegmatites are not complexly zoned like their tourmaline- and beryl-bearing counterparts in southern California. The extremely coarse-grained North Carolina intrusions show little zoning and pockets are rare. From a commercial point of view, they have been more important as sources of mica, feldspar, ultrahigh-purity quartz, and kaolinite than for the emeralds and other gemstones that occur in the deposits. The production of these more mundane minerals has a long history that illustrates the

importance of minerals in everyday life.

Mica mining and products

Muscovite is currently being mined for industrial flake mica in the region, but historically it was the production of large sheets of mica that was important.



Replicas of muscovite artifacts found on Ohio Valley burial mounds on display at the Museum of North Carolina Minerals. Hand is slightly larger than life-size. Paul Gordon photo.

Prehistoric evidence indicates that muscovite mica was the first mineral mined from the western North Carolina pegmatites. It occurs as impressively large sheets and is easily picked out of the rock where the feldspar has weathered to clay. Native Americans mined the glittering muscovite during the Woodland Age 2000 years ago. Their workings included the "Sink Hole Mine" near the Mitchell County town of Bandana where abundant evidence of mining, such as tools and artifacts, was still visible in the 19th and early 20th centuries. Modern sheet-mica mining has destroyed this evidence. The prehistoric mica production was transported to centers of the Adena and Hopewell culture in the Ohio Valley hundreds of miles away. Artifacts retrieved from burial mounds suggest that the abundance of mica objects in a grave represented social status.

The large sheets of muscovite in the pegmatites attracted European settlers, too. They mined mica for isinglass, oven windows, and eventually for electrical insulators and electronic components. Mica sheets for lampshades are also an important regional product.

A stop at the Tar Heel Mica Company quickly impresses visitors that mica has been an important part of the local economy for decades. Inside the company's historic building workers are manufacturing sheets of laminated mica for making

lampshades using equipment nearly a century old. Other employees are busy making electrical insulators for a wide variety of industrial applications. The only thing that has changed much in the factory over the decades is that the sheet mica is no longer mined locally; instead it is imported from India.



Entering the Tar Heel Mica Co. in Plumtree, NC where little has changed since it was established in 1909.
Paul Gordon photo.

The flake mica mining operation in the Kings Mountain district of North Carolina with its modern equipment stands in sharp contrast with the Tar Heel Mica Company. At the Archdale Mine, which is run by an affiliate of Zemex Industrial Minerals, the Cherryville Granite of Mesozoic age is mined for mica, white feldspathic sand, and white kaolin clay. The mining takes place in weathered granite, and the ore is carefully blended before going to the processing plant to compensate for variations in the granite body. The clay is removed hydraulically, and the other minerals are rod milled. A combination of Humphrey spirals and flotation separates the mica, quartz and feldspar which are subsequently dried, ground and sized. The small flakes of mica are mostly ground into a fine powder and appear to have endless uses including as a reinforcing agent in paints, plastics, wallboard, caulking compounds, and brake pads.



A weathered book of muscovite in the wall of the mining museum at Emerald Village, NC, which illustrates the typical large size of mica sheets from the Spruce Pine district. Paul Gordon photo.

Kaolinite and feldspar production

Today the kaolinite produced at the Archdale Mine clay is used principally in the manufacture of unique white bricks, but North Carolina kaolinite mining has a long mining history. In the 18th century an agent for the famous English ceramist, Josiah Wedgwood, regularly purchased kaolinite from the Cheorkees who originally inhabited western North Carolina. Wedgwood used the kaolinite for making fine porcelain china until kaolinite deposits were discovered in England.



In the pit at the Archdale mine, Kings Mountain district, NC. White material is the weathered granite "ore." Dark material is older schist included in the granite intrusion. Paul Gordon photo.

The large feldspar crystals from the region's pegmatites were originally hand sorted and processed for the manufacture of abrasives, such as household cleansers, and for the manufacture of ceramics. In fact the weathered pegmatites have the major ingredients necessary to make that all-important fixture in your bathroom. The vital statistics for most toilets are 17% quartz, 17 % kaolinite, 33% ball clay (a highly plastic clay that adds strength) and 34% feldspar (which acts as a flux to reduce the firing temperature). Today much of the feldspar, which is sodium rich, is processed into a feldspathic sand and used in the production of fiberglass.

High- and ultrahigh-purity quartz

Until late in the 20th century, there was no regular demand for the quartz of the western North Carolina pegmatites. Mostly the quartz was discarded or left in the mines. But the high purity and ease of hand sorting of quartz in the Spruce Pine district did eventually attract attention. Quartz from one Spruce Pine pegmatite was used to make the 200-inch reflecting mirror for the telescope at Mount Palomar. After World War II, flotation methods for separating minerals revolutionized the way the pegmatites were mined, and late in the 20th century it was recognized that the ultrahigh-purity quartz was just the thing for making high purity silica glass for the electronic industry and for use in the manufacture of silicon wafers used in computers and other high tech devices. Locals claim that 98% of the high-purity silicon chips used in the world's electronic devices were made using Spruce Pine quartz.

So what makes this quartz so special? One explanation is that following the original crystallization from the magma, the intrusions were recrystallized. This allowed the few impurities that existed in the quartz originally to be excluded and produced crystals of exceptional purity.



In the Zemex Industrial Minerals processing plant, mica flakes are separated from ground quartz and feldspar in floatation tanks. Paul Gordon photo.

September 16-17, Paso Robles, Santa Lucia Rockhounds, Pioneer Park and Museum, 2010 Riverside Ave., Hours: 10-5 both days, Joyce Baird 805-462-9544. liljoysee@charter.net.

September 23-24, Carmel, Carmel Valley Gem and Mineral Society, Monterey Fairgrounds, 2004 Fairgrounds Road, Hours: Sat. 10-6, Sun. 10-5, Sky Paston 831-755-7741, sky@familystones.net, www.cvgms.org.

September 23-24, Downey, Delvers Gem and Mineral Society, Woman's Club of Downey, 9813 Paramount Blvd., Hours: Sat. 10-6, Sun. 10-4, Teresa Widdison (562-867-1521, twiddison72@aol.com).

September 23-24, San Diego, San Diego Lapidary Society, Bernardo Winery, 13330 Paseo Del Vernao Norto, Rancho Bernardo, Hours: 10-4 both days, Kim Hutsell 619-294-3914 info@sandiegolapidarysociety.org.

Save the date!

The MSSC Annual Picnic will be held on Sunday, August 13 at 2:30 p.m. in the PCC Geology Department.

Start thinking now about what you can contribute for the Silent Auction at the picnic.

Look for details in the August MSSC Bulletin....

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