

Mineralogical Society of the District of Columbia

MINERAL MINUTES



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Club Meeting: Wednesday, May 5, 7:45 PM

The regular monthly meeting of the MSDC will take place as noted above. We meet at 7:45 PM in the lobby of the Smithsonian Natural History Museum.

Program and Speaker: "Collecting Rocks and Minerals in Greenland: A Slide-show and Trip Report." Bob Simonoff spent a week collecting minerals in southern Greenland, in and around a town called Narsaq. He will present a slide show of the trip, and with help from his daughter, Jessica, will describe minerals he collected there.

Place: The National Museum of Natural History, Smithsonian Institution, 10th Street and Constitution Ave, Washington D.C. We will gather at the Constitution Avenue entrance at 7:45 PM to meet our guard who will escort us to the Cathy Kirby room. If you park on the street, **THERE ARE NOW PARKING FEES, PAYABLE AT THE KIOSKS, AND ENFORCEMENT UNTIL 10 PM.**

Dinner: Some of us will meet for dinner at the Pier 7 Restaurant at 6:00 PM for dinner before the club meeting. Give President Andy a call at (301) 270-6790 so he can make reservations if you wish to attend.

The Prez Says - A Word From the President

- Andy Thompson

How Well Do Your Rocks Nurture Your Brain and Your Learning Experiences?

Someone has tried to assist my waning mental abilities by giving me a copy of Brain Rules: 12 Principles for Surviving and Thriving at Work, Home and School, written by John Medina. The author is a molecular biologist who takes the most up to date (2008) research

findings on how the brain works and, applies those insights and suggests ways to improve our daily living. John's rules include that physical exercise boosts brain power, repetition builds memories, spaced repetitions are key to remembering, sleeping well leads to thinking well, additional sense experiences support memory, and so forth.

What I am coming away with are two impressions that relate to the world of rock hounds and participation in club meetings. Although both are probably obvious, I find both reflections interesting.

The first is that many club members are long-term students of rocks and their interests include a wide range of geological matters. Their interests could be in specific minerals such as gold, sapphires, opals, fluorite, fluorescents and could also extend to diverse collecting sites such local quarries or foreign lands. Bob and Jessica Simonoff's MSDC May program on Greenland rocks and minerals is a fine example.

My point is that such a diverse range of members' interests may initially appear random and therefore fragmenting. But time is definitely on our side and repetition works on our behalf. Our monthly programs, given several years of members' time and attention, will indeed gradually build a strong base for club members' gradually developing an understanding of geological principles and the characteristics of mineral families.

The second impression I come away with from Brain Rules is that the nature of our content and programs supports our members' mineral education. In particular, the beauty of the geometric crystals, the colorful slide presentations, the interpersonal exchanges, occasional puzzling questions and even the occasional naps enjoyed during meetings, all contribute, according to Brain Rules, to nurturing a quick and retentive memory of things geological. Minerals' beauty and detail captivate our attention and stimulate our mind and emotions. The more the club meetings' capture our emotions and stimulate our

senses, the easier it will be for our mind to engage, our memory to recall and our mind to learn.

Obvious and simple as such research-based observations may be, they do support why mineral club meetings enjoy the popularity they do. If you can make our upcoming meeting on 5 May, please feel free to bring along a mineral or fossil of your choice, to share informally after our presentation on Greenland rocks and minerals.

MSDC Meeting Minutes - April 7, 2010

- Andy Thompson (acting on behalf of Secretary Betty Thompson)

MSDC members welcomed six guests to our April meeting, including Bob and Jessica Simonoff, Sheryl and Amber Sims, Patti Rehill and Casper Voogt. Several of the guests said they found their way to our meeting because of our website which Casper has been competently updating.

Andy then thanked past presidents Ed Fisher and Cynthia Payne for their years of service to our club.

The attendees then approved the Minutes of the March meeting as printed in the April edition of the club's newsletter. MSDC Vice President Tom Tucker reported that Bob and Jessica Simonoff will present at our May 5th meeting. For our June 2nd meeting, Tom reported that in all probability, Tom and Eric Grundel will combine forces to tell about their field collecting trips and the minerals they encountered.

In lieu of Treasurer Rick Reiber's first-hand report, Andy shared the good news that MSDC's finances have had no significant recent changes in revenues or expenses. Thanks to the generosity of several of our past members and their families, our accounts, including funds available for future scholarships, contain approximately twenty five thousand dollars. Attendees briefly discussed a possible computer-related expenditure for the desktop publication of our monthly club newsletter. But whether or not this is an actual need has not been determined and at this point in time is simply a question being considered.

Casper Voogt then gave attendees and update on his work with revamping the MSDC club website. The improvements, in www.mineralogicalsocietyofDC.org are obvious to all. MSDC members expressed their sincere appreciation for Casper's expertise and generosity.

There were no "old business" matters, except to report and read the thank you note that our scholarship recipient Stan Mordensky sent to MSDC. Attendees raised no "new

business" matters and members mentioned no "geology in the news" reports.

The business meeting concluded with the auctioning of several door prizes, including several donated by Cynthia Payne. Her donation of a pyrite specimen with relatively large cubic crystals resulted in \$6.00 being added to the MSDC treasury. Andy then thanked Susan and Ed Fisher, and Betty Thompson for bringing/sending goodies for members' enjoyment.

Members made a motion and seconded that the business meeting be closed. Tom Tucker then introduced the evening's speaker, Dr. Eloise Gaillou.

Summary of the MSDC April Program - AN EYE FOR DIAMONDS - Dr Eloise Gaillou

- By Sheryl E. Sims

[Editor's note: MSDC was honored to have Sheryl Sims visit with us for the April meeting. Ms. Sims is a member of the Northern Virginia Mineral Club and prepared the following article for inclusion in their newsletter. She graciously allowed us to also include it in *The Mineral Minutes*. Ms Sims was accompanied at the meeting by her daughter. We hope they both will visit us again and often. (The format, fonts and spacing in the article were adjusted to fit the format of *The Mineral Minutes*.)]

Many of us remember the colorful song of our youth pertaining to rainbows: Red and yellow, and pink and green, orange and purple, and blue—well, the same color reference may be made for diamonds. They come in all colors! The color, along with clarity, cut, and number of carats, determines their value. This was further explained by visiting scientist to the Smithsonian Institution, Eloise Gaillou, Ph D. Dr. Gaillou is a French scientist from the Université de Nantes.



(photo by Sheryl Sims)

At the April 7, 2010 club meeting of the Mineralogical Society of the District of Columbia, Dr. Gaillou gave a

brief lecture on, “The Beauty of Defects: Color in Diamond.” Because diamonds are indeed a girl’s (or a guy’s) best friend, I attended that meeting and learned more than I ever hoped to know about diamonds. As in my case, one need not have a background in geology or mineralogy to appreciate the beauty and value of diamonds. One only needs eyes to see their beauty, and the desire and money, to possess them.

Webster’s II New College Dictionary defines a diamond as: “a very hard, highly refractive colorless or white crystalline allotrope of carbon, used when pure as a gemstone and otherwise chiefly in abrasives.” While they are defined as being colorless, diamonds actually range from one end of the spectrum to another in terms of color and rarity. They are made up of carbon, but usually contain some impurities of nitrogen, hydrogen and very rarely boron. Diamonds are formed at least at 150 km deep in the earth and need a thick crust on top of them called a “craton.”

The most common color for diamonds is brown or subtle yellow. The brown colored diamonds, according to Dr. Gaillou, are referred on the market as champagne, cognac, or chocolate. Brown diamonds display a so-called “graining,” she stated, and this is due to plastic deformation.



Jewellers diamonds. (medium brown color.)
National Museum of Natural History

Diamonds can be found in almost every color of the rainbow: steel gray, white, blue, yellow, orange, red, green, pink to purple, brown, and black¹

What causes coloration in natural, non treated diamonds? Colored diamonds contain impurities and structural defects. These defects cause the coloration. However, pure diamonds should theoretically be transparent and colorless. They are classified into two main types and several subtypes. This is done based on how the impurities in them affect light absorption and on the type of impurities found.

Type I diamonds have nitrogen atoms as the main impurity, commonly at a concentration of 0.1%. If the nitrogen atoms are in pairs they do not affect the

diamond's color; these are Type IaA. If the nitrogen atoms are in large even-numbered aggregates they impart a yellow to brown tint (Type IaB). About 98% of gem diamonds are type Ia, and most of these are a mixture of IaA and IaB material: these diamonds belong to the Cape series, named after the diamond-rich region formerly known as Cape Province in South Africa, whose deposits are largely Type Ia. If the nitrogen atoms are dispersed throughout the crystal in isolated sites (not paired or grouped), they give the stone an intense yellow or occasionally brown tint (Type Ib); the rare canary diamonds belong to this type, which represents only 0.1% of known natural diamonds. Synthetic diamonds containing nitrogen is Type Ib. Type I diamonds absorb in both the infrared and ultraviolet region, from 320 nm. They also have a characteristic fluorescence and visible absorption spectrum.²

Type II diamonds have no measurable nitrogen impurities. Type II diamonds absorb in a different range of the infrared. They also have different fluorescence characteristics (but no discernible visible absorption spectrum). Type IIa diamond can be colored pink, red, or brown due to plastic deformation during crystal growth—these diamonds are rare. Type IIb diamonds, are usually light blue due to scattered boron within the crystal matrix. A blue-grey color may also occur in Type Ia diamonds and be unrelated to boron. Green diamonds get their color from exposure to varying amounts of radiation.³

Natural Black or grey diamonds. What are they and why are they black? According to Dr. Gaillou, the origin of color in natural black diamonds is mostly caused by a total absorption of light that can be due to:

- a large quantity of black or grey inclusions (usually sulfides or graphite inclusions)
- a large amount of fractures that will absorb light,
- or a very, very dark color, the stone will therefore appear black, but under a strong fiber optic light, a color (usually brown) can be observed

Colorless diamonds are clear and have no absorption of light in the visible range. Dr. Gaillou stated the following about colorless diamonds:

They can still contain a lot of impurities, such as aggregated nitrogen(A-aggregates for example) that do not absorb in the visible range, but only in the infrared (they can be type I or type IIa diamonds).

According to experts:

A chemically pure and structurally perfect diamond would be perfectly transparent with no hue, or color. However, in reality almost no gem-sized natural diamonds are absolutely perfect.

*The color of a diamond may be affected by chemical impurities and/or structural defects in the crystal lattice.*⁴

White diamonds have a milky appearance due to tiny inclusions that have the right size to diffract light. Another reason for the opalescence, according to Dr. Galliou, "is the presence of a very strong fluorescence, even under visible light, which is the example of the Portuguese diamond, in exhibit at the Smithsonian Institution."

Vivid Yellow diamonds are very valuable and are called "cape diamonds." Their color mostly comes from their N3 color center, that involves 3 nitrogen atoms surrounding a vacancy.

Green diamonds are very rare and very popular. Their color comes from natural irradiation that creates vacancies in the structure (carbon atoms are removed from the diamond) Dr. Galliou continued by stating that:

A color center named GRI center (neutral vacancy) is created and will absorb red and orange. But to have the green color, the N3 center absorbing the violet/blue needs to be present as well, so that the only color that can be emitted by the stone would be green. Faceted green diamonds are really rare, as the irradiation of the stone is usually on the surface of the rough diamond, and when the diamond is cut and polished, the surface layer that is colored in green is removed, and only remains a yellowish diamond.

Blue diamonds are the purest as they contain the less impurities of all diamonds. They are also the most desired and expensive. Per Dr. Gaillou:

Blue diamonds are type IIb and contain a small amount of boron (< 1ppm) which gives them their blue color. Most natural blue diamonds emit a blue phosphorescence. Interestingly, the famous Hope Diamond phosphoresces red for over a minute, a feature that is rare among blue diamonds. The only other blue diamond that presents such an intense red phosphorescence is the Wittelsbach-Graff diamond.

Note the Hope Diamond. It has 45.52 carats (9.104 g) and is a fancy dark grayish-blue. Fancy-colored diamonds such as the deep blue Hope Diamond are among the most valuable and sought-after diamonds in the world. (It is reported that in 2009 a 7-carat blue diamond sold for the highest price per carat ever paid for a diamond. It sold at

an auction for 10.5 million Swiss francs or \$9.5 million. Each carat sold for more than \$1.3 million per carat.⁵



(Museum of Natural History, The Smithsonian Institution)

Pink diamonds can have color modifiers like brown and purple. (Red diamonds are really just dark pink diamonds.) The cause of their color is not really known, however, the color is concentrated in the pink graining, which is known to be due to plastic deformation. The Darya-I-Nur Diamond (translated: River of Light) is one of the world's largest diamonds. It is one of the rarest diamonds because of its pale pink color, and it weighs about 182 carats (36.4 g). Its exact weight is not known because it has been mounted in its brooch setting for over 130 years.⁶

¹ Wikipedia. (http://en.wikipedia.org/wiki/Diamond_color)

² J. Walker (1979). "Optical absorption and luminescence in diamond." Rep. Prog. Phys 4: 1605-1659

³ Sources for Type I and Type II diamonds: http://en.wikipedia.org/wiki/Diamond_color

⁴ *Ibid*

⁵ *Ibid*

⁶ *Ibid*

One of My Favorite Things - The Minerals of the Dal'negorsk Mining Region

- Susan Fisher

(Editor's Note: Last month I suggested that we start a column titled "My Favorite Things." I had hoped to draw out some MSDC's vast wealth of knowledge on topics such as Pennsylvania minerals, calcites of the world, fossils of the Chesapeake Bay area, sapphire collecting in Montana, the minerals of Creede, Colorado (Have I given anyone a hint????), or anything you find interesting. It may be that spring fever has overtaken all of us so no one wants to step up to be the first. Come on and give it a try. You will have some fun considering what you love and the rest of us will learn something. The down side of the no one sending me something is that you get to read about another of my own favorite things.)

When I saw my first optically clear, absolutely colorless fluorite from Dal'negorsk in the early 1980s, I was enchanted. How could something so delicate and so perfect be formed in a lead-zinc mine? As I researched the literature, I discovered that that mining district had far more to offer than just great fluorite. I had to know more

about this rather exotic place. Dal'negorsk seems to have something to spark everyone's imagination. In addition to wonderful minerals, it has a tie to Hollywood, a supposed UFO crash site, political intrigue, and environmental concerns.

Dal'negorsk is a mining region in the Primorskiy Kraj district, Far East Russia, about 300 km north east of Vladivostok. This region is home to nine different mineralized deposits, including the one containing the famous Nikolaevskiy Mine and about 175 mineral species. The old Chinese name for Dal'negorsk is "Tetyukhe" (meaning "valley of the wild pigs") and can be encountered on some old mineral labels. There is evidence that some mining was taking place there in the 12th and 13th centuries but little was done in the region until the late 19th century. In 1897 a mining claim was filed in the name of Swiss immigrant Julius Brynner. The settlement of *Tetyukhe* was founded in 1899 near the first lead and zinc mine. Brynner's son Boris maintained the right to mine on the site until 1931, one of the longest-running private enterprises in the Soviet Union. Boris Brynner's son Yul Brynner later became a famous actor in the United States. In 1972, when the Soviet government was trying to remove the Chinese influence in the area, the settlement was renamed Dal'negorsk. In 1986 the region gained some notoriety when there was a reported UFO crash on Mount Izvestkovaya, also known as Height 611. The area gained further notoriety on October 19, 2006, three days before scheduled elections, when Dmitry Fotyanov, the mayoral candidate from the United Russia party was gunned down with assault rifle fire and the weapons were located by the police in a minivan that was blown up near the offices of the local newspaper. Recently it has been found that the region's long history of lead mining and smelting has caused some Dal'negorsk residents to suffer from serious lead poisoning.

The minerals of the Dal'negorsk region are truly special. The geology of the region has a lower level made up of cherty and carbonate rocks. This layer is overlain with magmatic arc volcanics. The entire area is broken by numerous faults and intrusive bodies. There are large sulfide ore deposits emplaced in the resulting skarn. There are also very unique borosilicate deposits (the "Borosilikatnoye deposit") predominantly composed of the minerals danburite and datolite. These borosilicates are sometimes accompanied by sulphides and a suite of rare native elements : antimony, arsenic and bismuth.

I am attracted to the fluorites that are present in cavities in the skarn deposits. In addition to the colorless, optically clear fluorite cubes and cubo-octahedrons, there are lovely moss green octohedrons that may perch on sharp sphalerite crystals. There are also delicate blue fluorite cubes nestled in white quartz. Calcite crystals are present in an a

dazzling array of shapes and degrees of clarity. In the early 1980s some of the world's best ilvaite was recovered. The lustrous black prisms are elegant. Even the common ore minerals take on unique, lovely forms. The large, tabular, mirror faced, spinel twined galena crystals on quartz are amazing as are the spinel twined sphalerite crystals. Quartz crystals draped in clear, shimmering datolite crystals make an amazing display. The list of notable minerals goes on and on. I suggest that the next time you visit a mineral display, take special note of the minerals from Dal'negorsk as you are in for a treat.

Upcoming Events: Start planning those spring trips now!

May 1-2: Topsfield, MA - 47th Annual New England Mineral & Gem Show sponsored by the North Shore Rock & Mineral Club. Topsfield Fairgrounds, Topsfield, MA

June 5: Macungie, PA - Spring Minerafest sponsored by the Pennsylvania Earth Sciences Association. Macungie Memorial Park Building, Macungie, PA.

June 26-27: State College, PA - 5th Annual Nittany Gem and Mineral Show sponsored by Nittany Mineralogical Society, Inc., at Mt. Nittany Middle School, 656 Brandywine Drive, State College PA 16801 Saturday 10-6, Sunday 11-4.

Guests and Members at the April meeting.

(Pictures courtesy of Cynthia Payne)

