The Mineral Minutes

Volume 77-12
December 2019

In this Issue:

Announcement 1:

There will be no regular club meeting on the first Wednesday of December, 2019. A formal meeting is replaced by a Holiday Party, see below.

Announcement 2:

All members are invited to MSDC 2019 Holiday Party on Saturday, December 14, 2019. It will take place at the house of the club President, Dave Hennessey. Time and address will be communicated in a separate email.

Announcement 3:

Since the first Wednesday of January of 2020 falls on New Year Day, our January meeting will take place on the second Wednesday, January 8, 2020. Program details will be provided in the next edition of this newsletter.

MSDC's November 6, 2019 Business Meeting Report

by Andy Thompson, MSDC Secretary

MSDC President Dave Hennessey called the meeting to order and thanked the club's attending former presidents for their service. He then called for the Treasurer's report and John Weidner gave an overview of the club's finances, including the expected upcoming end-of-year donations. He indicated the club currently had 31 paid memberships.

Dave then turned to the topic of MSDC's annual holiday party which by tradition is in lieu of the club's December meeting. This year it is scheduled for Saturday, December 14th. He said he would send members and guests an email invitation which will provide all needed information about the celebration including location and directions. Any member who does not receive an invitation should contact him at davidhennessey@comcast.net. Also, note that the MSDC January meeting will be held not on the first Wednesday [New Year's Day], but on the second Wednesday, January 8th.

Dave reminded everyone of the upcoming Northern Virginia mineral club's November 23-24 gem and mineral show held annually on the campus of George Mason University. He also referenced the upcoming Richmond mineral show and encouraged everyone to attend and enjoy the events.

His call for Old or New Business that might need discussion resulted in no additional agenda items. For the Geology In the News segment, only one item was shared. Dave Nanny described a quasi-mineral named "Termination Dust." It refers to the first snowfall of winter whose arrival in some Alaskan tourist towns effectively signals the end of the tourism season.

(cont. on p. 2)

Prez Says…

by Dave Hennessey
MSDC President

The holiday season is upon us! In keeping with past years, we are having a Holiday party at a member's house in lieu of a meeting at the Smithsonian. An email will be coming to all members and our honored invited guests, reiterating the place, date, and time announced at the November meeting. Hope to see you all there. Remember,

NO MEETING AT THE SMITHSONIAN THIS MONTH!

(cont. on p. 2)

(Business Mtg. cont.)

Lastly Dave called for the approval of the Business Minutes for the October meeting as published in the Mineral Minutes November edition. With no corrections or changes offered, the attending members approved them unanimously. Dave then turned the meeting over to Yury Kalish, VP for Programing, to introduce the evening's presenter.

Phenomenal pictures of a European cave

by Tom Tucker

Today, on a "mineral collectors" website that I frequent, I stumbled upon these webpages of pictures of phenomenal formations and passages in a cave I believe in Spain. I've only looked at one or two pages so far, and there are many more pages to enjoy. Many of the pictures are just "snapshots", but the cave scenes are exceptional. The captions and text are in Spanish, but are readily translated with the "button" at the top of the page. The cavers are French I believe, but I haven't spent a lot of time digesting the text, and there may be multiple sources of the photos.

I think in the past European caves suffered at the hands of specimen-hungry mineral collectors, and as a result cavers tended to be very secretive about cave identifications and localities, but I think there is more respect among the diverse groups in recent times. While hiking in the Italian Alps several years ago I was pleasantly surprised to come upon a fieldhouse belonging to a joint speleological and alpine mineral collector rescue organization, so at least some of them are getting along.

Here's a webpage to begin with, enjoy: https://www.foro-minerales.com/forum/viewtopic.php?p=130502#130502

(Prez Says cont.)

Also, please be thinking about Election of Officers for 2020. The current leadership team (David Hennessey, President; Yury Kalish, Vice President; Andy Thompson, Secretary; John Weidner, Treasurer) are willing to continue in 2020 but other nominations including self nominations are welcomed. We also need to fill two Board of Directors (BOD) positions. BOD members serve for three years, and our current 3-member BOD is Ken Reynold, Dan Teich and Amanda Parker. Amanda is unable to continue because of conflicting commitments and Ken's current term is coming to an end. Usually we are only electing one new BOD member each year but this year we will be electing two. Ken has indicated he is willing to continue for another 3 years and Leslie Nanney has indicated she is willing to serve as well. As with the Officer positions other nominations including self nominations are welcome for BOD. We will vote on the Officer and BOD positions at our January meeting.

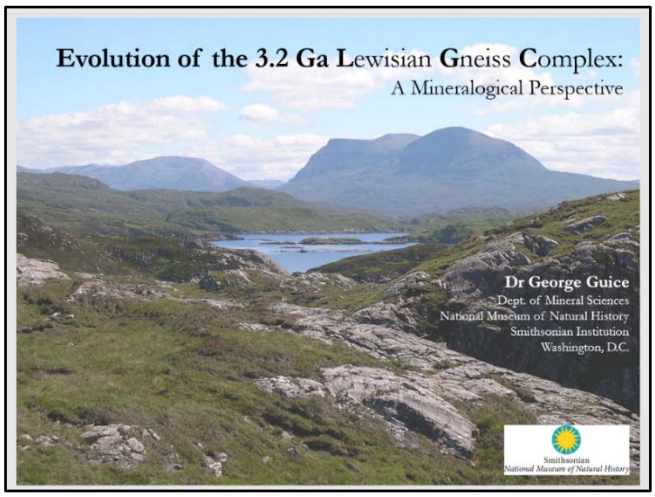
And speaking or our January meeting, the meeting date will be January 8th. Our normal first Wednesday meeting date would fall on New Years Day, so we are postponing the meeting one week. For February and after, we are back to meeting on the first Wednesday of the month.

Hope to see you all at our holiday party. Happy Holidays!

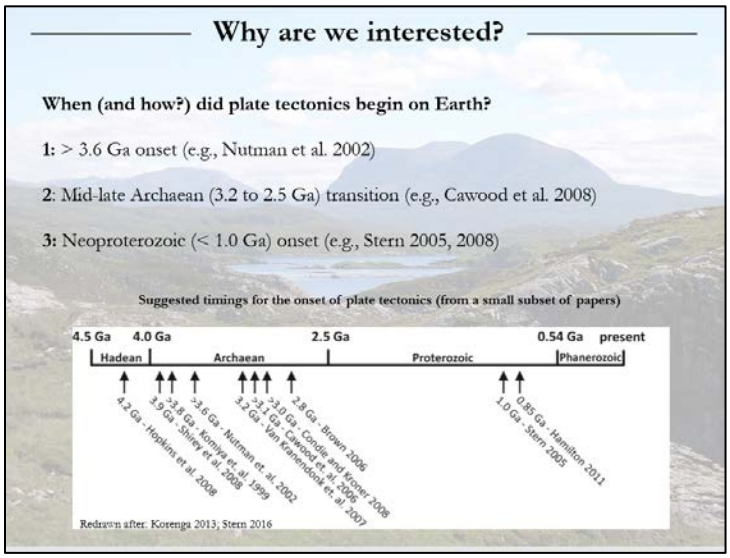
November 6, 2019 Program Presented by Dr. George Guice "Evolution of the 3.2 Ga Lewisian Gneiss Complex: A Mineralogical Perspective"

Synopsis by Andy Thompson, MSDC Secretary

MSDC's Vice President for Programs, Yury Kalish, introduced the evening's presenter, Dr. George Guice, who came to the Smithsonian's National Museum of Natural History in July as a post-doctoral Fellow in the Department of Mineral Sciences.

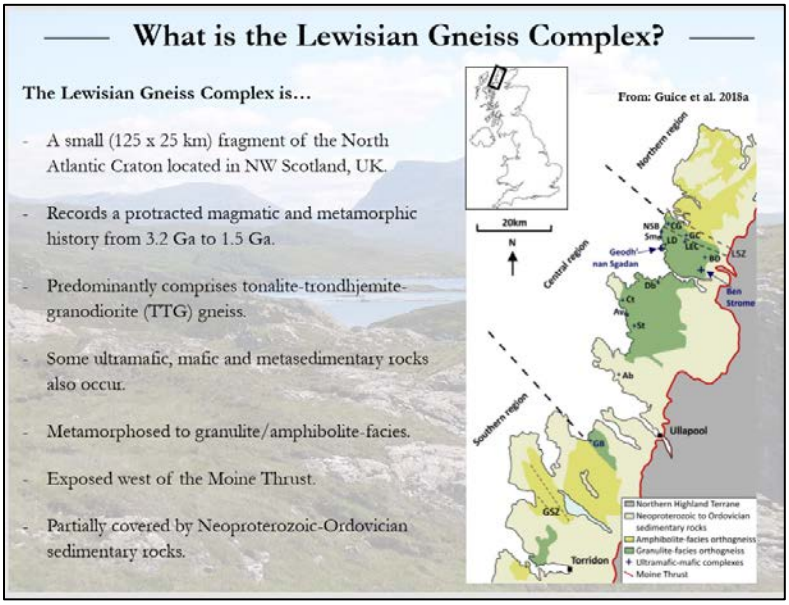


Dr. Guice began: "Tonight we are going on a journey" which explores the geological origins of a portion of the northwest Scottish mainland known as the Lewisian Gneiss Complex (LGC). Along the way he said he would unpack why this area is of interest, note some of the controversies surrounding the geological history of these Highlands, share current research findings of how it evolved and, lastly, note what George sees as his personal contribution to revealing the identity of its "dark rocks."

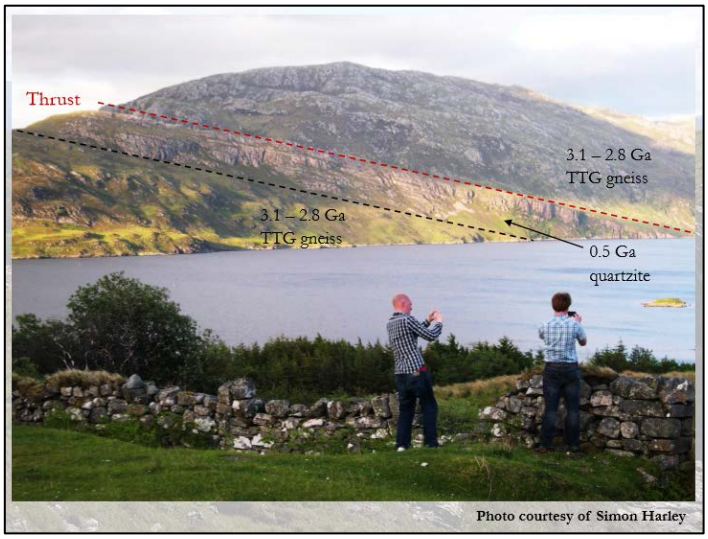


"I will not be talking about my dissertation," George said. That personal academic journey toward being awarded the doctorate in geology concluded only a few months earlier at the University of Cardiff, Wales (Project title: "Origin, geodynamic significance and mineralization potential of Archaean ultramafic complexes in the Kaapvaal and North Atlantic cratons"). Rather, the evening's presentation focused on the LGC region in Scotland which is part of the North Atlantic craton. Given that cratons are the relatively stable portion and among the oldest rocks of continental crust, his talk about the North Atlantic Craton was informed by his earlier scholarly doctoral research on the craton geology in South Africa, but without undue complexity and with the clarity of the evening's well-told story.

Because the origins of cratons such as the LGC in Scotland are ancient in nature and date back several billion years, George began with the question of when the Earth's plate tectonics began. "We really don't know the answer to that question," he noted. As indicated in the following slide, the geological community had debated this question for many decades as its members proposed answers between 3.6 Ga (billion years ago) in the Archaean era and less than 1.0 Ga in the Neoproterozoic era. Because the cratons are relatively intact geological structures, undamaged by the crashing together of Earth's plate movements, the cratons potentially contain a record of their own origins and evolution.



The journey George took MSDC members on was the evolution through time of the Lewisian Gneiss Complex in northwest Scotland. As indicated by the map and text below, the LGC region is a tiny portion of the northwest coast of Scotland which provides a record of its magmatic and metamorphic history. Its predominant mineralogical component is tonalite-trondhjemite-grandiorite (TTG) gneiss but also contains iron and magnesium-rich rocks, along with metasedimentary rocks. Tonight's story explains how and when the TTG evolved toward a granulite and amphibolite-facies composition and structure.



Part of the challenge for geological researchers is to use their observational and chemical analyses of the minerals to tease out and differentiate the mineralogical identities and origins of diverse portions of the region in question. Cratons, given their age and stability, would typically be the basement rock. But their mineral identity commonly can be cloaked by processes such as chemical changes due to causes including the early high temperatures and pressures due to impinging plate activity, by later magmatic events, subsequent thrusts and incursions from neighboring rocks and by chemical changes due to sedimentation.

For the first stop along the journey for understanding the evolution of the LGC, George provided a significant road mark that historically was named the "Highlands controversy." Geologists during the 19th and 20th centuries gave conflicting interpretations of the region pictured below, known locally as "The Highlands". It shows the landscape having two magma depositions, in the lower foreground and upper background, named the tonalite-trondhjemite-granodiorite (TTG) gneiss, separated by a (thrust) body of light brown quartzite. George explained, as indicated on the slide below, that current research suggests the darker TTG gneiss in the lower and upper sections originated between 3.1 and 2.8 billion years ago and the light brown quartzite thrust into place relatively late, namely about half a billion years ago.

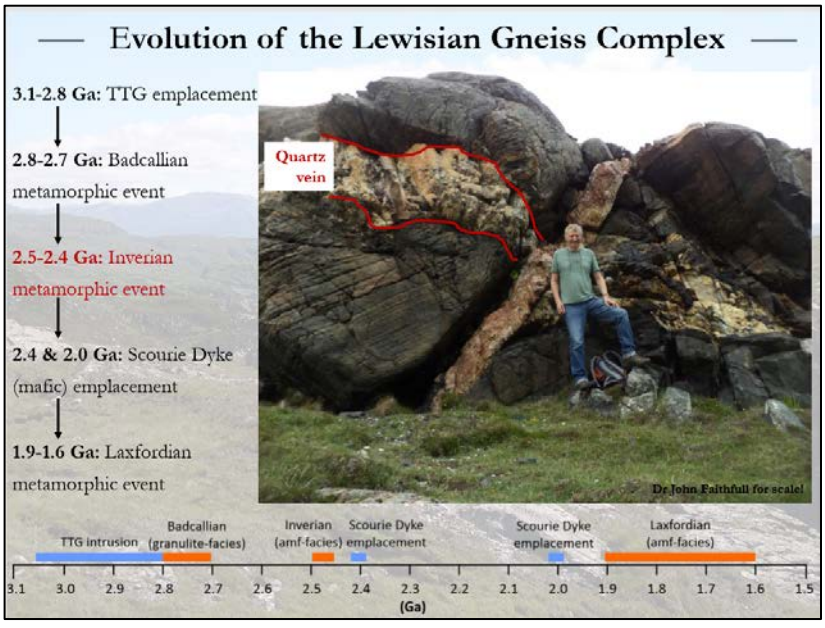
Discussion suggested that the Quartzite rock was a metamorphized sandstone that originated elsewhere and had then shifted to its current position above the TTG Gneiss.

A second major road stop along the journey is another textbook example typical of the LGC terrain which shows the change from original TTG rock into the Lewisian Gneiss Complex. Evident in the one photo pictured on the right, George pointed out, are evidence and indications of five events or states documenting the evolution of the LGC into a gneiss.

- The first event is the arrival of the TTG rock formations, the dark magmatic deposits shown below. The three tags identify the earliest rock formations embedded in this setting, which date from between 3.1 and 2.8 billion years ago. Originally, the site below consisted of only one large, TTG dark rock deposit.

After the TTG magmatic rock was in place, four subsequent events changed the chemistry and appearance of that proto-deposit.

- The first of the four (2.8 to 2.7 Ga) changes is named the Badcalliam metamorphic event which was brought about by ultra-high temperatures and partial melting and recrystalization of the TTG minerals. That constitutes a gneissic layering or gneissification of the original rock. The end result is an appearance of alternating bands of light



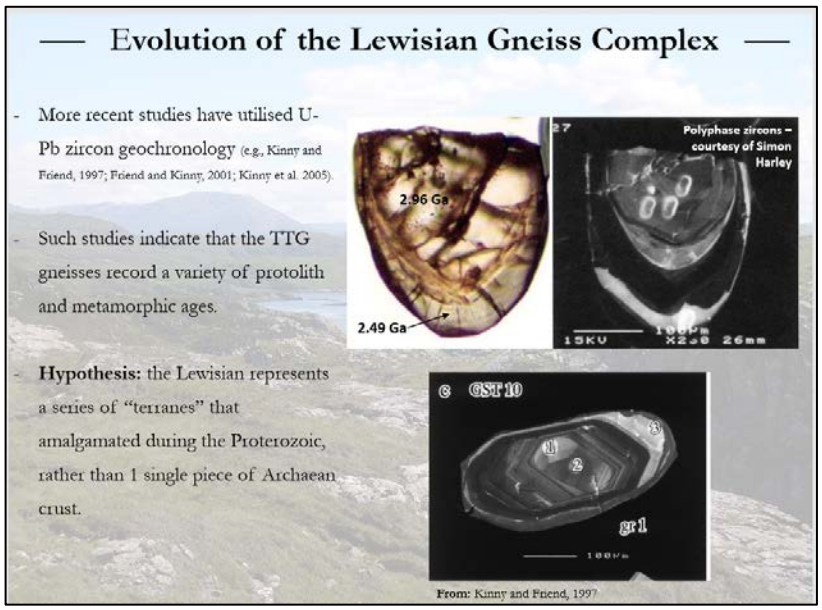
and dark gneiss, identified between the red lines in the photo below, running from lower left to upper right and named the gneissose foliation.

- The second of the four (2.5 to 2.4 Ga) changes in the evolution is named the Inverian metamorphic event. It is the intrusion of the quartz vein of lighter brown minerals, pictured below, sandwiched between the two TTG deposits on the left side of the photo. That quartz vein appears to the upper left of the geologist, as indicated and tagged in the photo below as the quartz vein.

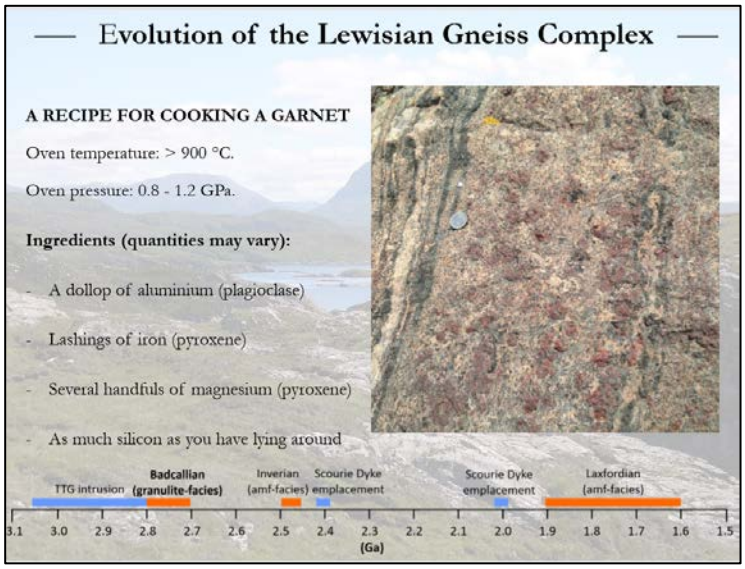
- The third chemical change (2.4 to 2.0) is pictured below and consists of the introduction of the dark mafic rock at ground level, to the lower right of the geologist. These magmatic features are named Scourie Dykes, after the dykes which are found in abundance in the immediate LGC area near the Scotland town of Scourie.

The final stage of this evolution is named the Laxfordian (1.9 to 1.6 Ga) metamorphic event, the results of which are evident in the brown mineral zone highlighted in red lines, running at a vertical angle from the ground to above the geologist's head, as pictured below. The chemical change results a mineralogical vein of quartz, feldspar and muscovite pegmatites as tagged.

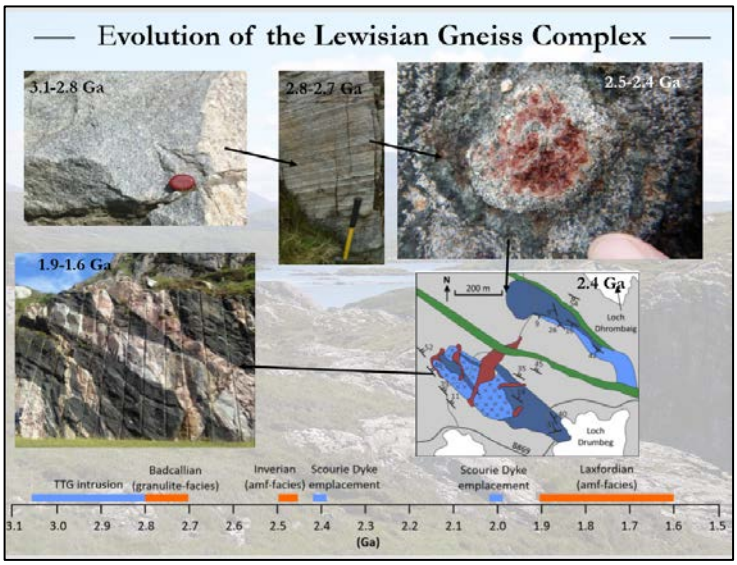
George then described two of the geochemical research methods which allow geologists to identify the time when the chemical events occurred. The first was analysis of the tiny zircon crystals found in the LGC rock which crystals contain uranium and lead isotopes. Presence of those elements provided evidence for the zircon crystals' chronology which indicated they were formed in two phases, at 2.96 and 2.49 billion years ago. That discovery supported the understanding that the rock containing the zircon experienced at least two distinct periods of formation during the Proterozoic era, hundreds of million years after the original deposition of the TGC rock in the earlier Archaean era.



George then shared a second research tool for understanding the mineral evolution of the LGC, namely identifying the arrival of garnet during the high-pressure first metamorphic event during the Badcallian era (2.8 and 2.7 Ga) era and the subsequent low-pressure and low-temperature period which caused instability and structural regression of the garnet crystals during the Inverian era (2.5 through 2.4 billion years ago). He also provided a whimsical "recipe for cooking garnets," including the key ingredients of very high temperatures and pressures which allowed the aluminum, iron, magnesium and silicon to "bake" into garnet crystals.



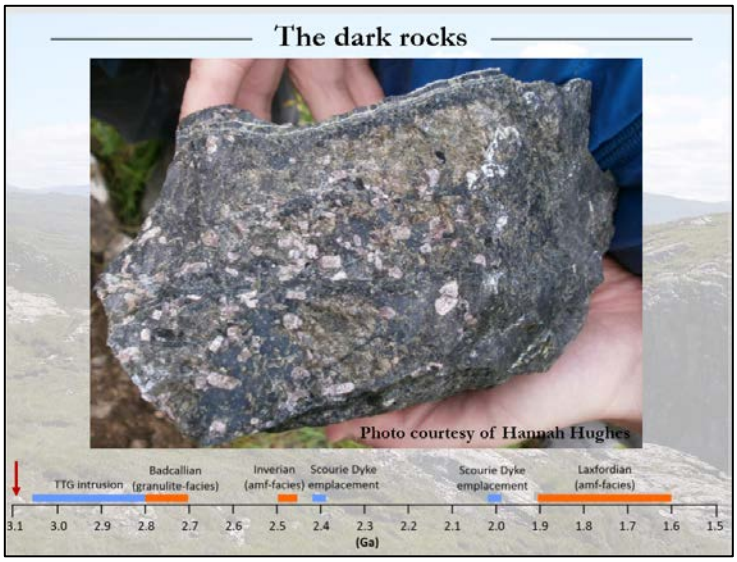
Having come to the end of his story of the evolution of the LGC rock formation, George looked back and with one slide, below, used five photos, viewed clockwise, to summarize the five transformative events including:



TTG intrusion (3.0 Ga), Badcallian (2.8) garnet formation, Inverian (2.5) rock foliation and garnet regression, Scourie Dyke emplacement (2.3) with younger dykes cutting across older dykes, and Laxfordian (1.9) era with its partial melting and recrystallization.

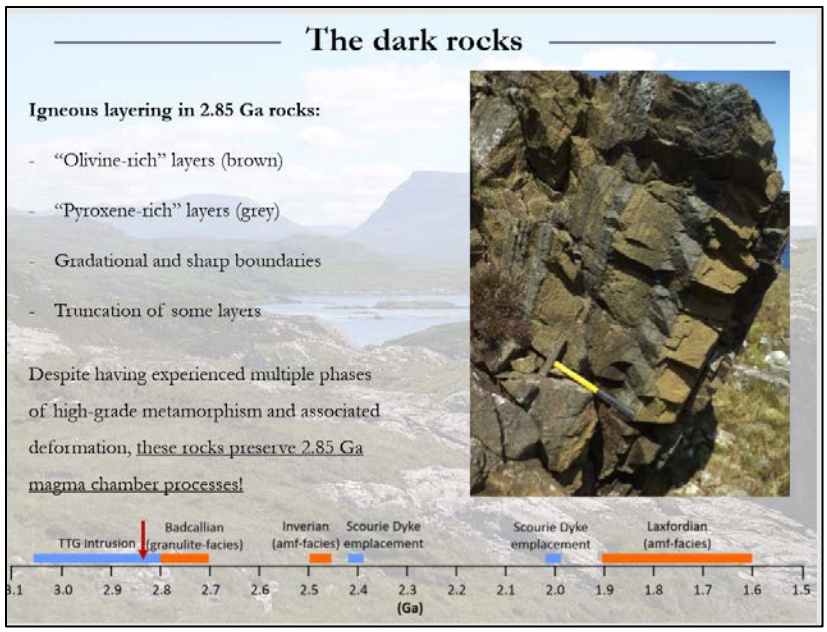
In summary, the TTG is a rock which is the primary felsic component of ancient Archean gneisses rock. Given its age, its original granitic composition is often subsequently complicated by diverse mineralizations that evolved over multiple generations during its billion-year history. These findings document why geologists rarely find TTG deposits composed of a simple igneous deposit.

George pointed out one additional surprising recent discovery geologists have made in this local, namely the rare occurrence of zircon crystals not usually found in ultramafic deposits. They were of extraordinarily large size, measuring about 2.0 cm in diameter, whereas most zircons are so tiny, in the 200 micron range, they are typically very difficult to see. Those large white zircon crystals are shown below.



In conclusion, George noted a possible contribution his own research may have made to explaining the evolution of the central or middle region of the three LGC areas about which his presentation began. That central region portrayed in the map within the third slide above, is the location where "dark rocks," the ultramafic and mafic rocks are located. Some earlier geologists had assumed that all the dark rocks originated at the same time, around 3.1 billion years ago. George's research instead suggests that the dark rocks are actually of two types. He believes that the first type, pictured below, formed within a magma chamber, and that other dark rock, located a few kilometers from the photo, are of a different type with a non-magma chamber origin and needing further analysis.

The outermost light brown rock to the far right is olivine-rich (mafic, heavy in magnesium and iron, lower in silica) whereas the grey rock is pyroxene-rich in its composition (ultra-mafic, also having magnesium and iron, but higher in silica). George's interpretation of this photo is that it illustrates the igneous layering of the structure of a magma chamber. Some MSDC attendees found this image stunning, as if the photo showed a magma chamber frozen in time, and above ground, preserved and undamaged despite all the metamorphism the original LGC rock deposits endured in its five stages George described in his evolutional journey.



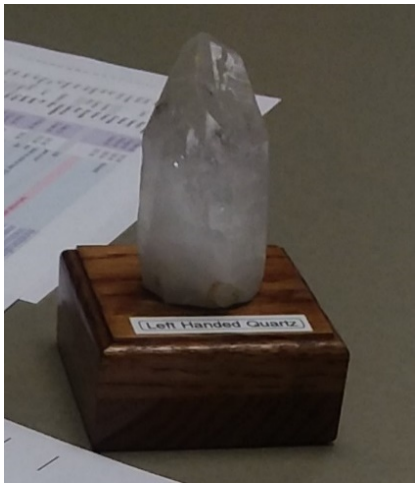
George acknowledged that his view differs from other, highly respected researchers, and that a range of interpretations are possible. George's interpretation sparked interesting questions and discussion including how this small geologic magma chamber formation could have survived the region's vast metamorphic transformations. But he suggested a context which included that the area's extensive melting and re-crystallizations were localized and this small region survived to tell its own history.

MSDC president Dave Hennessey thanked George for his wonderful presentation and the attendees expressed their appreciation with applause.

MSDC's November 6, 2019 Show and Tell Report

by Andy Thompson, MSDC Secretary

After the evening's formal presentation, Dave Hennessey invited attendees to share any mineral specimens they brought to the meeting. John brought in a quartz crystal which has a left-handed orientation.



Dave Hennessey brought in a Fenster quartz from Mexico with its window-like appearance. He explained: "Apparently "fenster" is the German word for "window" and some folks think that this habit of quartz looks like windows. I guess the way it grows sort of looks like window frames. In the USA I see these more often referred to as a skeletal growth habit. These crystals grew rapidly in a supersaturated environment. Atoms were added more rapidly to the edges and corners of the growing crystals than to the centers of the crystal faces, resulting in the form you see in that specimen."

Kenny brought in several fluorescent specimens from Sterling Hill, NJ, including garnet, sphalerite, calcite and Willemite. When illuminated with a UV light, their colors were spectacular. He pointed out one specimen he had been looking for and finally found, a zinc fluorescent which has a golden yellow patina, shown below.

Lastly, Dave Nanney displayed two specimens, a calcite from Illinois on the left and on the right a quartz from Madagascar with a floater, a fluorite inclusion. The calcite on the left, Dave noted, has two golden colored fibers in its interior.

MSDC Club Information

Meetings are the First Wednesday of the Month (Jan-Jun and Sep-Dec). We meet in the Constitution Avenue lobby of the Smithsonian National Museum of Natural History at 7:30 pm.

Website http://mineralogicalsocietyofdc.org/

Facebook www.facebook.com/Mineralogical-SocietyOfTheDistrictOfColumbia

2019 Officers and Directors

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THE MINERAL MINUTES

NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

Mineralogical Society of DC
Time Sensitive Dated Material
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Useful Mineral Links

	American Federation of Mineralogical Societies (AFMS)	www.amfed.org
	Eastern Federation of Mineralogical and Lapidary Societies (EFMLS)	www.amfed.org/efmls
	MINDAT	www.mindat.org
	Mineralogical Society of America (MSA)	www.minoscam.org
	Friends of Mineralogy	www.friendsofmineralogy.org/
	WebMineral	webmineral.com
	The Geological Society of America (GSA)	www.geosociety.org/
	Jeff Scovil Mineral Photography (not advertising - just great photos)	scovil photography.com/
	United States Geological Survey (USGS)	www.usgs.gov
	The Geological Society of Washington (GSW)	http://www.gswweb.org/

AFMS Code of Ethics

- I will respect both private and public property and will do no collecting on privately owned land without the owner's permission.
- I will keep informed on all laws, regulations of rules governing collecting on public lands and will observe them.
- I will to the best of my ability, ascertain the boundary lines of property on which I plan to collect.
- I will use no firearms or blasting material in collecting areas.
- I will cause no willful damage to property of any kind – fences, signs, and buildings.
- I will leave all gates as found.
- I will build fires in designated or safe places only and will be certain they are completely extinguished before leaving the area.
- I will discard no burning material – matches, cigarettes, etc.
- I will fill all excavation holes which may be dangerous to livestock. [Editor's Note/Observation: I would also include wildlife as well as livestock.]
- I will not contaminate wells, creeks or other water supply.
- I will cause no willful damage to collecting material and will take home only what I can reasonably use.
- I will practice conservation and undertake to utilize fully and well the materials I have collected and will recycle my surplus for the pleasure and benefit of others.
- I will support the rockhound project H.E.L.P. (Help Eliminate Litter Please) and will leave all collecting areas devoid of litter, regardless of how found.
- I will cooperate with field trip leaders and the se in designated authority in all collecting areas.
- I will report to my club or Federation officers, Bureau of Land management or other authorities, any deposit of petrified wood or other materials on public lands which should be protected for the enjoyment of future generations for public educational and scientific purposes.
- I will appreciate and protect our heritage of natural resources.
- I will observe the "Golden Rule", will use "Good Outdoor Manners" and will at all times conduct myself in a manner which will add to the stature and Public "image" of rockhounds everywhere.

MEMBERSHIP APPLICATION OR RENEWAL
THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA (MSDC)

(___) Family – $25.00 per year. One address.

(___) Individual – $20.00 per year.

(_____) New * (_____) Renewal Dues are for Year_____*

For new members who join in the last months of the year, membership will extend through the following year with no additional dues.

ANNUAL DUES – PLEASE PAY YOUR DUES PROMPTLY.

Pay at next meeting or mail to:

Mineralogical Society of DC
c/o John Weidner
7099 Game Lord Drive
Springfield, VA 22153-1312

Name(s) (First and Last) _____

Address_____

City_____State_____Zip:_____

Phone(s): Home/Work/Mobile_____

Email(s):_____

OK TO INCLUDE YOU ON CLUB MEMBERSHIP LIST?

( ) Yes – Include name, address, phone, email.

If you want any information omitted from the membership list, please note:

Omit my: ( ) Email; ( ) Home phone; ( ) Work phone; ( ) Mobile phone; ( ) Address; ( ) Name

SPECIAL CLUB-RELATED INTERESTS? _____

Meeting Dates, Time, and Location: The first Wednesday of each month. (No meeting in July and August.) 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 7:30 PM to meet our guard who will escort us to the Cathy Kerby Room.