THE MONTHLY NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

The Mineral inutes

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March 2018

In this Issue:

March Program

"Garnets!"

Presented by John Weidner

There are not many minerals that can be found in both metamorphic and igneous environments, but garnet is one mineral that is found in both. Except garnet isn't really one mineral. It's a whole family consisting of many varieties – andradite, grossular, pyrope, spessartine, melanite, uvarovite, tsavorite, topazolite, and many others. And garnets are found in all colors. It used to be said that garnet could be found in every color except blue. But a few years ago, blue garnets were found in Madagascar! Turns out they are a blend of spessartine and pyrope. How does that happen? In what ways are the different varieties different? In what ways are they the same? Just what is it that makes a garnet a garnet?

Our presenter this month, John Weidner, will address many of these questions and enlighten us on the topic of garnets. John is an active MSDC club member and is also the club's treasurer. John completed his PhD in math in 1973. Since then he has alternated between teaching math in college and designing databases as a subcontractor. He is presently a registered volunteer with the Geology Department at Northern Virginia Community College (NVCC) and promotes interaction between NVMC and MSDC. Last year, he set up "thin section" workshops at NVCC and has done so again this year, with two "thin section" workshops coming up in the next month.

Be forewarned, John's presentations often involve audience participation. In his presentation last year on neosilicates, John had us on our feet performing the dance of the tetahedrons. For his garnet presentation rumor has it that there may be a song (in 4/4 time).

Please join us in taking John to dinner on March 7th before the club

Prez Says...

by Dave Nanney
MSDC President

Hope you got through March winds safely. I am taking a break from working a chain saw to remove a large pine tree that fell through one of our fenced in azalea beds. We had started spring cleaning early with the nice weather in late February, only to have this recent superstorm undue much of that good work. But after looking at what happened up north, we're picking up fallen branches with somewhat fewer complaints.

I wanted to clarify the story around the award MSDC presented to Susan Fisher officially at the Anniversary party, and then in real life at the February Meeting. Yes, Susan and Tom Tucker put together all the table favorites. Yes, Ed and Susan Fisher put together all the book centerpieces for the party. But your Board of Directors decided to present this award for Susan's sustained and significant contributions to MSDC for decades. This was a very significant anniversary, and there was really one active member who literally has done it all, and continues to do more. So thanks to everyone who contributed to the Anniversary gathering, and congratulations for your award to Susan Fisher for everything you do.

The special treat for March will be the presentation of > Foshag, Hronic,

February Business Meeting Synopsis

By Andy Thompson, Secretary

Vice President Dave Hennessey, standing in for Dave Nanney, welcomed all attendees to the monthly meeting and thanked MSDC former Presidents (Fisher, Johnson, Thompson) and presidents of other local clubs (Reynolds, Greenwalt) as well.

Treasurer John Weidner reported the club's finances were stable and that to date, $400 of the usual $600 in annual membership dues had been collected. Dave Hennessey thanked Steve Johnson for his editing of the excellent February monthly Mineral Minutes newsletter. That edition contained the summary of the January Business Meeting minutes were accepted unanimously.

Old Business: Dave then had the pleasure of recalling when, during the December anniversary dinner celebration, the club announced its "75th Anniversary Honor Award" was given to Susan Fisher. Tonight Dave gave Susan the plaque which acknowledged her "Leadership, Mineral Expertise and Inspiration", an honor confirmed by the sustained applause of all present.

New Business: Several upcoming events were then announced, including the Delaware Mineralogical Society "Show and Symposium" on March 3-4. For details see: http://www.delminsociety.net/marchshow/marchshow.htm. Two weeks later, March 17-18, the 54th annual GLMSMC "Gem, Mineral and Fossil Show takes place at the Montgomery County Fairgrounds. For more information see: glmsmc.com/events/shtml.

Geology in the News: Jeff Gerber provided an extended report on the recent celebration and publications describing the earlier discovery of dinosaur tracks on the NASA grounds in Greenbelt, Maryland. Ray Stanford, who found the track-laden rock slab, had spoken to MSDC years earlier and NASA recently displayed a life-size reproduction of the clear fossil footprints. The juxtaposition of NASA's futuristic mission and its celebration of Ray having found the millions-year-old footprints visible on its grounds near a parking lot was a fortuitous linkage of space and time. For more information see Scientific Reports (2018) 8:471 pages 1-11 and the Washington Post's multiple page story.

Ken Reynolds noted there will be a mineral collection auction taking place on 14 April at the Rockville Senior Center. There will be several subsequent auctions given the collection being disbursed is extensive.

John Weidner noted there will be another day for examining and learning about thin-sections hosted by Professor Shelly Jaye of the Northern Virginia Community College. Details will be forthcoming when available.

Craig Moore noted that this time of year is a fine time to visit Smithsonian's gem and mineral collection and special exhibits because crowd numbers during February is typically lower which allows visitors greater access to the specimens.

A motion was then made to close the business meeting. It was seconded, approved and Dave put on his Program Chair hat and introduced the evening's presentation by Dr. Dale Greenwalt.

Dyse award to a GWU Geology undergraduate student. This year's nominee is Francesca LoVerde who will be attending the meeting.

I am looking forward to hearing John Weidner present his talk on garnets. Because his home has been without power for two days as of Sunday, he has been putting together his presentation at our kitchen table. I can assure you that this will be both an educational, and fun evening. If you can remember from John's talk on Silicates, there were some added features from the routine slide show.

John did ask each of us to bring in garnet samples from our personal collections, labeled with your name to prevent mix-up. He will include these in his discussion to highlight talking point as he presents.

Parking at the Smithsonian will change in October. We will lose the fabulous parking privilege for seven years. We are looking at alternative parking, and will provide additional information as we figure it out.

Consider joining us at the Elephant and Castle at 6PM before the meeting. John and Susie Weidner will be our guests. RSVP if you are joining us so we can get the proper reservations set.

See you in March.

Editor's Note: Crystal Shapes are from Goldschmidt's "Atlas der Krystallformen"

CLUB INFO

MINERALOGICAL SOCIETY OF
THE DISTRICT OF COLUMBIA

Meetings are the First Wednesday of the Month (Jan-Jun and Sep-Dec). We meet in the lobby of the Smithsonian National Museum of Natural History at 7:45pm.
WEBSITE http://mineralogicalsocietyofdc.org/
FACEBOOK www.facebook.com/MineralogicalSociety-OfTheDistrictOfColumbia

2018 Officers & Directors

President	Dave Nanney, dnanney@cox.net
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Directors	Yuri Kalish
	Amanda Parker
	Ken Reynolds
Editor	Steve Johnson
Webmaster	Betty Thompson
Webmaster	Casper Voogt

meeting. We will be meeting at 6:00 pm at Elephant & Castle Restaurant, 1201 Pennsylvania Ave, NW, Washington, DC, about 2 blocks from the Smithsonian Institution National Museum of Natural History (NMNH) where our club meeting is held. If you cannot make it to dinner, we will meet in the NMNH lobby at 7:30 pm and head up to the Cathy Kerby Room for John's presentation.

February Program: "The Middle Eocene Kishenehn Formation: A New Insect Konservat-Lagerstatten (Fossil Insects from the Eocene of Montana)"

Presented by Dr. Dale Greenwalt

By Andy Thompson, Secretary

David Hennessey introduced Casper Voogt as the evening's presenter, respected by all including for his work as MSDC's co-webmaster. Casper is widely known for his Plethora Design firm's technical support of many area mineral clubs, for his international collecting and occasionally serving as a dealer selling mineral specimens. He has made numerous trips abroad through the international Min.Dat organization and as with last month's January MSDC meeting, he shared his research and photography with his fellow MSDC club members.

Dave Hennessey, MSDC's Program Chair, introduced the evening's presenter, Dr. Dale Greenwalt. As a retired Ph.D. bio-chemist, Dale has labored for the past decade as a volunteer research collaborator within the Paleobiology Department of the Smithsonian Natural History Museum (NMNH). His passion has been to literally dig out and unpack the fossil treasures of an extraordinary locale in NW Montana known as the Kishenehn Formation. It is located along the steep banks of the Middle Fork of the Flathead River. Once the fossils are in hand, the real research can then begin.

The title and focus of his presentation, "The Middle Eocene Kishenehn Formation: A New Insect Konservat-Lagerstatten," speaks volumes. The German word "Lagerstatten" is an honorary title that can only be applied to a sedimentary formation proven to contain extraordinary fossils whose preservation is exceptional, such as including the insect's soft tissue.

During the course of his presentation, Dale introduced MSDC members to the when, where, how and why concerning this Kishenehn Formation (KF), all of which highlighted why its fossils are so highly valued. In snapshot form, they include:

- When – approximately 46 million years ago;
- Where – oil shale cliffs above the Middle Fork of the Flathead River south of Glacier National Park;
- How – how researchers first find, isolate and study the fossils, and secondly then determine how the insects became such perfect fossil specimens;
- Why – There are relatively few insect fossils compared to omnipresent plant fossils. So, for researchers, there are big gaps in the 40-million-year-old (myo) fossil record which makes study of their evolution practically impossible. Dale's KF findings, however, provide sufficient data to allow the beginnings of tracing insect fossil evolution.

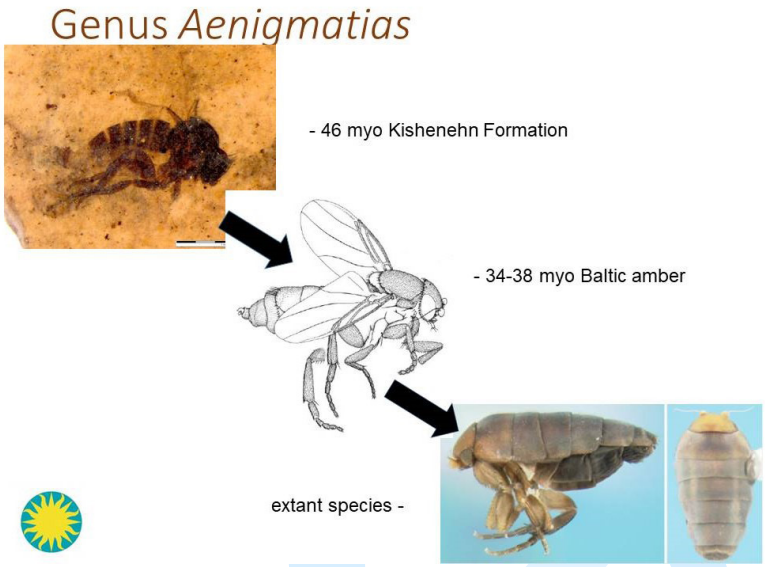
Scientists who research insects have had much better success finding large insects, having greater body mass, than small and more fragile specimens. As a result, flies, with their comparatively bulky bodies, constitute approximately 50% of the known insect fossil specimens found world-wide to date. But because of the Smithsonian team's collecting project in Montana's KF, with the assistance of Montana State University students and other researchers, the last decade has witnessed greater success finding smaller insects. So the number of tiny insect fossils available for research has been increasing.

As an example of why this site garnered the title Lagerstatten because of the rare and exceptional detail characteristic of the KF fossils, the photo of the excellently preserved rove beetle fossil, a member of the Staphylinidae family, shows long delicate hairs at the end of the stomach.

Similarly, the photo of the female mosquito species Culiseta Kishenehn allows viewers to see tiny crystals of pyrite in the head, thorax and legs.

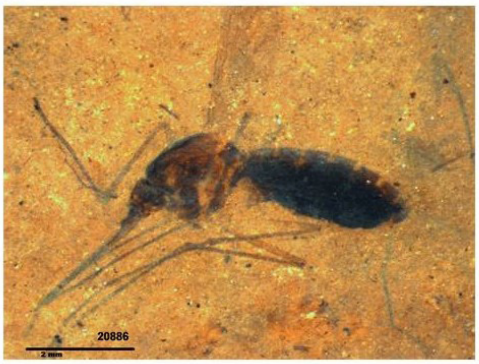
What the scientists can do with such refined details is begin the process of comparing the anatomical changes that have occurred over time and begin to take tentative steps toward understanding the evolution of a species.

The photo below, for example, illustrates the 46-million-year-old (myo) genus aenigmatias, on the left, having evolved into the 34-38 myo descendant found encased in Baltic amber, to today's member of that family on the right.



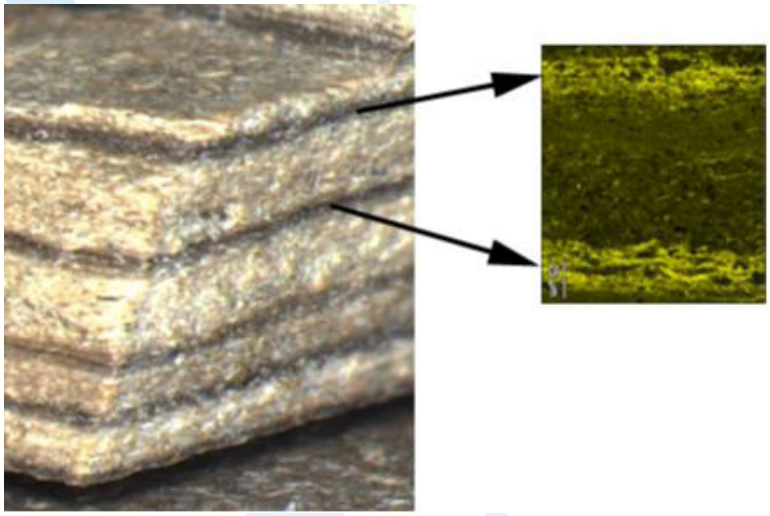
One dream for paleo researchers is to find a fossil so well preserved that it would allow for the extraction of the insect's DNA. Working with a fossil of a blood-engorged female mosquito, shown below, along with a smaller "control" male mosquito, researchers did extract material from the stomach but it did not yield DNA, being made up primarily of carbon. Back at the Smithsonian NMNH, with the assistance of Tim Rose and mass spectrometry instrumentation, the team discovered a significant amount of iron, which all insect, animal and plant forms have in the form of heme, which life forms use to move oxygen through their respective systems. It is not DNA, but it is definitely an important break-through, and it keeps alive the hope of proving false the adage that DNA does not survive past 40,000 years. Dale endorsed a newer wisdom, "never underestimate the fossil record."

Blood-engorged female and male "control"



Dale provided another example of research progress that these unique KF fossils have provided, namely, insights into their chemistry. Ants live and die by the strength of their mandibles. One fossil specimen allowed the analysis of its chemistry through bombardment of the mandible by bismuth. Mass spectrometry showed the presence of zinc in the jaws' cutting edge, which gave the mandible greater structural strength. Study of other KF fossil insects found a similar carbon-zinc presence, which may be a chemistry unique to the fossils. But until similarly preserved fossils are discovered elsewhere and analyzed, this remains an open question.

One ongoing question researchers pursue is what are the condition on the ground that allow for the optimum preservation of the insect remains. Dale has been working on this question with the KR formation. He has concluded that the tiny insects were trapped on a sticky algo mat which effectively entombed them as the organic material grew around the deceased insects and then sank to the bottom of a shallow river bed. Annual mud flows and repetition of this process produced layer upon layer embedded within the shale. A photo of the light and dark layers, below, illustrates the fossil-laden dark layer, protected by lighter hardened mud layers which protected and preserved the fossil bed.

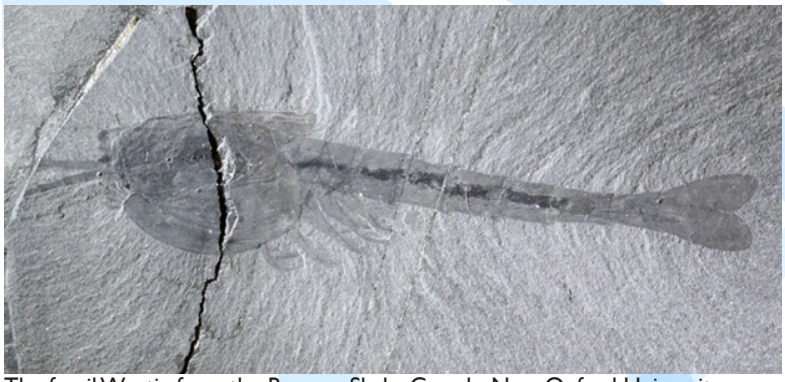


So, as Dale explained the who, what, when, where and how of these fossils, this concluding question of how the KF fossils were so well preserved now has a credible explanation. True to the broader vision of paleo research, it is not simply about the fossils themselves, but also about the broader environment that nurtured the insects and conditioned their excellent preservation. By repeating the analysis with later generations from following 40 million years, scientists have a basis for exploring the evolutionary adaptations of the insect species.

After an engaging question-and-answer session between Dale and the attendees, Dave Hennessey thanked him and the audience expressed their appreciation by extended applause.

"Soft tissue fossil clues could help search for ancient life on Earth and other planets Scientists shed light on Burgess Shale preservation for first time"

from ScienceDaily.com



The fossil Waptia from the Burgess Shale, Canada. New Oxford University research suggests that the mineralogy of the surrounding earth is key to conserving soft parts of organisms, and finding more exceptional fossils like the Waptia. Credit: Yale University

Fossils that preserve entire organisms (including both hard and soft body parts) are critical to our understanding of evolution and ancient life on Earth. However, these exceptional deposits are extremely rare. The fossil record is heavily biased towards the preservation of harder parts of organisms, such as shells, teeth and bones, as soft parts such as internal organs, eyes, or even completely soft organisms, like worms, tend to decay before they can be fossilised. Little is known about the environmental conditions which stop this process soon enough for the organism to be fossilised.

New Oxford University research suggests that the mineralogy of the surrounding earth is key to conserving soft parts of organisms, and finding more exceptional fossils. Part-funded by NASA, the work could potentially support the Mars Rover Curiosity in its sample analysis, and speed up the search for traces of life on other planets.

Perhaps the most iconic of all exceptional fossil deposits is the Burgess Shale of Canada, popularised by Stephen J. Gould's Wonderful Life. Dating to around 500 million years ago, the deposit preserves exceptional fossils from the Cambrian Explosion, an event which saw the rapid diversification of early animal life from simpler single-celled ancestors. Burgess Shale-type fossil localities are now known across the globe and without them roughly 80% of Cambrian organisms (those that have no hard skeleton or shell) would be unknown, distorting our picture of early animal evolution.

Published in Geology, the study, conducted by researchers from Oxford's Department of Earth Sciences, Yale University, and Pomona College, builds on their previous research which revealed that certain clay minerals are toxic to bacteria that decay marine animals. This time around, the team set out to find geological evidence that rocks composed of the same clay minerals are the hosts of Burgess Shale-type fossils.

The team examined more than 200 Cambrian rock samples using powder X-ray diffraction analysis to determine their mineralogical composition, comparing rocks with Burgess Shale-type fossils with those with only fossilised shells and bones. Nicholas Tosca, Associate Professor of Sedimentary Geology at Oxford, said: 'The number of samples required for this study was made possible because the diffractometer at Oxford collects mineralogical data 250 times faster than a conventional instrument.'

The findings reveals that soft tissue fossils are generally found in rocks rich in the mineral berthierine, one of the main clay minerals identified by the previous study as being toxic to decay bacteria. Ross Anderson, lead author and fellow at All Souls College, Oxford, explains: 'Berthierine is an interesting mineral because it forms in tropical settings when the sediments contain elevated concentrations of iron. This means that Burgess Shale-type fossils are likely confined to rocks which were formed at tropical latitudes and which come from locations or time periods that have enhanced iron. This observation is exciting because it means for the first time we can more accurately interpret the geographic and temporal distribution of these iconic fossils, crucial if we want to understand their biology and ecology.'

The study provides a mineralogical signature which can be used to find the more elusive sites that are home to these extraordinary fossils. 'The mineralogical associations we identified mean that for a given Cambrian sedimentary mudrock we can predict with around 80% accuracy whether it is likely to contain Burgess Shale-type fossils,' explains Anderson.

Of the project's wider applications, potentially supporting the search for life beyond our own planet, Anderson adds: 'For the vast majority of Earth's history, life has not possessed hard shells or skeletons. This means that if we want to look for fossil evidence of life on other planets like Mars, the chances are we probably need to find fossils of entirely soft organisms, and Burgess Shale-type fossilisation provides a way. NASA's Curiosity rover has the ability to record mineralogy on the Martian surface, so it could potentially look for the types of rocks which might be most conducive to preserving these fossils.'

To expand their understanding of the exceptional preservation of soft organisms, the team are currently delving further back into Earth history, to investigate the preservation of microbes before macroscopic organisms with skeletons or shells evolved.

Journal Reference:

1. Ross P. Anderson, Nicholas J. Tosca, Robert R. Gaines, Nicolás Mongiardino Koch, Derek E.G. Briggs. A mineralogical signature for Burgess Shale–type fossilization. Geology, 2018; DOI: 10.1130/G39941.1

Big data points humanity to new minerals, new deposits

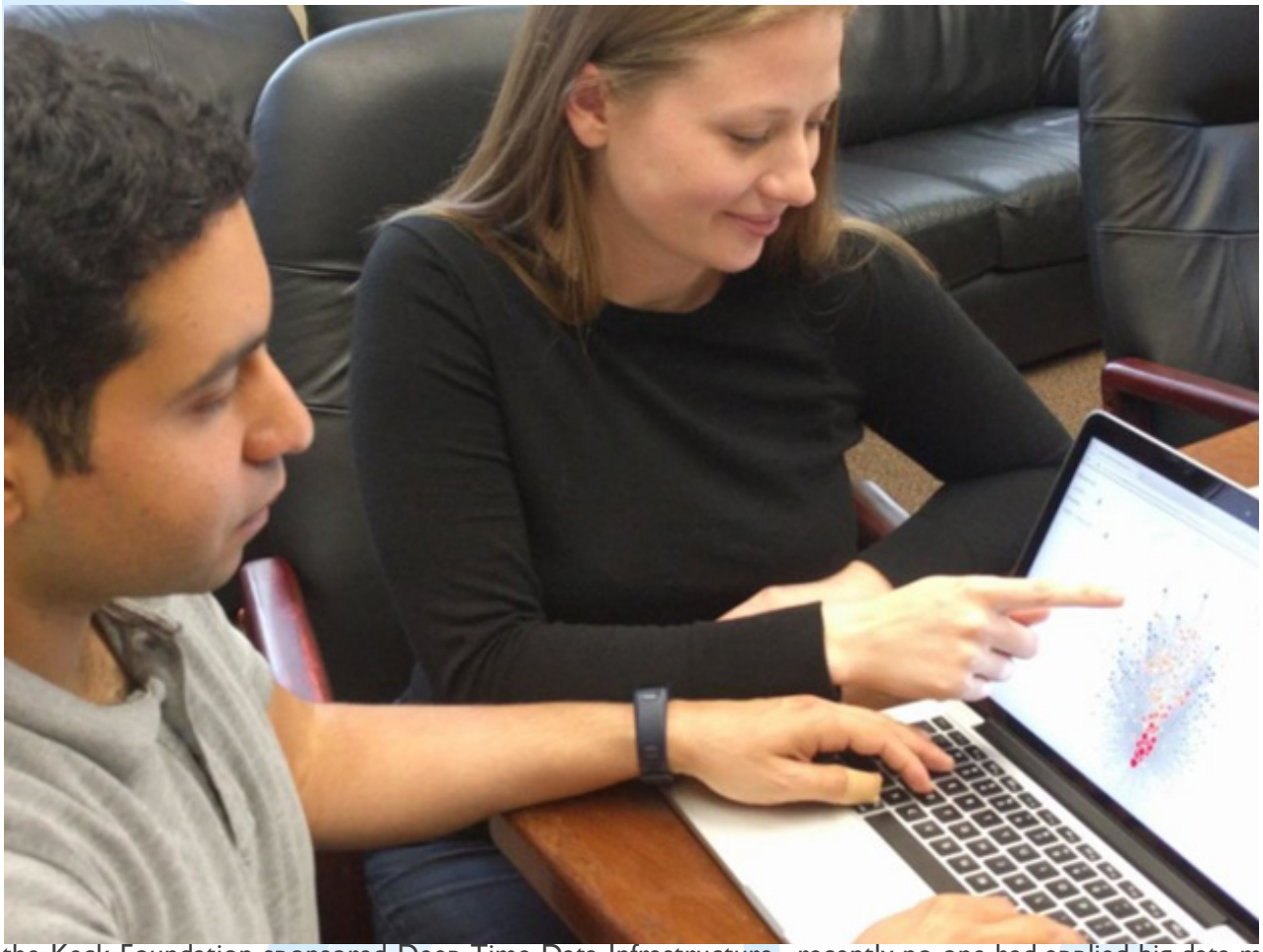
From ScienceDaily.com

Applying big data analysis to mineralogy offers a way to predict minerals missing from those known to science, where to find them, and where to find new deposits of valuable minerals such as gold and copper, according to a groundbreaking study.

In a paper published by American Mineralogist, scientists report the first application to mineralogy of network theory (best known for analysis of e.g. the spread of disease, terrorist networks, or Facebook connections).

The results, they say, pioneer a way to reveal mineral diversity and distribution worldwide, mineral evolution through deep time, new trends, and new deposits.

Led by Shaunna Morrison of the Deep Carbon Observatory and DCO Executive Director Robert Hazen (both at the Carnegie Institution for Science in Washington, D.C.), the paper's 12 authors include DCO colleagues Peter Fox and Ahmed Eleish at



Researchers Ahmed Eleish (Rensselaer Polytechnic Institute) and Shaunna Morrison (Carnegie Institution of Science) and colleagues applied network analysis tools, comparable to those used in studying the spread of epidemics or in designing municipal power grids, to develop a brand new way of visualizing the connections of Earth's minerals. Credit: Anirudh Prabhu

the Keck Foundation sponsored Deep-Time Data Infrastructure Data Science Teams at Rensselaer Polytechnic Institute, Troy NY.

"The quest for new mineral deposits is incessant, but until recently mineral discovery has been more a matter of luck than scientific prediction," says Dr. Morrison. "All that may change thanks to big data."

Humans have collected a vast amount of information on Earth's more than 5,200 known mineral species (each of which has a unique combination of chemical composition and atomic structure).

Millions of mineral specimens from hundreds of thousands of localities around the world have been described and catalogued. Databases containing details of where each mineral was discovered, all of its known occurrences, and the ages of those deposits are large and growing by the week.

Databases also record essential information on chemical compositions and a host of physical properties, including hardness, color, atomic structure, and more.

Coupled with data on the surrounding geography, the geological setting, and coexisting minerals, Earth scientists now have access to "big data" resources ripe for analysis.

Until recently, scientists didn't have the necessary modelling and visualization tools to capitalize on these giant stockpiles of information.

Network analysis offers new insight into minerals, just as complex data sets offer important understanding of social media connections, city traffic patterns, and metabolic pathways, to name a few examples.

"Big data is a big thing," says Dr. Hazen. "You hear about it in all kinds of fields -- medicine, commerce; even the US National Security Agency uses it to analyze phone records -- but until recently no one had applied big data methods to mineralogy and petrology."

"I think this is going to expand the rate of mineral discovery in ways that we can't even imagine now."

The network analysis technique enables Earth scientists to represent data from multiple variables on thousands of minerals sampled from hundreds of thousands of locations within a single graph.

These visualizations can reveal patterns of occurrence and distribution that might otherwise be hidden within a spreadsheet.

In other words, big data provides an intimate picture of which minerals coexist with each other, as well as what geological, physical, chemical, and (perhaps most surprising) biological characteristics are necessary for their appearance.

From those insights it's a relatively simple step to predict what minerals are missing from scientific lists, as well as where to go to find new deposits.

Says Dr. Hazen: "Network analysis can provide visual clues to mineralogists regarding where to go and what to look for. This is a brand new idea in the paper and I think it will open up an entirely new direction in mineralogy."

Already the technique has been used to predict 145 missing carbon-bearing minerals and where to find them, leading to creation of the Deep Carbon Observatory's Carbon Mineral Challenge. Ten have been found so far.

The estimate came from a statistical analysis of carbon-bearing minerals known today, then extrapolating how many scientists should be looking for.

Predicted before they were found

"We have used the same kinds of techniques to predict that

at least 1,500 minerals of all kinds are 'missing,' to predict what some of them are, and where to find them," Dr. Hazen says.

Says Dr. Morrison: "These new approaches to data-driven discovery allow us to predict both minerals unknown to science today and the location of new deposits.

Additionally, understanding how minerals have changed through geologic time, coupled with our knowledge of biology, is leading to new insights regarding the co-evolution of the geosphere and biosphere. "

In a test case, the researchers explored minerals containing copper, which plays critical roles in modern society (e.g., pipes, wires), as well as essential roles in biological evolution. The element is extremely sensitive to oxygen, so the nature of copper in a mineral offers a clue to the level of oxygen in the atmosphere at the time the mineral formed.

The investigators also performed an analysis of common minerals in igneous rocks-those formed from a hot molten state. The mineral networks of igneous rocks revealed through big data recreated "Bowen's reaction series" (based on Norman L. Bowen's painstaking lab experiments in the early 1900s), which shows how a sequence of characteristic minerals appears as the magma cools.

The analysis showed the exact same sequence of minerals embedded in the mineral networks.

The researchers hope that these techniques will lead to an understanding and appreciation of previously unrecognized mineral relationships in varied mineral deposits.

Mineral networks will also serve as effective visual tools for learning about mineralogy and petrology -- the branches of science concerned with the origin, composition, structure, properties, and classification of rocks and minerals.

Network analysis has numerous potential applications in geology, both for research and mineral exploration.

Mining companies could use the technology to predict the locations of unknown mineral deposits based on existing data.

Researchers could use these tools to explain how Earth's minerals have changed over time and incorporate data from biomarker molecules to show how cells and minerals interact.

And ore geologists hope to use mineral network analysis to lead to valuable new deposits.

Dr. Morrison also hopes to use network analysis to reveal the geologic history of other planets. She is a member of the NASA Mars Curiosity Rover team identifying Martian minerals through X-ray diffraction data sent back to Earth. By applying these tools to analyze sedimentary environments on Earth, she believes scientists may also start answering similar questions about Mars.

"Minerals provide the basis for all our material wealth," she notes, "not just precious gold and brilliant gemstones, but in the brick and steel of every home and office, in cars and planes, in bottles and cans, and in every high-tech gadget from laptops to iPhones."

"Minerals form the soils in which we grow our crops, they provide the gravel with which we pave our roads, and they filter the water we drink."

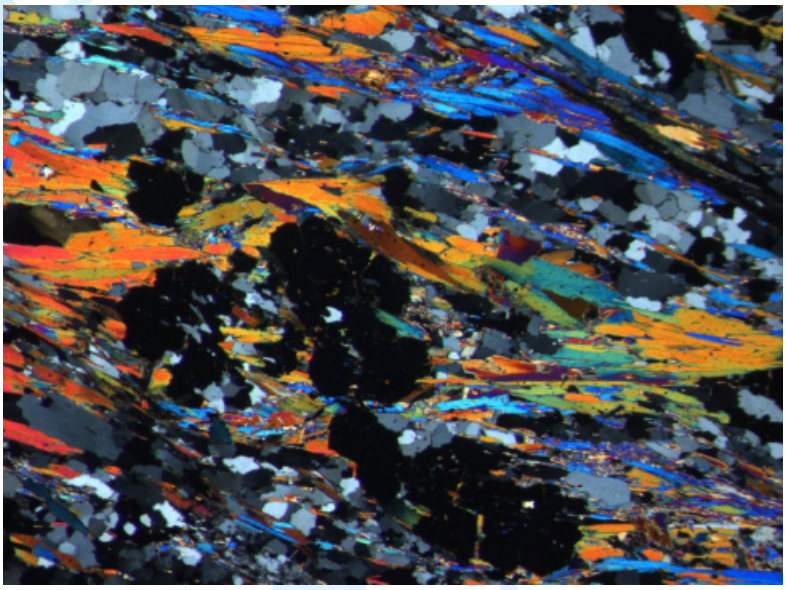
"This new tool for understanding minerals represents an important advance in a scientific field of vital interest."

Journal Reference:

1. Shaunna M. Morrison, Chao Liu, Ahmed Eleish, Anirudh Prabhu, Congrui Li, Jolyon Ralph, Robert T. Downs, Joshua J. Golden, Peter Fox, Daniel R. Hummer, Michael B. Meyer, Robert M. Hazen. Network analysis of mineralogical systems. American Mineralogist, 2017; 102 (8): 1588 DOI: 10.2138/am-2017-6104CCBYNCND

ScienceDaily, 1 August 2017. <www.sciencedaily.com/releases/2017/08/170801193336.htm>.

Thin Section Field Trip



Polish a rock. Glue it to a microscope slide. Cut it off at about a thousandth of an inch. Look at it through a polarizing microscope.

You are looking at a thin section, a research tool in geology for over a hundred years, and a way to make amateurs like me say “Wow!”

Like to look at some?

Come to the Thin Section Field Day, at the Annandale Campus of Northern Virginia Community College, March 24 and/or March 31.

More info to follow. If you plan to come, please RSVP to jfweidner42@gmail.com, with what date(s) you'd like to participate so we know how many people to prepare for.

Mineralogical Society of America Editors' Picks

With the permission of Keith Putirka, the following are the Editor's picks of Highlights and Breakthroughs & Invited Centennial Articles from the February 2018 issues of the American Mineralogist: Journal of Earth and Planetary Materials.

http://www.minsocam.org

Plate Tectonics Starts at 2.8 Ga, According to The Metamorphic Rock Record

On page 181 of this issue, Brown and Johnson make the utterly compelling case that contrasts in geodynamic regimes are warranted from the metamorphic rock record. From that record they extract apparent thermal gradients that are then compared to age. They find what they describe as three "cycles"—although these appear to be non-repeating, and so might better be described as evolutionary stages—where peaks in T/P correspond with supercontinent assembly. More interesting still are the implications for the start of plate tectonics. Although Brown and Johnson acknowledge that high pressure–low temperature metamorphism occurs sporadically at best prior to 0.8 Ga, they suggest that paired metamorphic belts are common after 2.8 Ga, which may indicate a transition from a deformable stagnant lid to a plate tectonic regime at 2.8 Ga.

Forcing Water into Chabazite

On page 207 of this issue, Kong et al. examine the structure of chabazite of various compositions to 5 GPa, not because natural samples exist at such pressures, but rather because of prior hints that elevated pressure may enhance their use as microporous filters. The find an anomalous 80% increase in the bulk modulus of their natural chabazite structure when pressurized with water. They infer that the increase in bulk modulus, which is not viewed when the P medium is a non-penetrating fluid, is due to water molecules being forced into the structure. Yet to be determined is whether this property will have practical applications.

Making High-Mg Andesite (HMA) at Shasta

On page 216 of this issue, Streck and Leeman weigh in on a debate on the origin of high magnesian andesite (HMA), in this case using samples from the Whaleback satellite vent near Mount Shasta Volcano, in the southern Cascades. They demonstrate that minerals in these HMA lavas comprise a disequilibrium assemblage that is derived by mixing of three components: dacite and basalt magmas, and disaggregated ultramafic country-rock material, the latter of which lends the high Mg content to the HMA. This paper stresses the importance of magma mixing in producing HMA at Shasta, and by extension other similar occurrences. This conclusion would appear to preclude origin of the HMA directly from the mantle as a 'primitive' magma, and casts doubt on its importance to crustal growth in this particular setting and in general. In contrast, the dominant mantle contribution is basaltic magma that provides both material and heat to remobilize pre-existing crustal materials and mix with resulting partial melts to produce 'andesitic' crust.

Apatite-melt Partitioning of Volatile Elements

On page 260 of this issue, Riker et al. present a new experimental study of OH, C, and halogen partitioning between apatite and co-existing silicate liquids. They find that partition coefficients are affected largely by temperature and only minimally by pressure and melt composition. They also find an interesting structural control on C partitioning in that in halogen-free systems, C occupies channel sites, along with H, and large amounts of C can be absorbed by the structure; but with the introduction of halogens, C tends also to substitute for P, and total C contents are greatly reduced for a given melt CO_2 content in magamtic systems. These results will be especially useful for modeling C contents in magmatic systems.

Tourmalines!

On page 298 of this issue, Ferdinando Bosi provides a new structural analysis of tourmaline, derived from several decades of existing structural studies. This new synthesis makes use of recently described end-member compositions that have especially informed the cation exchange relationships of various trivalent cations. The new synthesis identifies some discrepancies in how certain tourmaline compositions are classified; although it is unclear whether the discrepancies are minor or common, a new proposal for the assignment of Al is intended to provide consistency to tourmaline descriptions.

Apatite, Archeology and Mastodons

On page 324 of this issue, Matt Kohn introduces a new article type, Mineral Matters. These are intended to inform the public (aimed at high school level or above) about how minerals, and Mineralogy, are important for understanding the world around us. Perhaps no better mineral than apatite could serve as an inaugural topic, as Matt nicely illustrates how Sr isotopes in such can be used like tree rings, to inform us about mineral growth history. In the case studies presented here, that history reflects paleo-biological conditions for human migration patterns in Europe and Mastodon migrations in N. America. We hope that teachers and students find these useful.

Useful Mineral Links:

AFMS	American Federation of Mineralogical Societies (AFMS)	www.amfed.org
Eastern Federation of Mineralogical & Lapidary Societies, Inc.	Eastern Federation of Mineralogical and Lapidary Societies (EFMLS)	www.amfed.org/efmls
mindat.org	MINDAT	www.mindat.org
Mineralogical Society of America 1916 2016 American Mineralogist Centennial	Mineralogical Society of America (MSA)	www.minoscam.org
Friends of Mineralogy	Friends of Mineralogy	www.friendsofmineralogy.org/
	WebMineral	webmineral.com
The Geological Society of America	The Geological Society of America (GSA)	www.geosociety.org/
Scovil Photography	Jeff Scovil Mineral Photography (not advertising - just great photos)	scovil photography.com/
USGS science for a changing world	United States Geological Survey (USGS)	www.usgs.gov
The Geological Society of Washington	The Geological Society of Washington (GSW)	http://www.gswweb.org/

Upcoming Local (or mostly local) Geology and Mineral Events of Interest:

March

3 – 4 55th Annual Earth Science Gem & Mineral Show sponsored by the Delaware Mineralogical Society. University of Delaware – Wilmington Campus, Arsht Conference Center; 2800 Pennsylvania Ave (Rt 52), Wilmington, DE 19806. Info: www.delminsociety.net

7 MSDC March Meeting

7-18 54th annual GLMSMC "Gem, Mineral and Fossil Show, Montgomery County Fairgrounds

19 NVMC Meeting

21 MNCA Meeting

24-25 49th Annual Gem and Mineral Show sponsored by the Chehanna Rock & Mineral Club. Wysox Vol. Fire Co Social Hall, 111 Lake Rd; Wysox, PA. Info: www.chehannarocks.com

24-25 2018 Mineral Treasures and Fossil Fair sponsored by the Philadelphia Mineral Society & Delaware Valley Paleontological Society. LuLu Temple, 5140 Butler Pike, Plymouth Meeting, PA (PA Turnpike exit 333, or I-476, exit 20). Info: www.phillyrocks.org or cleibold@verizon.net

28-29 SuperDig! / Franklin Mineral Show / Tent Sale. A rock filled weekend in Franklin, NJ. The show is Sat & Sun. SuperDig! and the Tent Sale are Saturday.

April

4 MSDC April Meeting

7–8 45th Annual Mineral, Gem, Jewelry & Fossil show sponsored by the New Haven Mineral Club. Amity Regional Middle School, 1—Ohman Ave; Orange, CT. Info: www.newhavenmineralclub.org

12–15 Tar Heel Mineral Club annual show and EFMLS/AFMS Convention, Raleigh, NC; AFMS Annual Meeting - Thursday April 12; EFMLS Annual Meeting - Friday April 13; AFMS/EFMLS Awards Banquet - Saturday, April 14; Breakfast with the Editors & Webmasters - Sun. April 15; Info: www.amfed.org

14 14th Annual Earl & Malvina Packard Rock, Gem & Mineral Show sponsored by the Southeastern New Hampshire Mineral Club. Dover Veterans Community Center, 156 Back River Rd, Dover, NH. Info: Brian: 207-710-6254 or cshore108@yahoo.com

16 NVMC Meeting

18 MNCA Meeting

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 7:45 PM to meet our guard who will escort us to the Cathy Kirby Room. Street parking: Parking is available in the Smithsonian Staff Parking – Just tell the guard at the gate that you are attending the Mineral Club Meeting.

THE MINERAL MINUTES

NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

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