The BULLETIN

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America's Oldest Gem & Mineral Club

Founded 1886 ◆ Incorporated 1937

Bulletin of the New York Mineralogical Club

Founded 1886 ♦ New York City, New York ♦ Incorporated 1937

Volume 133, No. 7 *Celebrating the International Year of the Periodic Table of Chemical Elements* **July 2019**

July 10th Meeting:
Eric Rampello: "Quartz: An Infinite Variety"

Diamonds, rubies, emeralds and sapphires. All of these precious stones are well known throughout history for their beauty, top quality and use in jewelry. But what about quartz?

Although one of the top three most common minerals found on Earth, quartz still has the ability to show us amazing beauty through vivid colors, rare crystal habits and unusual occurrences or inclusions.

Through this presentation, we will take a comprehensive walkthrough of the mineral, looking at its many varieties, forms and unusual instances that only quartz may truly show best. We should all look to appreciate the stone more, as it gives us a wide array and vast catalogue of beautiful occurrences to be thankful for!

Eric, a resident of Long Island and NYMC member, is a very engaging speaker. His most recent talk to us was in March of 2018 when he gave us a presentation about the folklore related to minerals and gems. He later presented another version of this talk at the June 2018 NYC Mineral Show.

Lookback: Summer 2019 NYC Gem & Mineral Show

By Mitch Portnoy

The 2nd Annual Summer New York City Gem & Mineral Show took place on the weekend of June 22-23, 2019 in the Grand Ballroom of the Watson Hotel in Manhattan. Here are some of the highlights of the event:

The **show seemed busy** all weekend with the weather remaining pleasant and summery. The overall demographics was **noticeably younger** than the other two shows with lots of new faces. In all likelihood the increased use social media to promote the show is having a beneficial effect.

A corollary to this youthful outburst in our opinion is that the **lectures** were not very well attended. As a result, we will no longer sponsor lectures during the Summer NYC Gem & Mineral Show.

The NYMC has **no direct commercial interest** in the shows but in exchange for various levels of support the promoter, **Tony Nikischer (Excalibur Minerals)**, donates valuable space on the floor for a club booth.

We did sign up five **new members** during the show (at a special mid-year rate) and two "lapsed" members renewed their membership in the NYMC.

All of the club's "normal" **merchandise** sold well (gem pens, books, note cards, etc.) but the real highlight at this show was the distribution and sale to members and the public alike of the **new garnet-colored NYMC tee shirts.**

We sold about 25 of these very popular items during the weekend. Adding this to the 25 sold at the previous meeting, we have made a dent in the first shipment of shirts that we ordered. (There's also a second shipment – long story!) It was nice to see how many members were **proudly wearing their tee** during the show!

Also nice was the fact that each and every dealer showed their appreciation for our help before and during the show by giving a **donation** in kind. These items will be offered in the **Silent Auction** at the October Banquet and at next year's **Benefit Auction** in May.

I did notice that this year's gifts were especially aesthetic and high-quality. A **complete roster** of the donated items will appear in the **August Bulletin** due to space limitations in this issue.

The show ran truly **without stress** or controversy – I am sure that after 25 years and 60+ shows everyone knows what they are doing! But I think it is important to sincerely **thank those NYMC members** (in addition to Tony) involved in making this show such a success: **Paul Speranza, Mary Speranza, Diane Beckman, Richard Rossi, Mark Kucera, Vivien Gornitz, Anna Schumate, and Roland Scal.**

See you at the **Fall 2019 NYC Gem & Mineral Show** which will be held on November 9-10! (It never ends. . .)

Issue Highlights

President's Message

By Mitch Portnoy

The annual **EFMLS Convention** was held in Monroe, NY (May 31- June 3) with the Orange County Mineral Society as host. Here are some details:

- Thanks to **Cheryl Neary** (our Regional EFMLS VP) for selling "The 100" at the event. We divided the proceeds with the EFMLS and the OCMS.

(Do you have ideas for selling the book?)

- Congratulations to the thoughtful and forward-looking **David Nock,** who was elected to a second term as president of the EFMLS.
- Thanks to **Mark Kucera** for representing us at the event as a delegate, and for obtaining the various bulletin article awards and certificates that we won. He was also my eyes and ears there as I was unable to attend.

Pins worn by Mark at the Convention Banquet!

(See all the contest results on page 9)

- I had designed a set of **note cards** (theme: *Orange County Minerals*) that was produced by Mark and given to all delegates in their welcome bags.
- We also donated 50 small **Ellenville quartz crystals** for placement into that same welcome bag.

Diana Jarrett has agreed to write a series of "birthstone" columns during 2020 for her *Topics in Gemology* feature; these columns will be compiled into a special publication of the NYMC for release in early 2021. I am looking forward to working with her on this project!

During July, the **Annual NYMC Directors Planning Meeting** will be held. I will report on the results next month. If you have some ideas or agenda items for the team, please speak up!

Have an idea for a story?
Write for the *Bulletin of the NYMC.*
You'll be glad you did!

Club Meeting Minutes for June 12, 2019

By Vivien Gornitz, *Secretary*

Attendance: 50

President Mitch Portnoy presided

Announcements & Proceedings:

- The benefit raffle was held.
- There was a brief recap of the May Benefit Auction.
- **Naomi Sarna** was congratulated about her jade carving award.
- A NYMC website update was given, displaying the new birthstone gifs.
- The month's special days were listed.
- A game about minerals with the element lead was played.
- **The new NYMC T-shirts were sold for the first time!**
- The upcoming birthstone postcards for 2020 were shown and the birthstone theme for 2020 presented.
- A special tribute to **Vivien Gornitz** occurred, celebrating 25 years of her columns for the Bulletin and other club contributions.
- The Club's upcoming events, thru December 2019, were quickly listed.

Special Lecture:
Prof. Juan Manual Garcia-Ruiz
"Mineral Growth Patterns in Dallol, Ethiopia"

Dallol, Ethiopia is one of the most forbidding places on the planet—hellishly hot year-round and utterly devoid of living creatures. Yet it features one of the most spectacularly surreal landscapes in the world. Prof. Garcia Ruiz, Andalusia Institute of Earth Sciences, Granada, Spain described how volcanism and hydrothermal fluid activity interacted to create the bizarre mineral formations.

Dallol is located at one of the lowest spots on Earth (around 130 m , 427 ft) below sea level) in the Danakil Depression of the Afar Triangle—a tectonic triple junction formed by the Red Sea, the Gulf of Aden, and the northern extension of the East African Rift. Thick deposits of salt accumulated by evaporation of sea water that filled the rift valley during past periods of higher sea level. Hydrothermal solutions derived from basaltic magmas mixed with groundwater to produce the vividly colorful mineral assemblages. The predominant evaporite is halite, NaCl, but bischofite $MgCl_2 \cdot 6H_2O$, carnallite, $KMgClCl_3 \cdot 6H_2O$, gypsum (var. selenite), $CaSO_4 \cdot 2H_2O$, sylvite, KCl, and $CaCl_2$ minerals are also present. The hydrothermal springs are hypersaline (super-saturated in NaCl), hyper-acid (extremely low pH), and extremely hot (105° -108°C).

Unlike other highly saline or acid lakes (e.g., the Dead Sea, Great Salt Lake, or Yellowstone pools), which are colored by brine-tolerant algae, no microorganisms inhabit the Dallol hydrothermal pools except, possibly some nano-bacteria. Pure salt is white. However, here, iron in its various oxidation states create the color palette. Ferrous iron chloride produces a lime green, while ferric iron chloride tints minerals yellow, and ferric iron oxides paint jarosite a bright red.

Prof. Garcia Ruiz also explained how the "mineral gardens of Dallol" with their unique growth patterns, such as water lilies, flowers of salt, eggshells or tulips, salt pearls, and cauliflowers developed. He described Dallol as a "museum of mineral art where the exhibits are continuously changing." The stark beauty of Dallol results from the interplay of crystallization with fluid dynamics. The beautiful photography which complemented the lecture brought this unearthly landscape to life.

Members in the News

- **David Tibbits'** winning display of thumbnails during the Tucson 2019 Show was illustrated in the May-June 2019 *Mineralogical Record.*
- **Gail Brett Levine** gave a workshop on "Opals: A Playful Array of Colors" on May 17, 2019 at the Mediterranean Gemmological & Jewellery Conference in Cyprus.
- Two club members – **Charles Snider and Robin Wildes** – each had a work of their art exhibited at the National Arts Club in the Trask Gallery.

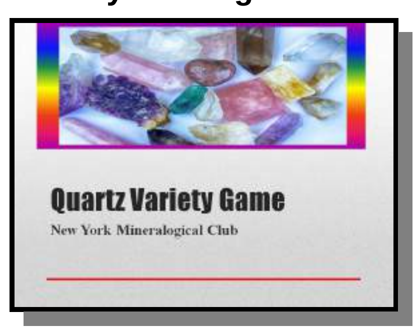
Welcome New Members!

- Cynthia Ayuso. . . . . Woodside, NY
- Surai Balbeisi . . . . NYC, NY
- K. Michael Ferranti . . . . Jersey City, NJ
- Jeannie Filippini . . . . NYC, NY
- Cherry Inigo . . . . Bronx, NY
- Keith & Tamara Johnson. . . . . Brooklyn, NY

(Grandson of past NYMC President Victor Pribil!)

- Heather E. O'quin & Family . . . . Dolgeville, NY
- Jordan Passno . . . . Astoria, NY
- Cheryl A. Quinn . . . . NYC, NY
- Lijana Vaitkevic . . . . Bronx, NY

July Meeting Game!



The World of Minerals

The *World of Minerals* is a monthly column written by Dr. Vivien Gornitz on timely and interesting topics related to geology, gemology, mineralogy, mineral history, etc.

Pounamu: New Zealand Jade

Pounamu is a dark green stone, predominantly nephrite, but less commonly includes bowenite (a deep to light green variety of serpentine) and serpentine rock. The Maori, the indigenous settlers of New Zealand, treat *pounamu* as a treasure, which increases in *mana* (power or prestige) when handed down from generation to generation. To the Maori, the green color represents vegetation, fertility, and life itself—a common color symbolism in many other cultures, as well. Formerly, pounamu was fashioned into a wide array of tools, weapons, as well as ceremonial objects that continue to play an important role in Maori culture.

Maori displaying the traditional uses of pounamu

The term "jade" encompasses two different mineral species–nephrite and jadeite, both of which have been revered by diverse cultures over the millennia (e.g., the Chinese, Mesoamericans, and Maori). ***Nephrite*** is a compact, massive form of *tremolite-ferro-actinolite*, $Ca_2(Mg,Fe)_5(Si_8O_{22})\bullet(OH)_2$, in the amphibole group. Nephrite (Mohs H 6-6.5; S.G. 2.90-3.05) has a tightly felted texture of fine, fibrous crystals, and is one of the toughest and most durable natural materials, capable of taking a sharp edge. These physical properties make it an ideal substance for fabricating tools and weapons.

Nephrite ranges in color from pure white, when Ca-rich, to varying shades of green to black with increasing amounts of iron. Surface oxidation of Fe^{II} to Fe^{III} produces a reddish-brown rind, which skilled Chinese carvers often exploit in order to emphasize the color contrast and highlight certain areas of their designs.

Jadeite, $NaAlSi_2O_6$, a pyroxene, is somewhat harder and denser than nephrite (Mohs H 6.5-7; S.G. 3.30-3.40), with a granular (sugary) texture of interlocking crystal grains. Because of its brighter luster and broader color palette (bright mint, apple, to emerald green, lavender, white, black, and varying shades of tan, yellow, russet brown, and red), jadeite is more desirable than nephrite for jewelry.

Serpentines are a group of hydrated magnesium silicate minerals (e.g., chrysotile, antigorite, lizardite), usually found as *serpentinite*—a rock consisting of serpentine minerals with minor amounts of chlorite, talc, and magnetite. Serpentine (the rock) ranges in color from light to dark green, but also comes in various shades of tan, rust, brown, and black. Softer and less dense than either form of jade, serpentine feels oily, greasy to the touch, most likely due to the sheet-like, layered crystal structure of the most common forms of serpentine (but sometimes also fibrous—as in chrysotile asbestos). It often substitutes for jade as a cheaper alternative in carvings and jewelry.

New Zealand nephrite is usually found in close proximity to serpentinites in ophiolite belts [Ophiolites are blocks of oceanic, island arc, and back-arc lithosphere that have been welded and uplifted onto continental crust during tectonic plate collisions.] along the Alpine Fault, in the West Coast, Fiordland, western Southland, and on the Arahura River, on South Island. During metamorphism, mineralizing solutions have transformed olivine- and pyroxene-rich ultramafic to mafic rocks into serpentinites. Based on associated mineral assemblages, the nephrite is estimated to have formed at temperatures between 300°C to 400°C (570°F to 750°F) at depths of 50 km (31 mi) or less. Eroded by glaciers and rivers, nephrite boulders and cobbles have accumulated in riverbeds and beach deposits. Because of their cultural significance to the Maori, pounamu deposits have been reserved for their exclusive use by treaty.

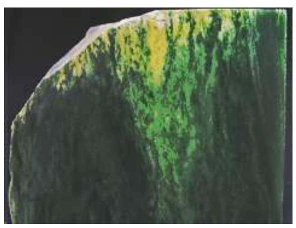
The Maori people are Polynesians, whose ancestors originally came from Southeast Asia via eastern Polynesia, and eventually settled in New Zealand about 700 years ago. Approximately 600,000 Maori live in New Zealand (as of 2013), comprising roughly 15 percent of the nation's population. Although most Maori live on North Island, the pounamu or greenstone deposits are concentrated on South Island. The Maori traditionally classified pounamu based on the stone's color, hardness, special markings, and degree of translucency instead of the crystal structural and chemical classification favored by mineralogists. Some of the different types of pounamu include the following:

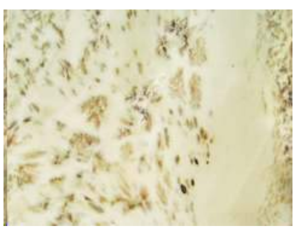
- **Kawakawa**—the most common type, appears in many shades of green; may have dark flecks or inclusions (magnetite, or chromite)
- **Kahurangi**—a translucent, vivid to forest green serpentine with few inclusions—rare, can be gemmy
- **Inanga**—a pearly white to pale gray-green, translucent to opaque variety of serpentine
- **Flower Jade**—green to yellowish green, with swirling lines or streaks, found in the Marsden area, West Coast, South Island; popular with carvers
- **Kokopu**—also from the Marsden area—light to dark browns, tan, off-white, olive green, yellow with brown spots, like a mountain trout
- **Tangiwai** (bowenite)—yellow, olive-green, brown, bluish green, clear, translucent


Kawakawa


Kahurangi


Inanga


Flower Jade


Kokopu


Tangiwai

Lacking metal prior to European contact, the Maori carved pounamu into a variety of useful tools such as adzes, axes, chisels, hammers, knives, fish hooks, and weapons (clubs, spear points), as well as ritual objects. While today's Maori use modern metal tools and implements, they continue to carve traditional designs for amulets, ornaments, and ceremonies. Some of their traditional designs, also popular among non-Maori, include the following:

- **Hei-tiki**—probably the best-known design: a human-like form with big, round eyes, a large tilted head, protruding tongue (protection), arms resting on hips (fertility), and bent feet touching heels. The tiki symbolizes "first person", or ancestor
- **Mere**—an elongated rounded shape with a sharp edge, formerly used as a jabbing weapon, hung on the wrist by a cord
- **Toki**—adze or axe—a smooth trapezoidal shape with a sharp edge, symbolizing strength, courage, authority, and power
- **Hei Matau**—a stylized fish hook symbolizing abundance, respect for sea life, safety in traveling over water
- **Koru**—spiral forms representing creation, movement, new growth, regeneration, as in unfurling fern fronds and many other growing plants
- **Pikorua**—twists (intertwined and braided forms)—a popular modern design symbolizing the bond between two people united by friendship, love, family
- **Whales' Tails**—sea life, abundance
- **Manaia**—A complex design with a stylized bird head, human body, and fish tail representing the balance between the three realms (sky, earth, sea)
- **Leaves**
- **Other nature-inspired designs**


Hei-tiki


Mere


Toki


Hei matau


Koru


Pikorua

Further Reading

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Note: All pictures used in the article are in the public domain or permission to use here was granted.– Editor.

(More on jade, see page 11!)

Can Quantum Ideas Explain Chemistry's Greatest Icon?

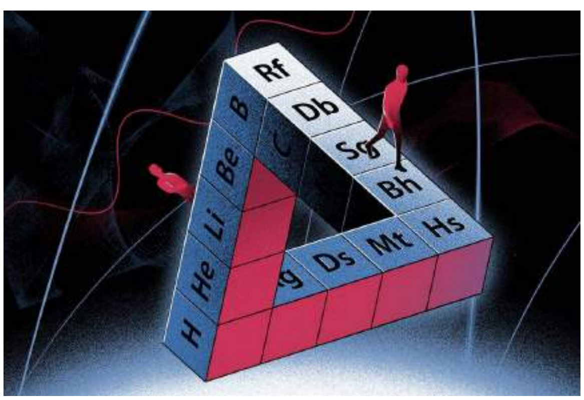
By Eric Scerri

Such has been the scientific and cultural impact of Dmitri Mendeleev's periodic table of the elements that many people assume it is essentially complete. In its 150th year, can researchers simply raise a toast to the table's many dividends, and occasionally incorporate another heavy synthetic element?

No — this invaluable compilation is still not settled. The placements of certain elements, even hydrogen and helium, are debated. Chemists dispute certain groupings, such as which elements should form group three of the periodic table (see go.nature.com/2vxnkqq). Traditionalists maintain that these comprise scandium, yttrium, lanthanum and actinium; a growing number thinks that lutetium and lawrencium should replace the last two on the basis of electronic structures. This matters, because moving an element to a different group might reveal new properties — it could become a candidate for inclusion in a high-temperature superconductor, for example.

The quantum-mechanical descriptions of electron arrangements in some atoms, notably transition elements such as copper and chromium, have been difficult to reconcile with the wider patterns of the periodic table. And it is unclear why there are more than 1,000 variants of the table, or whether there is one optimal version. Even the governing body of chemistry, the International Union of Pure and Applied Chemistry (IUPAC), is unsure. It claims not to back any particular arrangement[1], yet the version on its website features a block of 30 elements below the main body of the table (see go.nature.com/2t2uzmo). This is inconsistent with simple quantum-mechanical interpretations of atoms, which predict 28 such elements[2].

Here I outline some of these inconsistencies, and explain how solving them continues to help physicists and chemists to understand and predict the behavior of matter.



Predictive Power

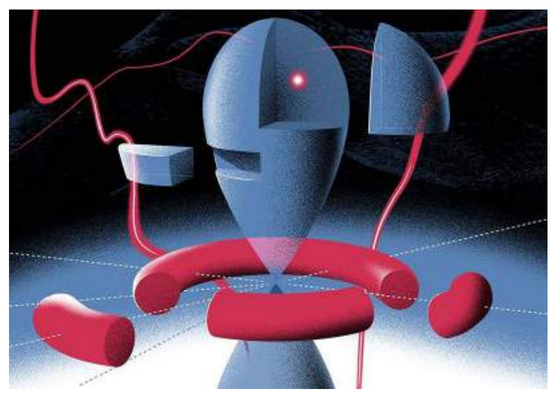
Mendeleev was not the first to try to arrange elements by their increasing order of atomic weight. He was the first to put such an arrangement to good use. His 1869 framework predicted the existence of several then-unknown elements, including gallium, germanium and scandium[3]. In the 150 years since, chemists have used it to predict atomic properties and have been inspired to perform landmark experiments. Physicists from J. J. Thomson to Erwin Schrödinger have used it as a test bed for theories of atomic structure and quantum mechanics.

Mendeleev did not know why elements had properties that recur periodically. Today, through many physicists' attempts to explain it, we know that atomic structure lies at the heart of the ordering of elements.

In the early twentieth century, physicists including Charles Glover Barkla and Ernest Rutherford noticed that the central charge of an atom is roughly half of its atomic weight. In 1911, a little-known Dutch economist and amateur scientist named Antonius van den Broek offered an explanation: atoms other than hydrogen are made up of multiples of 'alphons', a fundamental particle with half the mass of helium (two atomic mass units) and a single positive charge[4].

Alphons have never been found, but van den Broek's hypothesis was the origin of the concept of atomic number — the number of protons in the nucleus of an atom (and thus the electrons around it) that determines an element's position in the periodic table. Physicist Henry Moseley confirmed this ordering in 1913 using X-ray spectroscopy[5]. This physical explanation justified previous ad hoc rearrangements of atoms in the periodic table, such as Mendeleev's switching of tellurium and iodine. (Iodine's atomic number is higher than that of tellerium, which has a higher atomic mass than iodine.)

As quantum mechanics developed in the 1920s, physicists Niels Bohr and Wolfgang Pauli developed a more sophisticated interpretation of the periodic table. The aufbau principle (from a German word meaning construction) describes the arrangements of electrons orbiting atomic nuclei, and is still taught today. Electrons orbit in a series of shells of increasing energy and distance from the nucleus (which are labeled with numbers); within each shell are orbitals of different types (s, p, d, f). The laws of quantum mechanics limit how many electrons can sit in each shell and orbital. Hydrogen has one electron in its 1s orbital; the next element, helium, has two. Lithium's third electron goes into the 2s orbital, and so on.



Both Illustrations by Señor Salme

The aufbau principle uses a simple numerical rule to describe the sequence in which orbitals are filled. This is known as the Madelung rule, after physicist Erwin Madelung, who (among others) formalized it in the 1930s. The sequence is straightforward for the first three rows of the periodic table (in which elements have only s and p orbitals). The 3p orbitals fill from aluminium to argon. But things get complicated in the fourth row. The 4s orbital fills next, for potassium and calcium. But then the transition elements appear. The additional electron in the next element, scandium, doesn't go into 4p, but into 3d. Hence, transition metals are also known as d-block elements. The Madelung rule accommodates these non-intuitive steps, such that electron occupancy of 4s precedes that of 3d, and 4p is occupied before 5s. But the Madelung rule has not yet been derived from quantum mechanics or other fundamental physical principles.

In 1969, on the 100th anniversary of the periodic table, chemist Per-Olov Löwdin declared this derivation to be one of chemistry's major theoretical challenges. It still is, 50 years on[6].

Rule Breakers

Worse, there are 20 elements whose electron structures seem not to follow the Madelung rule. Some philosophers of science have argued that this points to a failure of quantum mechanics to explain the periodic table. I confess to having fallen into this trap myself[7]. Yet recent developments suggest that quantum mechanics can be reconciled with the aufbau principle and Madelung rule, if one looks deeper.

Chromium is one such anomalous element. The Madelung rule predicts that it should have four electrons in its 3d orbitals and two in its 4s orbital. However, spectroscopy of chromium reveals a different configuration: five electrons in the 3d orbitals and one in its 4s. Similarly, copper, niobium, ruthenium, rhodium and a dozen other elements have one extra electron in their d or f orbitals, rather than in their outermost s orbitals as one might expect.

In 2006, theoretical chemist Eugen Schwarz and his colleagues moved the debate along[8]. According to the probabilistic approach of quantum mechanics, an atom can exist in a range of possible electronic configurations at the same time. For a given energy, there's a chance that an electron might lie in or across several orbitals. All of these options and their probabilities need to be considered when deriving the most stable configuration. After averaging, the predicted electronic states of most atoms agree with the Madelung rule. And the calculations predict the anomalous states correctly, in agreement with experiments.

Thus, quantum mechanics can explain these puzzling elements. However, most chemists, physicists and textbook writers are unaware of this.

In 2010, Schwarz and his team explained another quirk of transition metals[9]. The order in which electrons are released when some atoms are ionized also doesn't seem to follow the Madelung rule. Although scandium's extra electron lies in its 3d orbital, experiments show that, when it is ionized, it loses an electron from 4s first. This doesn't make sense in energetic terms — textbooks say that 4s should have lower energy than 3d. Again, this problem has largely been swept under the rug by researchers and educators.

Schwarz used precise experimental spectral data to argue that scandium's 3d orbitals are, in fact, occupied before its 4s orbital. Most people, other than atomic spectroscopists, had not realized this before. Chemistry educators still described the electronic structure of the previous element in the periodic table (calcium) carrying over into the next. In fact, each atom has its own unique ordering of energy levels. Scandium's 3d orbitals have lower energy than its 4s orbital[10]. Schwarz urged chemists to abandon both the Madelung rule and Löwdin's challenge to derive it.

Schwarz is correct in saying that the Madelung rule is violated when it comes to the progressive occupation of orbitals in any particular atom. But it is still true that the electron that differentiates an element from the previous one in the table follows Madelung's rule. In the case of potassium and calcium, the 'new electron' relative to the previous atom is a 4s electron. But in scandium, the electron that differentiates it from calcium is a 3d one, even though it is not the final electron to enter the atom as it builds up.

In other words, the simple approach to using the aufbau principle and the Madelung rule remains valid for the periodic table viewed as a whole. It only breaks down when considering one specific atom and its occupation of orbitals and ionization energies.

The challenge of trying to derive the Madelung rule is back on.

Theories Still Needed

This knowledge about electron orbitals does not change the order or placement of any elements in the table (even the anomalous 20 cases). It does enhance its theoretical underpinning. It shows how resilient the periodic table continues to be, along with the rules of thumb that have developed around it, such as the Madelung rule.

Quantum mechanics does a great job of explaining specific properties of atoms. Yet something more is needed to see the big picture. Although Schwarz cautions against superficial quantum-mechanical accounts of chemical facts, a deep dive into quantum mechanics might reveal a fundamental explanation of the Madelung rule, or a new way of thinking about it.

Even 150 years on, theoretical chemists, physicists and philosophers still need to step in to comprehend the gestalt of the periodic table and its underlying physical explanation. Experiments might shed new light, too, such as the 2017 finding that helium can form the compound Na_2He at very high pressures[11]. The greatest icon in chemistry deserves such attention.

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Source: Nature.com from January 30, 2019

[Note: Dr. Eric Scerri gave a special lecture to the NYMC about the Periodic Table at the July 2016 meeting. – Editor]

Lady Gaga Wears the Same 130-Carat Tiffany Diamond as Audrey Hepburn to Oscars 2019

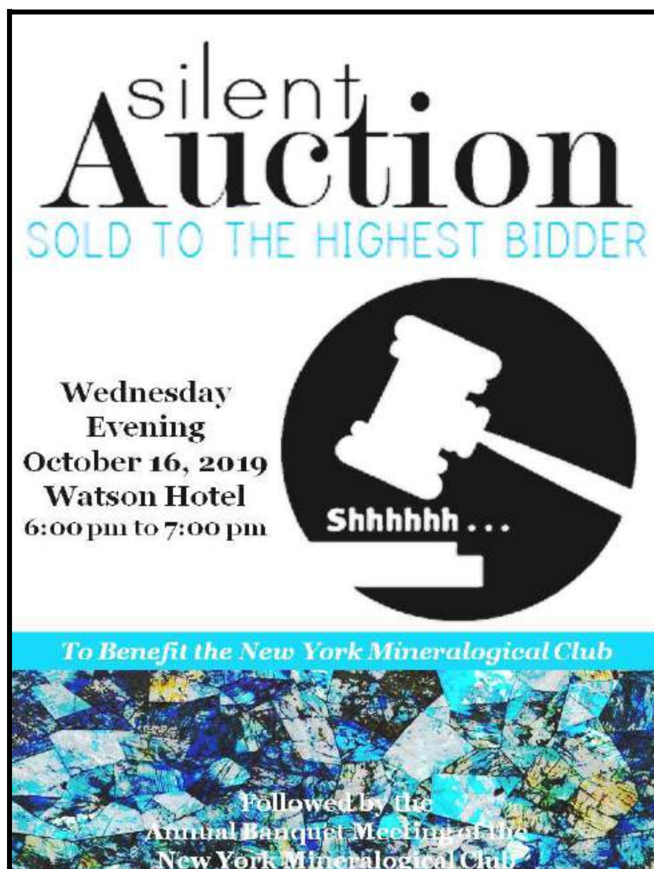
By Lindsey Graham-Jones

Before Lady Gaga set foot on the Oscars 2019 red carpet, rumors swirled that her outfit would include a really large — and really famous — diamond. Well, the "Shallow" singer, A Star is Born actress, and Oscar nominee did not disappoint at the 91st Academy Awards on February 24 at the Dolby Theater in Los Angeles, California. Gaga stunned in a strapless Alexander McQueen gown topped with one dazzling necklace featuring the iconic Tiffany & Co. Tiffany Diamond.

Gaga has kept it real classy this 2019 award season, opting for retro-inspired dresses, sweeping up do's, and polished statement jewelry — the most stunning being this brilliant, cushion cut diamond. "The chance to work with such an amazing piece of design and history tonight is a creative dream come true," says stylists Sandra Amador and Tom Eerebout. "There are so many beautiful jewels in the world, but the radiant Tiffany Diamond is truly exceptional, which is just so fitting for Lady Gaga." Last month, Gaga accidentally twinned with Judy Garland at the 2019 Golden Globes and she seems to draw continuous inspiration from industry legend Audrey Hepburn, as with her Oscars outfit of a classic black gown by Alexander McQueen and chignon hairstyle. The 128.54 carat yellow stone has only been worn by two people in its nearly 150-year history — to a ball in 1957 by Mary Whitehouse and then by Hepburn herself in a publicity photo shoot for the iconic 1961 rom-com Breakfast at Tiffany's. (Photo via Jeff Kravitz/FilmMagic)

Purchased by Tiffany & Co. in 1877 for just $18,000, the Tiffany Diamond was originally 287 carats before it was shaped into 128.5 carats and expertly cut to highlight its quality and radiant yellow color. Now considered to be priceless, the gem was most recently reset with over 16 cushion-cut diamonds and 46 round brilliant cut diamonds totaling 95 carats in a stunning platinum necklace fit for a queen. Or for a Lady Gaga, obvi. (Photo via Bettmann/Getty)

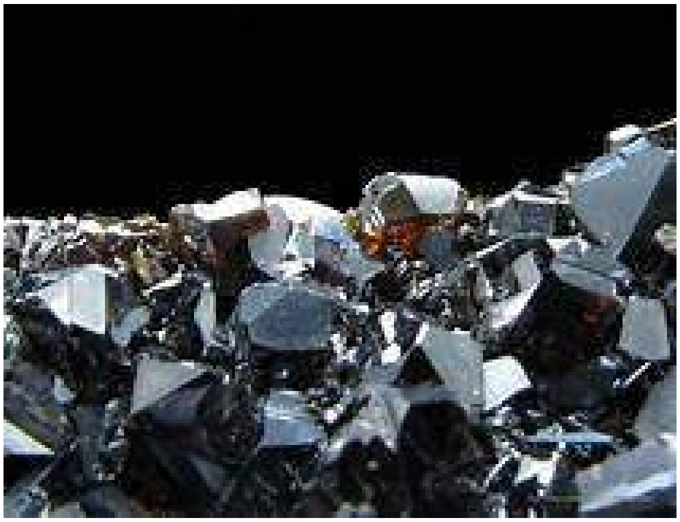
Source: Yahoo.com from February 24, 2019



It's Elemental

It's Elemental is a series of columns by Bill Shelton written this year in recognition of the United Nations' International Year of the Periodic Table of Chemical Elements.

Part II: Traces



Sphalerite

It is not uncommon to see a formula for sphalerite that indicates it is a zinc-iron sulfide. Other sources will say that it is a zinc sulfide, i.e., Back, 2018. The simple explanation lies in the fact that many samples will definitely show iron is present when they are subjected to analysis. References indicate sphalerite, as found in nature, may contain up to ~ 26 wt % iron (Deer et al, 2011). Compare this with Klein and Hurlbut, Jr., 1985, where they indicate a compositional range from pure ZnS to Zn (.68) Fe (.32) and illustrate a sample with 18.25 wt % Fe that yields an atomic proportion of Zn (64.4) Fe (30.8) and a ratio of Fe:Zn of 32.4 :67.6.

Standard sphalerite, as pure zinc sulfide is perhaps a natural rarity especially in large crystals and hand-sized specimens – they are unusual in that they are white to colorless. As a mineral collector will eagerly tell you, sphalerite is likely to be very dark colored and commonly appears black in hand-sized specimens. One variety is called marmatite and it is always black.

If you pursue the name, you are most likely to find out it is an opaque black variety of sphalerite. We know there are red, yellow, green, orange, brown and shades in between these present in sphalerite. This is important because essentially all sphalerite colors are due to varying amounts of iron. While iron may be non-essential in the formula, it is very common in most analytical reports for sphalerite. We do find numerous trace elements in sphalerite, as we see in Deer et al, 2011: see the list following.

Copper	Indium	Cobalt	Molybdenum
Cadmium	Silver	Germanium	Vanadium
Antimony	Arsenic	Selenium	Chromium
Mercury	Titanium	Nickel	Manganese
Tin	Gallium	Barium	Thallium

In order to reinforce the significance of trace element mineralogy, be aware that sphalerite is the main source of cadmium, indium, germanium and gallium. Samples where modern technology has been utilized prove sphalerite can contain 13.7 % manganese, nearly 8 % mercury, 10.4 % indium and 17.6 % cadmium – all of these unusual examples are far richer in these elements that "a trace" might generally imply.

Specimen collections can contain some examples that are really natural rarities. For example, the green to yellow-green specimens from Colorado or the bright yellow pieces known from the Niagara escarpment in New York. We often see reddish-orange examples from Spain – they can be quite sizable and even yield large faceted stones. Sometimes, collectors have a sub-collection with numerous pieces illustrating varied crystal forms, different colors or multiple localities.

Gold

It is common to find gold in nature with other elements present that result in impure specimens. The most abundant element is silver; Sher, 1999, indicates any specimen with less than 500 fineness should be labeled auriferous silver. Also, for the variety electrum, the actual silver content varies from 20 % silver as described by Pliny to others who indicate 10 % up to 45 % silver may be present. Perhaps the moral of the story indicates varietal names are dubious at best and may be difficult to precisely describe which is unlike the proper description for a mineral species. Other elements noted, and classified as minor or trace include the following.

Arsenic	Zinc	Lead	Antimony
Bismuth	Tellurium	Selenium	Mercury
Molybdenum	Platinum	Tin	Titanium
Chromium	Tungsten	Nickel	Cobalt
Copper		Iron	

The predominant quantities range from very small to nearly 1% except, of course, for silver. The natural fineness given by Sher ranges from 980 to 700 with 920 to 800 being the most frequent range observed in that study.

Dana, 1892, mentions palladium and rhodium traces in gold. He states that California gold is mostly 87 to 89 per cent fine [or 870 to 890 in Sher's terminology] and may attain 95 per cent while other samples are classed as electrum. In Dana, Rose's data tells us Uralian specimens vary from 0.16 Ag to 33.38 % Ag; they vary as does the stated specific gravity.

Dana, 1874, tells us ordinary gold can contain 0.16 to 16 per cent of silver; or the atomic ratio of gold to silver varying from 150:1 to 3:1. Analytical examples are given below:

Schabrovski:	Au = 98.96, Ag = 0.16
Siranovski:	Au = 60.98, Ag = 38.38, Cu = 0.33
California:	Au = 96.42, Ag = 3.58
California:	Au = 86.57, Ag = 12.33, Fe = 0.54, Cu = 0.29
Australia:	Au = 96.52, Ag = 8.48

There are a total of 90 analyses available in this edition of Dana from about fifty different localities worldwide.

I also have good news for collectors. Mindat.org lists thousands of localities and can provide you with the opportunity to view innumerable images. If you are happy with micromounts, there are plenty available. Larger specimens and matrix examples are, on the other hand, likely to be costly as would large nuggets. One should expect this because as of today [October 8, 2018] gold is trading for $1283.30 in bullion coin form weighing one ounce. A natural piece as found in nature may sell for more per ounce than a coin, depending on a lot of other factors such as aesthetics and locality.

In 1993, loosely based on Gold, The Noble Mineral; extraLapis English No.5, popular potential localities include California, Nevada, Colorado, as well as Australia, Venezuela, Canada, Alaska, England and Romania. We see specimens online and at mineral shows but many of the available pieces are from California, Australia and Venezuela. Trace mineralogy can have a dramatic effect on the color we see in an individual specimen.

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1. Anthony et al, 1985, Handbook of Mineralogy.
2. Arem, 1987, Color Encyclopedia of Gemstones.
3. Back, 2018, Fleischer's Glossary of Mineral Species.
4. Dana, 1874, A System of Mineralogy.
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6. Deer et al., 2001, Rock-Forming Minerals.
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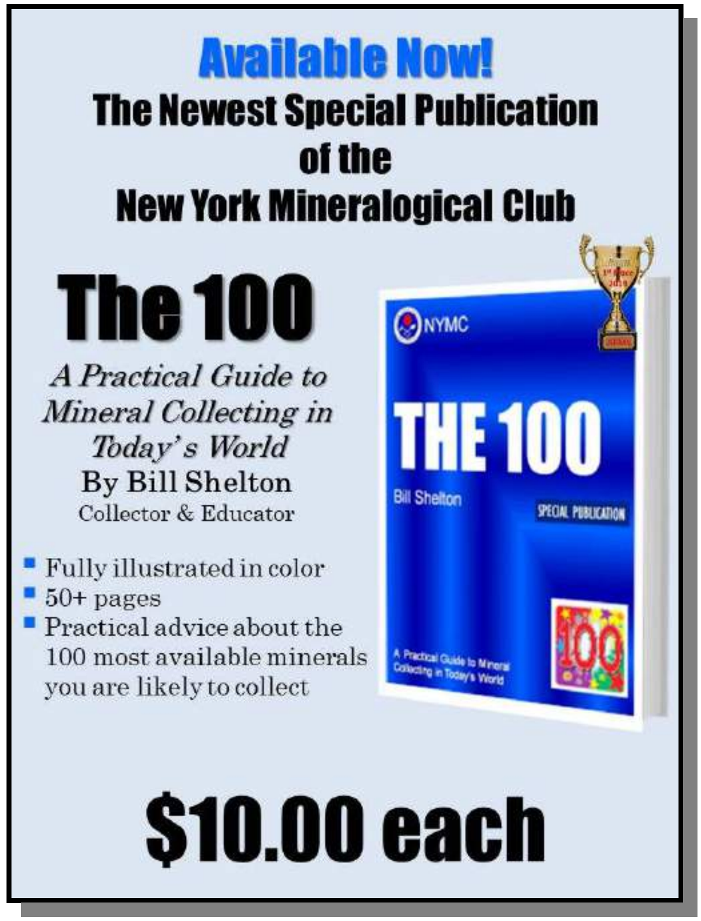
8. Roberts and Rapp, 1965. Mineralogy of the Black Hills.
9. Sher, 1999, Gold: Nuggets of Russia.
10. The Fifteenth Annual Sinkankas Symposium, 2018.

IYPT Game Online!

In light of celebrations for the International Year of the Periodic Table, European Chemical Society is proud to present "Elemental Escapades!", a Periodic Table Adventure puzzle platform game in which you play as Jan, a janitor inadvertently transported across time and space! In your journey home you will learn about basic chemical elements and combine them to make useful compounds to help navigate the strange alien world you find yourself in!

Play the game online now:

https://gamejolt.com/games/ElementalEscapades/391150



2019 EFMLS Article Contest Results

The following 2018 works were submitted to the EFMLS for judging in the 2019 contest. Results were announced at the EFMLS convention in June in Monroe, New York. [The AFMS (national) results were announced EARLIER in the year at the AFMS convention in March 2019 held in Cedar Rapids, Iowa.]

Category: Advanced (OE) Articles

EFMLS 2nd Place Trophy; AFMS 2nd Place Trophy

- *Swiss Mystery Rock* by Vivien Gornitz (March 2018)

EFMLS 3rd Place Trophy; AFMS 3rd Place Trophy

- *CLIPPIRs* by Vivien Gornitz (August 2018)

Category: Regular (ON) Articles

9th Place

- *Rooftop Spacedust* by Vivien Gornitz (February 2018)

Honorable Mention

- *Namibia's Ghost Town* by Diana Jarrett (March 2018)

Honorable Mention

- *2017 EFMLS Convention* by Mark Kucera (February 2018)

Category: Written Features (FW)

4th Place

- *Madagascar* by Diana Jarrett (May 2018)

6th Place

- *Is the Moon for Sale?* by Bill Shelton (March 2018)

Honorable Mention

- *Larimar* by Diana Jarrett (June 2018)

Category: Special Publications (AFMS ONLY – A Sweep!)

- *The 100* by Bill Shelton - 1st Place
- *Club Designations* by Mitch Portnoy - 2nd Place
- *'19 Postcards Calendar* by R. Wildes/M. Portnoy - 3rd Place

Topics in Gemology

Topics in Gemology is a monthly column written by Diana Jarrett, GG, RMV, based on gemological questions posed to her over the years by beginners and experts alike. Contact her at diana@dianajarrett.com.

Surprising Tanzanite

There's not a professional in the jewelry trade who doesn't know about tanzanite. The same can be said of most jewelry lovers by now. Say the name tanzanite, and consumers can fill in the blanks by claiming it's a one-source gemstone and it was discovered in the mid-20th century. And it's about to run out in our lifetime. That all may be true—depending on the individual's lifetime of course. Marketing aside, it's pretty spectacular to discover an intensely saturated blue / violet transparent gemstone that is only found in one small region in the world. In my books, that makes it an exceptional find.

18K white gold and fancy color tanzanite earrings and ring (Courtesy Lisi Fracchia)

First it was Blue

Tanzanite is a trade name, not an actual mineral species. Soon after its discovery, Tiffany & Co., coined the name Tanzanite in a nod to its origin, Tanzania. The mineral had actually been around for centuries, albeit in an unattractive brownish hue, and mostly opaque. That mineral, called zoisite was never used for jewelry owing to its rather plain look. Tiffany was the first retailer offering the new transparent blue-violet gemstone variety. They apparently considered marketing it under the name Blue Zoisite, but decided against it since they thought the name Tanzanite, a more exotic and easier to remember name would excite their consumer base.

Unusual Terrain

The attractive gem's limited geographic origin adds to its cachet. So far, all known mines are located in a tight area of just eight square miles surrounding the Merelani Hills, near the foot of Mount Kilimanjaro and the city of Arusha. But a surprising variety of Tanzanite that has somehow eluded the radar screen of popularity is the bi-color variety and also what is called fancy colored Tanzanite. Bi-color Tanzanite is cut into pleasing gemstones showing both green and blue on different areas of the stone. Sometimes the stones are a mashup of purple-violet at each end and blue in the center—or vice versa. These stones have been cut on their C-axis to produce their distinct color zones, and for jewelry fans, this is all pretty exciting stuff.

Fancy color Tanzanite is produced in pastel-candy colors that are both charming and surprising. Shoppers looking at a piece of jewelry with fancy color Tanzanite would never guess what they are actually seeing—and that's all part of the mystique.

Selection of various fancy color tanzanite rough (Courtesy NewEra Gems)

Colors Offer Intrigue

According to Bangkok based, AJS Gems, "But with extensive mining in Tanzania, some rare and beautiful colors of natural zoisite and have been found and these are now sold as fancy colored tanzanite (though technically they should be called "fancy colored zoisite"). The colors include green, golden, orange, green-blue, pink and purple."

Not all fancy colored tanzanite is created equal, reports AJS Gems. "The key to value in fancy color tanzanite is the purity of the color. Most zoisite has a brown or grey secondary hue, and these muted colors are not desirable. Vivid pinks, greens yellows and oranges are rare and are sought after by collectors. Most fine fancy colors are found only in small sizes (under 1 carat) and larger pieces are very rare, especially in purer colors."

For another source for this sub-set of tanzanite, is quickly found by searching on Multicolour.com. This colored stone vendor is also based in Bangkok and provides an eye-opening array of several fancy color. Tanzanite varieties, some you may never have seen before.

Let the Stones Speak

Madrid-based jewelry designer Lisi Fracchia is renowned for her striking combinations of colored gemstones appearing in her couture collections. While her original designs are sophisticated, she prefers to allow the lively gemstones to take centerstage. Her customers are loyal to Fracchia because she delivers the finest colored gemstones in designs not found elsewhere. She includes fancy tanzanite in her collections since the gorgeous pastel colors definitely spark a conversation.

Jewelry fans are always looking for something out of the ordinary. Fancy color tanzanite and bi-color tanzanite offers collectors one more avenue to make a personal statement through jewelry with these surprising stones.

Bi-color yellow-green tanzanite (Courtesy Multicolour Gems)

Jade: Intrigue, Allure & Ancient Stones

A connoisseur's stone, jade has many variations. It takes a master to understand the subtle nuances that drive price and consequently its value. It's only when auctions, often held in Hong Kong, show results do we begin to focus once more on their collectability.

Fine green jade and diamond ring; Credit: Bonhams

The much buzzed about Christies ***Hong Kong Magnificent Jewels*** auction last May 31, 2016 produced some dazzling results. One lot, called an Impressive Jadeite Bangle brought in over $2M. It was an 8.8mm thick cylindrical jadeite bangle of bright apple green to whitish pastel green—some areas being close to transparent.

The same auction sold a simple diamond accented ring featuring a rectangular curved plaque of a jadeite (22.8mm x 11.8mm) for over a have million dollars US.

Impressive Jade Bangle Christies Hong Kong May 31, 2016 sale

What stirs such feverish bidding to bring these colossal auction results for green stone ornaments? Asia's devotees of the material are legion. And their love affair with jade goes back millennia. The material in general has an impressive provenance. Skillfully carved jadeite ax heads mined in northern Italy from the Neolithic period (beginning about 10,200 BC) were found scattered across the British Isles. Owing to the tremendous difficulty in working with jade, it's believed these jade ax heads were ornamental or even used as a form of currency.

Turkey produces some unusual lavender color jade. The ancient Mayans treasured and intense deep toned green—almost blue jade referred to as Olmec Blue Jade. The Mesoamericans prized this unique variation of the hard stone, and carved wondrous adornments for the breastplates of their high priests in this material.

In Chinese culture, the value of jade extends far beyond its ornamental use. They place deep spiritual significance to this stone. And today, in tandem with the rise of China's economy comes a spike in jade's value. Chinese citizens who have always admired jade are actually able to buy it now. So the supply lags far behind the demand at this point.

Rough purple jade specimen, Bursa Province northern Turkey

Burma (now Myanmar) fine quality green jade is the gold standard of desirability for this gemstone. Jade from any source however is critiqued first by its color, then transparency and texture. Whether the item has even coloration or mottling, these elements must be pleasing to the eye. The best jade will take a fine polish and reflect light well. In the case of translucent to the ultra rare semi-transparent jade, clarity reigns—any surface reaching fractures impacts value.

3000 year-old blue jade carved Jaguar-warrior mask, Olmec Culture

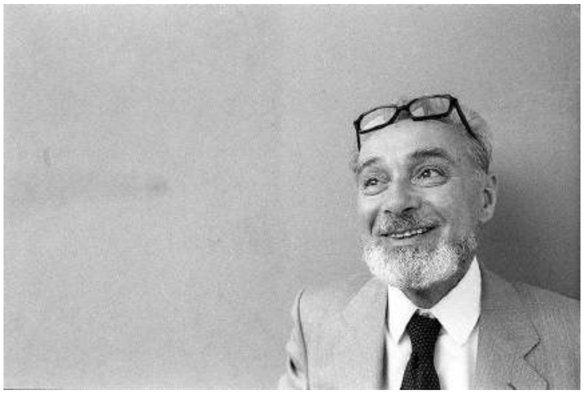
Even lovers of jadeite who have heard of lavender jade or its bluish-green version may be surprised to learn of the tremendous variety of colors that appear in this stone. Black, white and grey are found in the jade world. So are yellow, red, orange and brown. All of these can be crafted into exciting jewelry or decorative items.

But the one kind—dubbed Imperial Jade in a nod to the legendary Chinese Royal Court is still considered the top of the heap. Nearly transparent and vibrant green, this finest quality jadeite still thrills the cognoscenti. These are the items one is not surprised to discover selling in the millions of dollars.

While ornate decorative items have been routinely carved from jade for eons, today the most popular use is still found in its simplest form—a plain saddle ring carved from a single jade stone, or smooth round green bangles like our $2M stone bracelet sold at Christies.

In His Element: Looking Back on Primo Levi's *The Periodic Table*

By Tim Radford



Primo Levi, literary alchemist and Auschwitz survivor. Credit: Marcello Mencarini/Bridgeman

In *The Periodic Table*, Primo Levi — scientist, poet, writer — makes chemistry a metaphor for his life. But it becomes more than that. Chemistry shapes his life, defines his life, in Auschwitz even saves his life. It becomes his living. In the end, chemistry becomes everything: life itself.

When, in 1985, I reviewed Raymond Rosenthal's translation of Levi's collection of short stories (by then a decade old), I called it gold. I wish I'd also said what I thought at the time: that this was a book that people would still be reading in 100 years. With each re-reading, the chapters based on memoir seem even more perceptive, more profound.

Western European history is embedded in the work's brief time span, from Levi's student years to the post-war recovery of Italy. Each title of the very different 21 tales is the name of an element at that story's core, sustaining the architecture of a book that delivers a sharp sense of the compulsion, ambiguities and delights of science.

His narrative briefly invokes the rise of fascism, the folly of British Prime Minister Neville Chamberlain at Munich, the fall of Prague, General Francisco Franco's conquest of Spanish Republican forces in Barcelona, the sustained bleakness of all-out war in the 1940s, the nightmare of the concentration camps and the cruel post-war struggles to survive and rebuild.

Literary references are scattered through, among them Thomas Mann's The Magic Mountain, Emile Zola's Germinal and the work of fellow Italian–Jewish political exile, writer and physician Carlo Levi. But the narrative stubbornly returns to elemental chemistry. He recalls in the story 'Iron' the moment he learnt while conducting assays that to conquer matter is to understand it; and that that knowledge — he calls it the missing link between the worlds of words and of things — is in turn central to understanding the Universe. For him, the periodic table was "poetry, loftier and more solemn than all the poetry we had swallowed down in liceo [secondary school], and come to think of it, it even rhymed!"

Elemental Struggles

Levi was born in Turin in 1919. What narrative there is begins with his ancestry, peopled by individuals "noble, inert and rare", but poor compared with "other illustrious Jewish communities in Italy and Europe". The story is 'Argon', from the Greek for inactive. His memories of barbe and magne (uncles and aunts in the dialect of his native region, Piedmont) become a reflection on words, in Hebrew and Yiddish too. The links between obdurate matter and precarious survival become more intimate with time, as he graduates, begins a career, finds ways just to stay alive. The realization that zinc samples must be impure to yield to acid triggers an insight into the importance of difference and the new place of the Jewish people in fascist Italy under Benito Mussolini, who ruled from 1922 to 1943. "Dissension, diversity, the grain of salt and mustard are needed." Fascism, however, "wants everybody to be the same and you are not".

Resistance to fascism in Italy was something of a buffer against the country's fascist racial laws. Levi achieved a first-class honours degree in chemistry. An unnamed military officer then gave him an enigmatic and ultimately futile job in faraway, unidentified hills, to see if he could extract value from the tailings of an asbestos mine. In 'Nickel', this rooting in rubble prompts another hymn to matter. "The entrails of the earth swarm with gnomes," he writes. The word nickel is even derived from the German for 'little demon' — creatures that might "let you find a treasure beneath the tip of your pickax, or deceive and bedazzle you, making modest pyrites glitter like gold".

After the collapse of Italian fascism in 1943, Nazi divisions occupied Milan and Turin. Levi joined the partisans, and was betrayed. Imprisoned in Italy's Republic of Salò, a German puppet state, he was subsequently shipped to Auschwitz. Here, his chemistry degree and ability to speak German saved him — for slave work at the Buna rubber factory. To avoid starvation, he secretly made fatty acids by oxidizing paraffin, tried to make fritters of cotton and forced himself to ingest glycerine. He identified and stole iron–cerium rods found in the laboratory. Whittled down to make cigarette lighter flints, these were bartered: "This is how we won the bread which kept us alive until the arrival of the Russians."

In his 1947 memoir *If This Is A Man*, Levi had written unforgettably of the crazy market forces in the camps, one of the great testaments of cruelty, shame and despair in mid-century Europe. The stories of *The Periodic Table* are poignant, acute and more shaped. In one casual sentence in 'Vanadium', he recounts how, decades after the war, when he was working with an industrial-varnish business, he found himself dealing with a German from the Auschwitz factory. As he wrote, "reality is always more complex than invention: less kempt, cruder, less rounded out". But crude, unkempt experience is transmuted in this book. Literary alchemy is at work. In the 2002 biography Primo Levi, Ian Thompson notes that, in some ways, the closest Levi came to being a novelist was in the "daring and original" *The Periodic Table,* and nowhere more so than in 'Vanadium'.

'Silver' exemplifies that originality, too. It includes a little detective story, told by a fellow chemist, of how intermittent batches of silver nitrate papers supplied for X-ray imagery were spoilt. Mystery solved, Levi declares his ambition to seek more stories of luck, intuition and stratagems on which the working chemist relies, stories "in which stolid matter manifests a cunning intent upon evil and obstruction, as if revolted against the order dear to man". In the post-war wreckage of Italy, he finds plenty of obstruction. A down-at-heel factory manager in 'Nitrogen' commissions him to identify the unguent that renders lipstick 'kiss proof'. He decides the starting point must be uric acid. The search ends with Levi and his bride trying to amass urea from chicken dung and python excrement.

Such visceral realities are the lesson of the chemist's trade, he writes. "Matter is matter, neither noble nor vile, infinitely transformable, and its proximate origin is of no importance whatsoever." The book ends with the imagined odyssey of an atom of carbon, from calcium carbonate to carbon dioxide to leaf tissue, to glucose and ultimately to the pulse of energy in the hand that holds the pen.

Levi died in 1987, after falling from the third-storey landing of his Turin home. His book lives on, a chemist's book, a hymn to the elements and a testament to what he calls "the strong and bitter flavour of our trade".

I have four anthologies of science writing on my shelves. Levi is in all four, and his matchless short story 'Carbon' in three. I think people will still be reading *The Periodic Table* in 2085.

Source: Nature.com from January 28, 2019

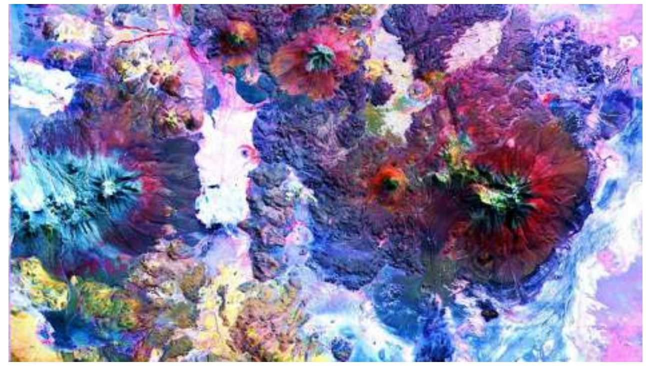
We May Finally Know Where Continents Come From

By Stephen Luntz

If you can overlook the insignificant lifeforms on its surface, the history of Earth is the slow expansion of its continents. Billions of years ago our planet was largely a water world with a few small islands poking above the surface. Then, as now, the floor of the oceans bore more resemblance to the composition of the other rocky planets than it does to continental rocks. The question of how continents came to cover so much of the planet has puzzled geologists, but a new theory gives the credit to mountain ranges.

The idea is counterintuitive. After all, if there were no continents, where would the mountains sit? Nevertheless, Dr Ming Tang of Rice University said in a statement: "If our conclusions are correct, every piece of land that we are now sitting on got its start someplace like the Andes or Tibet, with very mountainous surfaces."

Many of the world's mountain ranges are eroded continental arcs, located at the margin where a continental plate rode over an oceanic one. Tang proposes these arcs are factories for the distinctive continental rocks.



Earth's 'continental nurseries' formed under mountain ranges, like the Andes shown here. The colors signify the different materials.
NASA/GSFC/METI/ERSDAC/JAROS, and US/Japan ASTER Science Team

Tang's hypothesis, presented in Nature Communications, is based on the distribution of niobium and tantalum in rocks from around the world. Although the two metals' names sound like they come from science fiction and fantasy books respectively, the elements are so chemically similar they usually turn up in the same places, leaving a very constant ratio.

However, the continental crust has 20 percent less niobium, proportionally, than the rest of the planet. The missing niobium has troubled geologists for decades.

Tang studied databases of the elemental composition in rocks, and came to the conclusion the continental average is being dragged down by arclogites, materials that collect at the base of continental arcs. Although often deeply buried, arclogites can be brought to the surface by volcanoes.

Tang had arclogites from the High Sierras tested and confirmed those made of rutile crystals are high in niobium. He thinks these crystals trapped a lot of niobium, but not tantalum, and most of them sunk into the mantle, leaving low niobium crust behind.

Rutile only forms under high pressures, such as is provided at the base of the crust with a mountain range above. While the niobium content provided the clue that allowed Tang to recognize what was happening, the more important aspect of the minerals formed by the continental arcs is that their low iron content makes them lighter, and therefore more buoyant than oceanic basalts.

Where the first continental arc came from is unclear, but once it appeared, it began a self-reproducing cycle. The arc produced continental rock, which rode over any oceanic plates it encountered, producing more continental arcs, and therefore more continents.

Source: IFLScience.com from January 31, 2019

Bring an additional friend or loved one!

133nd Anniversary New York Mineralogical Club Banquet

Date:	October 16, 2019 [Wednesday Evening]
Time:	6:00 p.m. - 11:00 p.m. [Social Hour & Silent Auction from 6 p.m. - 7 p.m.]
Place:	Watson Hotel Manhattan, 57th Street Between Ninth & Tenth Avenues, NYC
Cost:	$30 for Members/Guests (***Advance Payment***); $35 for Non-Members (or ***Payment at the Door***)

Gala Dinner Menu (tentative)

Appetizer
Salad
Choice of Entree:
chicken • salmon • beef • vegetarian • kosher
Potatoes & Seasonal Vegetables
Selection of Breads & Rolls
Red & White Wine
Soft Drink Assortment
"Labradorite" Dessert Selection
Coffee & Tea

Special Banquet Theme

"Dazzling Labradorite"

Amount						
	Please reserve _______ seat(s) for me at the banquet @ $30.00 per member (or $35.00 per non-member) each. I will ***probably*** be ordering G **Salmon** G **Chicken** G **Beef** G **Vegetarian** G **Kosher** for my dinner entree(s).					
	Special Food Instructions (if any):					
	Special Seating Instructions (if any):					
	Also included are my **2020 New York Mineralogical Club Membership Dues.** (G $25 Individual, G $35 Family)					
	I am adding a **Wine/Dessert Donation** to help make the banquet an affair to remember. (Each bottle costs about $25)					
	I REALLY want _____ of the **NYMC T-Shirt(s)**! [$15.00 each - indicate size(s)]	S	M	L	XL	XXL
	Please bring _____ copies of the **Club's Award-Winning Publication, "The 100"** for me. (Each book @ $10.00)					
	I'd like to get _____ of the **Drawstring Backpack(s)** which features the Club. (Each backpack @ $5.00)					
	Please reserve _____ set(s) of the **Boxed Labradorite Note Card Sets** for me. (Sets @ $5.00 each include envelopes)					
	I wish to make an **Additional Donation** as a sponsor to help support the Banquet and the NYMC.					
	← Total Included	Other Comments:				

Name(s)		
Street Address		Apt. No.
City	State	Zip
Phone	Email	

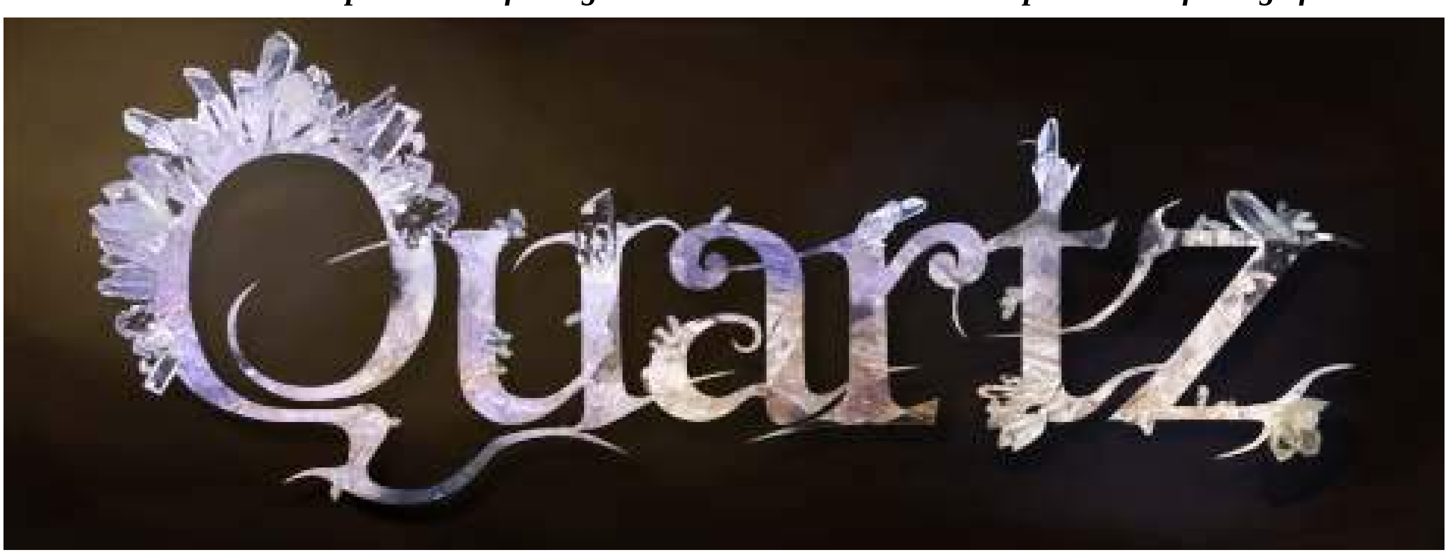
2019 Club Calendar

Date	Event	Location	Remarks & Information
July 10	Meeting at 6:00 pm	Watson Hotel, Manhattan	Special Lecture: Eric Rampello – "The Joys of Collecting Quartz"
Sunday July 21	Annual NYMC Directors' Planning Meeting	Upper West Side, NYC	2019 Banquet Planning; 2020 Club Calendar & Events; Club Merchandise; Other Important Topics
Sunday August 18	Open House	Home of Cheryl Neary Patchogue, Long Island, New York	RSVP Required; Lots of Details to Follow
THIRD Wednesday! September 18	Meeting At 6:00 pm	Watson Hotel, Manhattan	Special Lecture: Christopher Kemper Ober – "The Periodic Table and the Language of Science"
Thursday October 3	Special Gallery Talk at 6:00 pm	Wilensky Mineral Gallery 173 Tenth Avenue (at 20th Street)	Emerald Exhibit Talk by Stuart Wilensky RSVP required! (Members & Friends ONLY!)
THIRD Wednesday! October 16	Annual Gala Banquet	Mezzanine B & C Watson Hotel, Manhattan	Theme: Labradorite; Silent Auction; Awards; Fun & Games; Gifts & MANY Surprises!
November 13	Meeting At 6:00 pm	Watson Hotel, Manhattan	Special Lecture: Alfredo Petrov– "Mineral Collecting in Spain Today"
December 11	Meeting At 6:00 pm	Watson Hotel, Manhattan	Special Lecture: Vivien Gornitz– "Ice: The Mineral that Shapes the World"

2019 Show & Event Calendar

Date	Event	Location	Remarks & Information
June 20-21	Mineralogical Society of America Centennial Symposium	Carnegie Institution Building, Washington, DC	Info: https://msa.minsocam.org/Centennial.html
June 22 - 23	Summer NYC Gem, Mineral, Jewelry & Fossil Show	Grand Ballroom, Watson Hotel, New York City	25+ High Quality Dealers; NYMC Booth; Lecture on Both Days; Wholesale Section
July 27-28	38th Annual Gem & Mineral Show	Mattituck High School, 15125 Main Road, Mattituck, NY	Sponsor: Long Island Mineral & Geology Society (LIMAGS); Info: limineralandgeology.com
August 9-11	East Coast Gem, Mineral & Fossil Show	Better Living Center, Eastern States Exposition, West Springfield, MA	Largest Show in the East! 200+ Dealers! Info: www.mzexpos.com/east-coast-show
August 17	Gem and Mineral Show and Sale	Morris Museum , Morristown, New Jersey	Sponsor: Morris Museum Mineralogical Society
September 21 - 22	Mid-Hudson Valley Gem and Mineral Show & Sale	Gold's Gym, Poughkeepsie, NY	50th Anniversary Show!; Theme: "Pyrite . . . Don't be Fooled"; Pyrite Exhibit by Vassar College

For more extensive national and regional show information check online:
AFMS Website: http://www.amfed.org and/or the EFMLS Website: http://www.amfed.org/efmls



The New York Mineralogical Club, Inc.

Founded in 1886 for the purpose of increasing interest in the science of mineralogy through the collecting, describing and displaying of minerals and associated gemstones.

Website: www.newyorkmineralogicalclub.org

P.O. Box 77, Planetarium Station, New York City, New York, 10024-0077

2019 Executive Committee

[redacted]

Dues: $25 Individual, $35 Family per calendar year. **Meetings**: 2nd Wednesday of every month (except August) at the Watson Hotel, 440 West 57th Street between Ninth and Tenth Avenues, New York City, New York. Meetings will generally be held in one of the conference rooms on the Mezzanine Level. The doors open at 5:30 P.M. and the meeting starts at 6:45 P.M. **(Please watch for any announced time / date changes.)** This bulletin is published monthly by the New York Mineralogical Club, Inc. The submission deadline for each month's bulletin is the 20th of the preceding month. You may reprint articles or quote from this bulletin for **non-profit usage only** provided credit is given to the New York Mineralogical Club ***and*** **permission** is obtained from the author and/or Editor. The Editor and the New York Mineralogical Club are not responsible for the accuracy or authenticity of information or information in articles accepted for publication, nor are the expressed opinions necessarily those of the officers of the New York Mineralogical Club, Inc.

Next Meeting: Wednesday Evening, July 10, 2019 from 6:00 pm to P:00 pm

Mezzanine Level, Watson Hotel, 57th Street & Tenth Avenue, New York City

Special Lecture: Eric Rampello – "*The Joys of Collecting Quartz*"

New York Mineralogical Club, Inc.
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FIRST CLASS

George F. Kunz
Founder