THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: November 22 Time: 7:30 p.m.

The meeting will be hybrid due to the coronavirus pandemic. Details on page 9.

Rutile

Couto de Magalhaes de Minas, Minas Gerais, Brazil

Photo: R. McDougall.

Volume 61, No. 9
November 2021
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November Meeting Program:

Rutherford Mine Pegmatite #2

Details on page 11

In this issue …

Mineral of the Month
Rutile

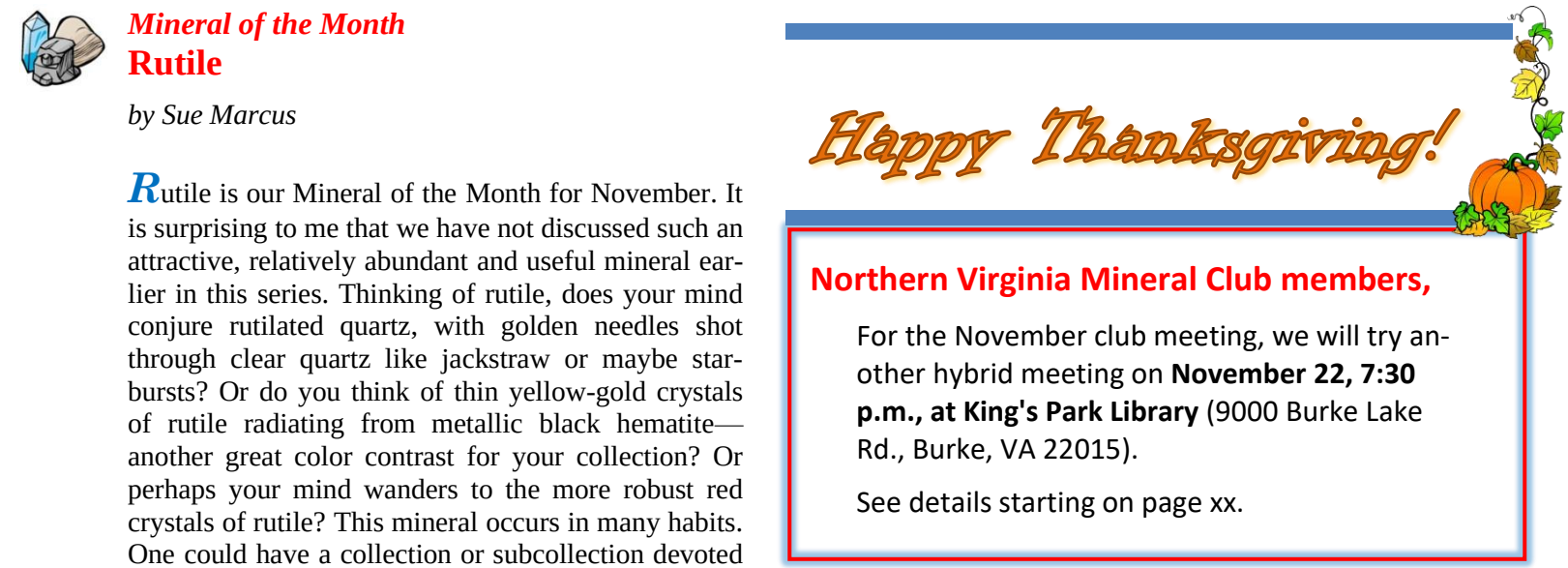
by Sue Marcus

Rutile is our Mineral of the Month for November. It is surprising to me that we have not discussed such an attractive, relatively abundant and useful mineral earlier in this series. Thinking of rutile, does your mind conjure rutilated quartz, with golden needles shot through clear quartz like jackstraw or maybe starbursts? Or do you think of thin yellow-gold crystals of rutile radiating from metallic black hematite—another great color contrast for your collection? Or perhaps your mind wanders to the more robust red crystals of rutile? This mineral occurs in many habits. One could have a collection or subcollection devoted to rutile specimens.

Like our October mineral, axinite, rutile's name has a lengthy history. The substance now known as rutile was known before it received that name. Since schorl—now known as a mineral in the tourmaline superclass—was known early in the science of mineralogy, many minerals were named as somehow related to schorl. What we know as rutile was originally named *Basaltes crystallisatus ruber* or red crystalline schorl *(basaltes* was used for columnar basalt and schorl). The type locality for this material, which was named by Ignaz von Born in a 1772 catalog, was Murán, Slovakia. However, naming rights go to Abraham Gottlob Werner who bestowed the name based on its reddish color, *rutilis* in Latin. Various other scientists and observers gave this mineral names relating to its red color in some specimens, its hairlike crystals in others, or its titanium oxide chemistry. The recognized type locality is Horcajuelo de la Sierra (Madrid), Spain.

Rutile has the simple formula of TiO_2, titanium dioxide. However, that crystal lattice—literally the atomic framework of the mineral—can occasionally add a few atoms of another element without changing the lattice structure. This leads to the many varieties of rutile. Note that these are not different mineral species. The atomic substitutions include elements like iron (ilmenorutile), niobium (also ilmenorutile and niobium-bearing rutile), or tantalum plus iron (stüveritte). There are others, including some synthetics.

Rutile also has polymorphs—that is, distinct mineral species that share the same chemistry as rutile but



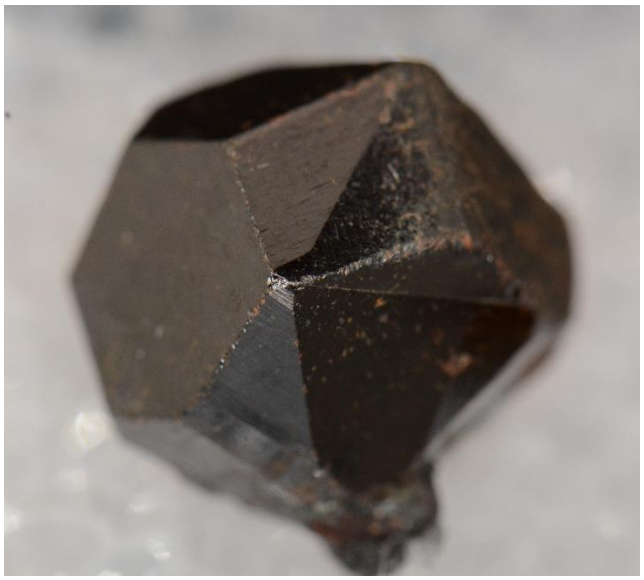
Northern Virginia Mineral Club members,

For the November club meeting, we will try another hybrid meeting on **November 22, 7:30 p.m., at King's Park Library** (9000 Burke Lake Rd., Burke, VA 22015).

See details starting on page xx.

Top: *Rutile on hematite, Novo Horizonte, Bahia, Brazil. Photo: R. McDougall.*

Left: *Rutilated quartz, Novo Horizonte, Bahia, Brazil. Photo: Bob Cooke.*



Twinned rutile, Graves Mountain, GA.
Photo: Bob Cooke.

have a different crystal structure. Anatase and brookite are the minerals most known to collectors, although Mindat also lists akagoiite (no photos), riesite (thin-section image only), and two unnamed minerals (no images) that exist in grain-size quantities.

The eastern United States hosts one of the premier rutile localities in the world: Graves Mountain in Georgia. Crystals from this location are chunky and deep red or metallic red with lustrous faces, contrasting with their white quartzite matrix. Other crystals can be free of matrix or nestled in pyromorphite. Various types of twinned and occasionally doubly terminated crystals were found. Sixlings are the most prized form, with six crystals joined at a central point to form an unusual "hexagonlike" structure.

Another unusual occurrence at Graves Mountain is crystals of rutile and kyanite with iridescent coatings of hematite or goethite on rutile and kyanite. Graves Mountain comprises metamorphosed igneous and sedimentary rocks mined for kyanite, so the "mountain" is now mostly (literally) "the pits." The quality of the rutile crystals far surpasses that of the kyanite found there. Euhedral crystals weighing up to 10 pounds are reported. The world's largest nice rutile crystal is purportedly from here, 25 centimeters (about 10 inches) in size. Blasting used in quarrying probably destroyed many lovely rutile specimens, although this mineral is tough, so many survived. Specimen availability waxed and waned, depending on company policies and mining activity. Active mining has ceased. This is a rare famous locality: fine crystals have been collected since the mid-1800s, and specimens can still be found. *Note to field collectors:* This famous collecting locality was open for collecting earlier this year. Although collecting was free, donations were strongly requested to pay for the caretaker's time and the facilities provided. I have no idea what, if anything, was found.

Magnet Cove in Arkansas is famous for rutile as well as magnetite, both of which were mined here. Vanadium came from another deposit, while niobium and molybdenum occur in not-quite-economic abundance. Most rutile specimens exhibited on Mindat are reportedly pseudomorphs or paramorphs after brookite (see the sidebar below). Some are dull; others are lustrous, and a few show the typical deep red of fine rutile, so some may be primary rutile—analysis would be needed—if you or I had one. This area has produced single crystals, sixlings, rare eightlings, and even one pictured sixteenling, if there is such a word! These "ling" crystals are cyclical twins with eight sides—that is, six, eight, or more separate but attached rutile crystals around a central point. Although micromounts and tiny rutile crystals are shown on Mindat, there are also eightling specimens pictured up to 2.6 centimeters (~1 in) in the longest dimension. Specific localities include Perovskite Hill (best for cyclical twins), the Mo-Ti Prospect, the Titanium Corporation Mine, and the general Magnet Cove area. Specimens are available for sale on the internet—but buyer beware, and look carefully for the size of

Rutile Paramorphs

Theoretically, paramorphs form when a mineral changes form without changing chemistry. That happens when the geological environment changes, like when the temperature or pressure drops and the crystals form—but the chemistry doesn't change. That's what is proposed and what has probably been deduced using analytical techniques for some rutile specimens.

From what I can discern, brookite does not form multiple twins (such as sixlings). Therefore, any of the specimens that are cyclical twins are probably primary rutile, not paramorphs. I acknowledge that I have done no hands-on research or analyses of specimens form this area.

Rutile, Hiddenite, NC. Photo: Bob Cooke.

what's for sale before you buy. This is an unusual famous locality that still seems to be open to collectors in some places; of course, check before you go.

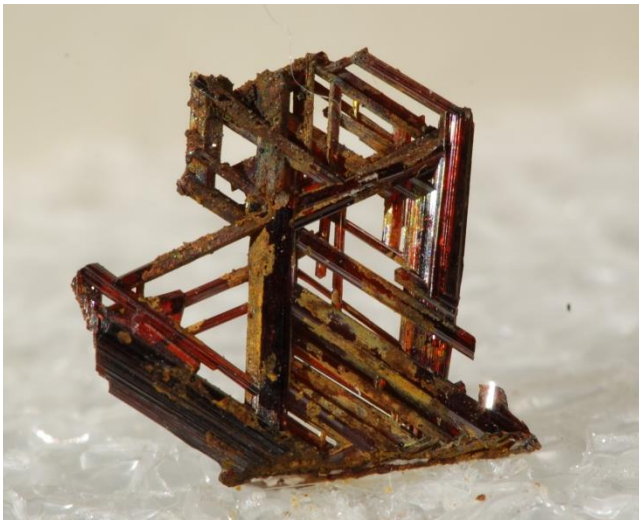
A study published by Erickson and Blake in 1963 found unusually high amounts of niobium in several minerals from the Magnet Cove area and particularly high in rutile, in paramorphs of rutile after brookite, and in the separate mineral perovskite. Interestingly, no ilmenorutile or niobium-bearing rutile has been identified from here, to my knowledge. The USGS authors also mentioned that they found vanadium and tin in some of their rutile samples.

The rocks that formed a ring dike complex experienced several generations of recrystallization through melting and probably some metamorphism. These geologic processes resulted in differentiation of the minerals and formed unusual rock types here, along with several mineral species for which this area is the type locality. Deposits in the Magnet Cove area that produced rutile, though not necessarily specimen-quality crystals, include the Christy, Hardy-Walsh, Titanium Corporation Mines; the Mo-Ti prospect; and Perovskite Hill. Niobium concentrations were highest in the cyclical twins from Perovskite Hill, where the perovskite found there has the highest niobium content of any minerals they analyzed by Erickson and Blake in the area. They noted that the redder the rutile from this area is, the less niobium it is likely to contain.

Some readers know about thin sections, which are very thin slices of rock that are examined under a microscope. Erickson and Blake examined thin sections of veins from Magnet Cove containing rutile and saw light and dark blotches in some rutile crystals, along with golden, secondary growth rutile crystals on the rims of some blotches. They postulated that some of the color change was due to orthorhombic brookite becoming tetragonal rutile with niobium atoms clustering too, although they did not prove this. Geology and minerals can be interesting form the very micro to the macro level, and scientists and collectors can learn about the geologic environment from looking at rocks. Cool.

We will move north, then west. Rutile has been reported from a few locations near Hiddenite, NC. The North Carolina rutile crystals can be thin but not hairlike, and many are red; some are deep reddish black, though others are unmistakably and beautifully currant red. Most crystals are small; some are up to 5.7 centimeters (2.2 in) long; reticulated crystals (small networks) are unusual. Most rutile specimens are free of matrix, and a few rare ones were found with beryl, for a nice color contrast. Mindat even shows a photo of rutilated quartz from this area; in this specimen, the rutile crystals are golden and hairlike.

Farther north, and even closer to our area, is an old locality where rutile was collected, though also reportedly commercially exploited for dental use. Rutile is a source of titanium, which, when powdered, is white. Apparently, some rutile from this locality was ground into powder and used to color dentures or artificial teeth in the 1800s. Twinned crystals weighing



Reticulated rutile, Hiddenite, NC. Photo: Bob Cooke.

Rutile on beryl, Hiddenite, NC. Photo: Bob Cooke.

up to a pound were found along with lovely, much smaller sixlings; one of these sixling crystals is now in the Carnegie Museum in Pittsburgh. Mindat images from this site include a rough crystal that is 8.7 centimeters (3.4 in) long, weighing 340 grams (12 oz). Another image shows a lovely sixling that is 6.5 centimeters (2.6 in) in its greatest dimension. Most crystals are very dark, though some show fine red color. Many are single crystals, whereas a few shown are matrix specimens. Various web boards imply that collecting in fields yielded nice rutile crystals at least as late as 2008.

Moving north again, collectors have found sparse euhedral rutile crystals in Vermont. The best of these small producers is the Davis Farm near Bethel, VT. Some attractive micromounts were found here, along with matrix specimens at the macroscale. Some rutile crystals occur in dark green chlorite schist at this locality. The schist was originally clay-rich sedimentary rock that became schist through regional metamorphism.

The Champion Mine in the White Mountains of Mono County, CA, is another famous rutile locality. A deposit of andalusite formed in metamorphosed sedimentary and igneous rock with rutile and associated minerals. The deposit, which was mined under

Rutile, Grayson County, VA. Photo: Bob Cooke.

many names (including the Jeffrey Mine, the White Mountain Mine, and the Vulcanus Mine, among others) was a source of andalusite. Many of us know the Champion Company through Champion spark plugs. Those spark plugs originally used andalusite, and you can guess who came to own the mine.

The famous 24-mule teams assisted in mineral extraction at a California deposit for borax. Mules were also used at the Champion Mine; instead of braving the desert heat, as they did in Death Valley, they carried packloads of hand-cobbed andalusite up and down the mountains. Andalusite was used to make synthetic sillimanite to strengthen ceramics in spark plugs and in laboratory supplies to help with heat tolerance.

Rutile crystals from the Champion Mine are similar to those found at Graves Mountain, GA, occurring in quartzite and pyrophyllite in beautiful and lustrous chunky crystals. Twinned crystals have been recovered, though relatively infrequently. Rutile crystals seem to range up to about 3 centimeters (1.2 in), and many (though not all) are matrix specimens. Smaller nonmatrix crystals look like nice thumbnail specimens. The site might be available for collecting, depending on the mining claim status; but it takes a hike in the mountains to get there.

Brazil, and particularly Novo Horizonte, excels in rutile specimen production. This Brazilian municipality is the source of very different types of rutile, which may interest different people. I'm a crystal specimen collector, so I'll start with the spectacular rutile and hematite specimens because these are my favorites.

Top: *Rutile on hematite, Novo Horizonte, Bahia, Brazil.*
Bottom: *Rutilated quartz, Minas Gerais, Brazil.*
Photos: Bob Cooke.

Sheaves of then, golden rutile crystals radiate from a central area, associated with shiny silver-black platy hematite crystals. In some specimens, the centers of the rutile starbursts are masked by a hematite crystal. Hematite is usually at the center when the two minerals occur together. The color contrast creates stunning specimens. Specimens are selling for $38 and up on Etsy and eBay. There is little information on the geologic environment of this occurrence. Raymond McDougall informed me that the rutile and hematite formed in hydrothermal veins in metarhyolite, but no more details are available.

The other type of rutile from Novo Horizonte, Brazil, is the well-known rutilated quartz. This twosome occurs when rutile crystals, usually in the form of thin needles, grow first; then, silica-bearing fluids bathe the rutile crystals, crystalizing around and encapsulating them. Rarely, clear quartz crystals with golden rutile crystals inclusions are found. More frequently, broken pieces or ill-formed quartz crystals are found and used for beautiful jewelry.

Reticulated rutile and more blocky rutile crystals have been found at other sites throughout Brazil, as reported in the late Rock Currier's "Best of Rutile" Mindat article. But they are not in any abundance.

At the type locality in Spain, dark red-black chunky, somewhat rounded rutile crystals were found in that late 1700s and can be rarely found today. These range up to 3-by-1.5 inches and are frequently twinned. Collecting over several centuries has diminished the likelihood of major discoveries. Mindat presents this as the type locality but notes that the original description by Werner is incorrect, probably due to confusion between the landowner's name and the locality name.

Rutile occurs sparsely in many locations throughout the Alps in Austria, Germany, and Switzerland. Crystals can be striking, lustrous dark red, sometimes attractively offset with quartz crystals. An Austrian sample featuring a 2-centimeter (0.8-in) rutile crystal on a 15-centimeter (6-in) rock was being offered of 1800€ ($2,092) by Saphira Minerals—a bit too expensive for my budget. The Salzburg, Austria, region hosts numerous places with various types of rutile crystals, including tiny, hairlike needles and reticulated crystals for micromount collectors and an elongated, striated group of crystals up to about 3 centimeters (1.2 in) long. Some collecting areas in Hohe Tauern National Park became off limits to collecting in 2003. Some of us will learn a new mineral-related term: "sagenite rutile." This seems to be used for twinned, specifically reticulated twinned rutile, from the Hohe Tauern mountain range and Arkogel mountain. Sagenite rutile crystals are thin, so the red or brassy gold color is evident. The crystals are small, so of greatest interest to micromounters.

Rutile with hematite, Grisons, Switzerland. Photo: Bob Cooke.

Lovely clear quartz crystals with thin black or gold rutile crystals included in them—rutilated quartz—occur sparsely in the Salzburg area. Imagine rutilated quartz without the quartz and then think of the rutile crystals as thinner, more like byssolite, for those who know that mineral. Tufts and groups of rutile crystals up to 10 centimeters (~4 in) in size have been found at least as recently as 2011 in the Habach Valley near Salzburg.

Several localities in Switzerland's Binn Valley have produced nice rutile crystals. Like others from the Alps, most of these are of greatest interest to micromounters, although some reach 3 centimeters (1.2 in) in size. The macrocrystals from the Lengenbach Quarry are stunning, with varying crystal habits and colors. This area, judging from Mindat photos, has some unusual beauties, like iridescent rutile crystals and unusual light orange crystals, a shade I hadn't seen elsewhere. I wonder what the chromophore is. Cavradi Valley is another Swiss rutile locality known primarily for microcrystals but surprising collectors with a rare 6.7-centimeter (2.6-in) cluster.

The Italian Alps, part of the same geologic environment, also have scattered rutile occurrences, and fine micromounts have been found. A large exception is a somewhat eroded 6.4-centimeter (2.5-in) crystal in the Smithsonian's collection.

Countries sometimes follow borders influenced by geology—valleys, for example. But rutile crystals are

Rutile and hematite on quartz, Grisons, Switzerland. Photo: Bob Cooke.

found on Mount Kapydzhik (also known as Mt. Kaputjugh) on both sides of the border between Armenia and Azerbaijan; geology doesn't care about political borders. Rutile crystals can range up to 5 centimeters (~6 in) long, although none of that size are shown on Mindat websites.

The specimens from the occurrences on this mountain are gorgeous. They show many different crystal habits, with rutile crystals usually bright, lustrous, deep red, and attractively set off by contrasting clear, milky, or granular quartz or (less frequently) orange calcite. The metallic luster of the rutile crystals can make them difficult to photograph. Most specimens were collected in the 1990s, and they are rarely on the market now.

We don't usually include Belgium on our worldwide trips in learning about our minerals of the month, so let's stop there for rutile. Belgium is not a major specimen producer, but some lovely, delicate tufts of fibrous rutile crystals have come from an aptly named "Old Quarry" in the Wallonian municipality of Bertrix. These are micromount-sized specimens.

Rutile occurs in metamorphic terrains, and mountain ranges have been created by the tectonic forces that also provide the heat and pressure for metamorphism. Pakistan has mountains—and rutile. Perhaps the best rutile locality is Zagi Mountain, north-northwest of

Peshawar. Diverse crystal habits have been found in colors ranging from deep red in thicker crystals, to brighter red in thinner ones, to red or golden in included needles in quartz. The largest crystal pictured on the Mindat site is 3.3 centimeters (1.3 in) long. Most specimens seem to have been found in about 2010. Alchuri, in Pakistan's Shigar Valley, and Skardu have also been the source of fine, relatively small but not micro rutile specimens. Many of these are the sagenite type, looking like tiny red lattices. Somewhat oddly (because geology ignores political borders), I could find no references to rutile specimens from Afghanistan.

Sierra Leone hosts with world's largest rutile deposits, which are exploited commercially in two large alluvial sand quarries. Unfortunately, rutile occurs as abraded crystals. I have not seen any images of specimens of interest to collectors.

Bright cyclical twins and partial twins (the circle isn't complete) were found in Kinyanfumbe, Zambia. Most specimens, discovered in 2007, show a pleasing contrast with granular yellow limonite. Apparently, that was a good year for rutile finds because complex rutile-hematite specimens were also found in Mwinilunga, Zambia. Most of these were apparently pseudomorphs after ilmenite. Specimen sizes were large (up to about 8 centimeters (3 in)), although most of them were mostly hematite, with lesser amounts of rutile.

Rutile, Hiddenite, NC.
Photo: Bob Cooke.

Rutile, Diamantina, Minas Gerais, Brazil.
Photo: Bob Cooke.

Farther west on the African continent in mineral-rich Namibia, the Onganja Mine produced copper—and fine mineral specimens including cuprite, crystalline native copper, and rutile, among other minerals. The mine is now flooded, so the best specimens have probably been recovered. Rutile from this locality tends to form elongated and striated crystals up to 6.2 centimeters (2.4 in) long, some of which are doubly terminated; others are twinned in v-shaped twins. These don't seem to have been abundant, though they are attractive.

Blocky rutile crystals and sixlings have been collected in the Blockade Mine area, Rosebud Station, Queensland, Australia. Some of these are up to 4.2 centimeters (1.7 in) across. In Mindat photos, they are not as lustrous as crystals from other localities, but that could be because some were found in alluvium and might have been abraded. Another possibility is that they haven't been as carefully cleaned and prepared as many specimens. A nicely cleaned specimen is listed on eBay for about $75 (the largest dimension is 3.7 centimeters (1.5 in); there's a sixling for sale for slightly more.

The Harts Ranges in the Northern Territory of Australia have produced rare, small rutile crystals and

fibrous rutile inclusions in quartz, including amethystine quartz and kyanite.

Varieties of Rutile

The titanium and oxygen in rutile's simple chemistry can pick up elements such as niobium (Nb) or tantalum (Ta) to form ilmenorutile (niobium-bearing rutile, $(TiNb)O_2$) or strüverite $(Ti,Ta,Fe)O_2$. Strüverite was found in Connecticut and South Dakota as well as in the Czech Republic, Brazil, and several localities in Madagascar. The Malagasy specimens are the largest shown on Mindat, up to 9 centimeters (3.5 in) long, whereas those from Minas Gerais are the most lustrous. Attractive ilmenorutile crystals up to 4.5 centimeters (1.8 in) in size were collected from a somewhat mysterious locality in Tulare County, CA, in 1965. According to Mindat, the collector refused to give the exact location of his discovery and has not produced more.

The Laacher See Volcanic Complex in Germany has produced some bright microcrystals in various crystal habits. Both strüverite and ilmenorutile have come from Håverstad, Norway, though not abundantly or in comparatively attractive specimens. I should note that this is not a comprehensive description or list of all rutile, ilmenorutile, or strüverite crystal occurrences. I try to share what I believe collectors are most likely to come across. And I hope more localities will be found for this and all the other minerals of the month.

Heading for Africa, Madagascar and Mozambique produced crystals, with some reportedly originating from pegmatites—a unique geologic environment. The Madagascar localities include some for stüverite and others for the ilmenorutile varieties of rutile. The crystals I've seen are rarely pretty. Some are large, up to 8.35 centimeters (3.29 in) in size. The Mozambique localities seem more obscure. The best specimen shown on Mindat is a sixling from an "undisclosed locality in the Alto Ligonha district."

Commercial Uses

Rutile is composed of titanium and oxygen. Because, in powered form, it adds whiteness to many products, its primary use is in paints, and similar products. It is also used in paper. Titanium can compete with aluminum in some uses due to the lightness and relative strength of both metals, but for titanium, rutile is a relatively minor use. Economic recovery (mining) for rutile was only done in Georgia in the United States.

Top: *Rutilated quartz, Hardangervidda, Norway.*
Bottom: *Rutile, Kiruna, Sweden.*
Photos: Bob Cooke.

Rutilated quartz makes beautiful gemstones. I like the cabochons that feature radiating suns of acicular golden rutile in clear quartz. The rough lapidary material can be worked into jewelry or larger pieces can be carved. I designed pendants for my mother and mother-in-law using faceted rutilated quartz and tiny blue sapphires. The cut stones were pretty cheap, probably less than $60 per pendant; the gold and labor set me back much, much more!

Gemstones with stars, like star sapphires or rubies, usually owe their asterism (starriness) to rutile. In

Pendant made from rutilated quartz from Brazil. Photo: Sue Marcus.

these inclusions, like the beautiful rutile sunbursts with hematite from Brazil, rutile fibers, called silk in this part of the gem trade, form radiated, usually six-pronged stars. When the lapidary can center the cabo chon, the cut stone exploits the color of the gemstone (corundum and so on) artfully accented by the whitish rutile "star." The larger the gemstone and deeper its color and the better the star, the higher the price or (less crassly) the more valuable the cut stone. Single bands of rutile silk can form chatoyancy (sometimes called cat's eye) in minerals other than chrysoberyl.

Blue rutile gemstones are not natural. Rutile can be synthesized, with the resulting material colored blue through heat treatment.

Technical Details

Chemical formula	TiO_2
Crystal form	Tetragonal
Hardness	6–6.5
Specific gravity	4.23
Color	Deep red, gold, black
Streak	Gray, light brown, light yellow
Cleavage	1 good, 1 poor (sources vary)
Fracture	Uneven to conchoidal
Luster	Metallic, adamantine

Sources

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November 22 Club Meeting
Hybrid Format

by Tom Kim

We're going to try another hybrid club meeting on **November 22, 7:30 p.m., at King's Park Library,** 9000 Burke Lake Rd., Burke, VA 22015.
So if you'd like to meet some of your fellow club members in person (masks on), come to the library. Our speaker, Scott Duresky, will be speaking in person about pegmatite minerals from the Rutherford Mine near Amelia Courthouse, VA (see his program description below). You can also watch his presentation from home on Zoom:
https://us06web.zoom.us/j/83666326397?pwd=YjdkK0p0aHJJazIxenRjdW0yZnpSUT09

Meeting ID: 836 6632 6397
Passcode: 978718

Either way, hope to see you there!

November 22 Program

The Historic Rutherford Mine Pegmatite #2, Amelia Courthouse, VA

Scott Duresky

Scott Duresky will discuss minerals extracted from the Rutherford Mine (now closed) in pegmatite near Amelia Courthouse in south-central Virginia. He will show a number of photomicrographs, some from previously unreported species, taken by his colleague Michael Pabst, one of the most accomplished mineral photographers in the Southeast.

Scott's work on the Rutherford Mine Pegmatite #2, some of which is still going on, has also included Tony Nikischer of Excalibur Minerals and Dr. Mike Wise of the Smithsonian Institution. It was the basis for research completed in 2020 on the extensive collection of Rutherford Mine materials at the Lora Robins Gallery of Design From Nature on the campus of the University of Richmond.

Scott is a self-taught mineralogist. Over the last 7 years, he has done intensive research on this mineral locality. Until it closed in 1998, this locality was one of the most important places in the United States for collecting rare-earth minerals. His research, following in the tradition of published papers dating back to 1883, features analytical techniques developed in the last 2 decades.

President's Collected Thoughts

by Tom Kim

I heard recently that the NASA engineers who designed the space suits were on tenterhooks every time Neil Armstrong and Buzz Aldrin bounced around, played golf, and—heaven forbid—fell during their shenanigans on the first moon landing. One serious tear on a sharp lunar rock and ... well, you can imagine how short their fingernails might have gotten on that historic event.

Our club recently had a first of its own: our first hybrid meeting. Anyone who attended might tell you that, despite our excellent speaker from Oregon (you can catch up with a little of what Beth presented in last month's newsletter), it wasn't exactly smooth sailing.

I'm sure we'll improve iteratively, however; next month, we'll take another big swing with a live in-person presentation that'll also be streamed on Zoom.

Will we start right on time? Hmmm. Will we need to scramble to deal with a midmeeting technical snafu? Maybe. Will I be able to relax? Meh. Will it still be worth it? Definitely.

So log in or come on down on November 22. And if you make your way to Burke, see if you can't also come a little early to join us for a premeeting dinner with Scott Duresky at Giardino Italian Restaurant.

Tom

Nominations for 2022 Club Officers Coming Up

At the December club meeting, we will elect club officers for 2022. Sue Marcus will be stepping down as club vice president.

We have many club officers (see the list on the last page of this newsletter), but only four positions are elected each year:

- The ***president*** presides over club meetings and helps to coordinate club activities ranging from auctions and the annual club show to field trips and the club newsletter.
- The ***vice president*** assists the president and coordinates programs and speakers for the monthly club meetings.
- The ***secretary*** takes minutes at club meetings, as needed, for the club newsletter and summarizes presentations at club meetings for the newsletter.
- The ***treasurer*** collects club dues, keeps records of club members, and handles all club financial transactions.

The Streets Are Paved With Gold (and Platinum)

by Tim Worstall, London Forbes Media LLC

Editor's note: *The article is adapted from* A.F.M.S. Newsletter *(June May 2020), p. 1; it was originally in* The Pick and Dop Stick *(newsletter of the Chicago Gem and Mineral Society), April 2020.*

One of Great Britain's biggest street cleaning firms has announced it is to "mine" the sweepings it collects from roads and pavements in search of gold and other precious metals. Veolia Environmental Services believes it can find at least £1 million (about $1.165 million) worth of materials like platinum, palladium, and rhodium from the muck swept up from Britain's streets each year.

The background to this is that all cars and trucks now have catalytic converters for pollution control. These are made with zirconia (zirconium oxide) and a small amount of the platinum group metals. Those for diesel engines might have 1 gram of platinum per half-kilo (1.1-lb) brick of zirconia, and those for gasoline engines a mixture of platinum, palladium, and rhodium. A small car (say, a Ford Fiesta) might have a single half kilo brick in the converter, a large car (say, a V12 Jaguar) eight such bricks. There's a well-developed market for collecting and refining these converters when they come to the end of their working lives.

Sometimes, the converters fail and some part of that zirconia ends up coming out of the back of the exhaust pipe of the vehicle. Platinum, palladium, and rhodium derived from catalytic converters that reduce poisonous exhaust emissions are enriched in road dust. Studies of platinum group metal concentrations surface samples from British roads, urban waste, and natural sediments show that these elements are dispersed into natural and artificial drainage systems, finding their way eventually into the sea.

Maximum values of platinum group metals in road dust from the city of Sheffield were found to be as high as 408 parts per billion of platinum, 444 parts

per billion of of palladium, and 113 parts per billion of rhodium. That's a bit low for a platinum group metal ore. You wouldn't go and dig up a mountain for these values. So don't go out sweeping the road and thinking that you're going to get rich.

However, for the people who are already sweeping the road, collecting the dust, and having to landfill that dust, it might well be an attractive operation to try to recover those metals' values. *Read the full article*.

Unlike Diamonds, Most Minerals Not Forever

By Harvey Leifert February 23, 2009

Editor's note: *The article is in LiveScience (February 23, 2009).*

Diamonds may be forever, but that's not true of most minerals, including malachite, turquoise, and thousands more. In fact, about two-thirds of the 4,300 known minerals on Earth today owe their existence to biological processes and thus evolved fairly recently in geological terms. So says Robert M. Hazen of the Carnegie Institution in Washington, DC, who with seven colleagues identified three phases of mineral evolution: solar system formation, the collision that formed the moon, and biological processes (particularly photosynthesis). … *Read more.*

An Invitation to Micromounting

by Michael Seeds

Editor's note: *The article is adapted from* The Virginia Pen *(newsletter of the Gem and Mineral Society of the Virginia Peninsula), August 2019, pp. 6–7.*

Micromounting is the study and collection of mineral specimens that require magnification to be appreciated. The typical micromount is a group of crystals only a few millimeters in diameter, mounted in a small box and properly labeled with species and location. Collectors study and enjoy their minerals under low-power stereomicroscopes.

Micromounters are famous for being friendly and generous because the best way to find micromounts is to trade raw rock, unmounted specimens, or finished micromounts with other micromounters. All around the world, micromounters hold conferences to swap stories, give away extra material, and have a good time.

Why would you want to collect micromounts?

Space: You can store 3,000 micromounts in one cubic foot of space. Your equipment could fit on a card table. If you are pressed for space, micromounting will allow you to enjoy the beauty of minerals and the fun of collecting without a workshop or hobby room.

Beauty: Large crystals are often cracked and dinged, but microscopic crystals are often perfect. Small minerals often form in vugs where they are protected from damage, and mounting a specimen in a micro box protects it and makes it easy to view. Micromounters are accustomed to seeing flawless crystals and undamaged formations.

Variety: Most minerals do not form large crystals. If you collect larger specimens, only a few hundred are available. Of the 4,000-plus minerals known, the vast majority form only microscopic crystals. Add to that, nearly all newly discovered minerals are available only as microscopic crystals. It is not unusual for a micromounter to have over 1,000 different species, and at least one micromounter has 80 percent of all known minerals in his micromount collection.

Hematite (micromount), Black Rock Mine, South Africa. Photo: Bob Cooke.

Activity: Micromounting is a way of working on your minerals instead of merely admiring them. On cold winter nights and rainy days, micromounters study their rocks, find the best specimens, trim them down to size, glue them on cork supports, put them in boxes, and write labels. Some micromounters explore quarries and mines, whereas others never leave their chairs. Micromounting has been described as a craft and an art. However you pursue it, it is an active way to enjoy mineralogy.

Cost: Nearly all micromounters are anxious to swap minerals, and micromount conferences traditionally have "giveaway" tables where collectors put their extra rocks free for the taking. Fantastic specimens routinely come from giveaway tables. Dealers sell micromounts for a few dollars, with rare or unusually beautiful specimens going for tens of dollars. The value of one good cabinet specimen could buy an entire micromount collection.

How do you get started?

The book: The best source of information about micromounting is "The Complete Book of Micromounting" by Quintin Wight, Mineralogical Record, 1993.

Dioptase with plancheite (micromount), Mindoula District, Republic of Congo (Brazzaville). Photo: Bob Cooke.

Your scope: You need a stereomicroscope with magnification between 10 and 20 times. A zoom scope is best, and many go up to 40 times. Higher magnification is not necessary but can be useful. You can find used microscopes by asking other mineral collectors, and a few companies sell both new and used scopes. Scan the ads in mineral magazines for dealers.

Light source: Micromounts must be illuminated from above, so you need a light source. Many micromounters use bright-light sources with fiber-optic arms that pipe the light directly to the mineral, but others use desk lamps, homemade illuminators with LEDs, and so on. All you need is a bright light on the mineral. Most companies that sell microscopes also sell light sources.

Tools and supplies: You probably have hobby knives and forceps, but you might want to buy a small rock trimmer to crack specimens down to size. You also need the microboxes (23 by 23 by 19 millimeters in size) and corks to mount specimens. Boxes, tools, and supplies are available from a number of dealers.

Rocks: Many micromounters are avid field collectors, and you can find micromount material in surprisingly mundane places. Almost any rocky place is a possibility. Nevertheless, one of the best places to find rocks is with other micromounters, so just locate someone near you and introduce yourself.

[***Editor's note:*** Many NVMC members also belong to the Micromounters of the National Capital Area, the club that meets in most months in the same location as ours 2 days (last Wednesday of the month).]

Rules of micromounting: Rule number one is: There are no rules. Most micromounters try to produce neat, clean specimens carefully mounted so that the cork and glue underneath do not show, but some collectors stick their specimens into boxes with stickum or even hot glue. Some collectors use various size boxes and some use only one size. Some collectors photograph every specimen and catalog it carefully in a database and double-entry card catalog. Others hardly keep records at all. It is just fun. Do it your way.

Bench Tip: Identifying Unmarked Solders

Brad Smith

There are plenty of ways to mark your sheet or wire solders, but suppose you forgot to mark them and have a couple that you can't identify. The answer is to compare the melting temperature of the unknowns with that of a known solder.

What I do is take a thick scrap of copper or nickel and arrange several solders on it. Ideally, I would have a sample of easy, medium, and hard known solders surrounding the unknown solder. Then I heat the plate from the bottom and watch the order in which the solders melt.

See Brad's jewelry books at
amazon.com/author/bradfordsmith

November 2021—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3 MSDC mtg, Washington, DC	4	5	6
7	8 GLMSMC, Rockvle, MD	9	10	11 **Veterans Day**	12	13
14	15	16	17	18	19	20
21	22 **NVMC mtg, Arlington, VA**	23	24 MNCA mtg, Arlington, VA	25 **Thanksgiv-ing**	26	27
28	29	30				

Disclaimer

All meetings/shows are tentative during the coronavirus pandemic, and club meetings might well be remote. Check the website for each organization for more information.

Event Details

4: Washington, DC—Mineralogical Society of the District of Columbia; info: http://www.mineralogicalsocietyofdc.org/.

8: Rockville, MD—Gem, Lapidary, and Mineral Society of Montgomery County; info: https://www.glmsmc.com/.

22: Arlington, VA—Northern Virginia Mineral Club; info: https://www.novamineralclub.org/.

24: Arlington, VA—Micromineralogists of the National Capital Area; info: http://www.dcmicrominerals.org/.

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

2021 Club Officers

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The Northern Virginia Mineral Club

Visitors are always welcome at our club meetings!

PLEASE VISIT OUR WEBSITE AT:
http://www.novamineralclub

Please send your newsletter articles to:
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RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
Roger Haskins, Treasurer, NVMC
4411 Marsala Glen Way, Fairfax, VA 22033-3136

OR

Bring your dues to the next meeting.

Dues: Due by January 1 of each year; $20 individual, $25 family, $6 junior (under 16, sponsored by an adult member).

Club purpose: To encourage interest in and learning about geology, mineralogy, lapidary arts, and related sciences. The club is a member of the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS—at http://www.amfed.org/efmls) and the American Federation of Mineralogical Societies (AFMS—at http://www.amfed.org).

Meetings: At 7:45 p.m. on the fourth Monday of each month (except May and December).* (No meeting in July or August.)

**Changes are announced in the newsletter; we follow the snow schedule of Arlington County schools.*

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