BRECCIA

Santa Clara Valley Gem and Mineral Society

Volume 73 Number 10, October 2025

Table of Contents

Events

October 28, 6:30 PM: Member Sale

If you have something to sell, please contact **Jim Herbold**.

October 28, 7:30 PM: The General Membership Meeting will feature Sonia Dyer's presentation on the Rocks and Minerals of Michigan. She will be bringing specimens for us to examine. These will include agates, iron ore, native copper, Petosky stones, Yooperlite, etc. Don't know what a Yooper is? Come find out. Please bring your own Michigan specimens for Show and Tell.

The Bragging Rights theme is **"California Agate"**.

November 25: The General Membership Meeting will feature a **Silent Auction**.

Editor's Message

Welcome to the spooky season, leading up to Halloween and the Day of the Dead.

October Birthstones are Opal and Tourmaline. I included **Phil Kesten's** article on Opals last year, so this year I am using his article on Tourmaline; the colors are amazing. I also have a great article on Pineapple Opals from the *Opal Express* of the American Opal Society.

October is also a month with 12 rock shows in California!

Do you have anything that other members might enjoy? The deadline for submissions is the Sunday after each General Meeting.

Deb Runyan, Breccia Editor

editor@scvgms.org, 408-628-7789

Rockhound of the Month

Our rockhound of the month is **Deb Runyan** for being the editor of the *Breccia*. :)

Sunshine

There is nothing for Sunshine this month.

If you know of anyone needing some sunshine in their lives, please email **Margo Mosher at** margomosher@yahoo.com.

Field Trips

Note: Driving times are from Campbell and are approximate.

October 10–12 (Friday–Sunday): Clear Creek, CA, 5.5-hours

Materials: Plasma agate, serpentine, other goodies

Sponsor: Ventura Gem & Mineral Society

Leader: Tyrone LaFay, 909-802-9177

Sign Up: www.whoscoming.com/vgms

November 1 (Saturday): New Hogan Lake, Valley Springs, CA, 2.7-hours

November 2 (Sunday): Coulterville CA

Materials: Day 1: Red Dumortierite

Day 2: Marposite in the Bagby Recreation Area

Sponsor: El Dorado M & G Society

Contact: Contact the field trip leader before Oct. 29, 2025, john95670@yahoo.com.

November 8 (Saturday): Black Butte Reservoir, Stoney Creek, CA, 4-hours

Materials: Jaspers of multiple colors, Poppy or Orbicular Jasper, some Agate, Quartz veins.

Sponsors: Co-Op Field Trip, Mother Lode Mineral Society

Leader: Kevin Kirschman

Stays: Buckhorn Campground, Orland Buttes Campground (Hotel stay in Orland)

For questions about the Co-Op field trip

Contact: Stephen May, Stephenmay0990@gmail.com

Phone: 669-248-3993 or 408-306-6782

Website Links

Your Window to the World of Important Websites

SCVGMS Website: https://www.scvgms.org/

SCVGMS Facebook Page: https://www.facebook.com/santaclaravalleygemandmineralsociety

American Federation of Mineralogical Societies (AFMS): https://www.amfed.org

American Lands Access Association (ALAA): www.amlands.org

BLM Rockhounding: https://www.blm.gov/programs/recreation/rockhounding

California Federation of Mineralogical Societies (CFMS): https://www.cfmsinc.org/

Mindat.org (world's largest open database of minerals, rocks, meteorites): https://www.mindat.org/

GemKids: https://gemkids.gia.edu/

Smithsonian Science How Webcast Archives: https://naturalhistory.si.edu/education/school-programs/grades-3-5/smithsonian-science-how/smithsonian-science-how-webcast-archives

Smithsonian National Museum of Natural History: https://www.youtube.com/@nationalmuseumofnaturalhistory

New Members

We welcome new members to SCVG&MS!

Murphy Alexander
Ben Calvert
Neil Delfino
Vana Lee

September 2025 Mini Miners Monthly

The September Mini Miners Monthly includes information about Rhodochrosite and *The Mineral & Crystal Coloring Book*. Click here to view a copy.

President's Message, October 2025

Hi everybody! I hope that you are doing well and that you have had a chance to spend some quality time with minerals over the past couple of weeks. They are known to improve quality of life, reduce stress, and increase happiness, so go hang out with your collection, or get outside to achieve similar outcomes!

I was able to make it to the recent gem and mineral shows in Denver, Colorado in early September. I've been attending the Denver shows since the mid 1990's when I lived there, and I've seen lots of changes over the years. I can say that there is a large amount of cross-pollination with the Tucson shows—many dealers still show up at both.

Weekday foot traffic was light.

There were 12 different shows this year at about 7 different locations. Three of these shows were specifically for bead vendors or wholesalers, so those were not relevant to me. Some shows have moved to newer hotels, so the venues were nicer in those cases. Foot traffic seemed light during the week and it seemed quite vibrant during the weekend. There were still hundreds of dealers overall, but I did notice many more vendors sharing a space to reduce costs. Every show seemed to have some no-show dealers which I cannot ever remember seeing. Two dealers that I interacted with were not willing to negotiate on prices, citing tariffs as the reason.

Super-gemmy grape willemite from Franklin, New Jersey. Fantastic!

(Continued on page 6)

(Continued from page 5)

I was invited to an evening event by a particular dealer that sells higher-end material including fluorescent minerals. It was a fun evening and most attendees were younger dealers who are newer to the mineral business. This was very refreshing to see.

Plumbogummite after pyromorphite from China, a mineral I always purchase if the piece is good.

The local gem and mineral club still had a presence but it seemed much smaller than before. They used to manage the biggest show at the end of the show run at the convention center, now it's a smaller show in a shared location with the Hard Rock Summit. The fluorescent room was still there, but the glow room at our annual show in San Jose has better displays :-)

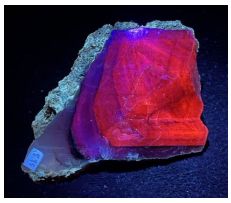
"Jelly" rhodochrosite from Argentina. Delicious!

The Denver shows continue to evolve, but overall the scene was vibrant, several dealers indicated satisfaction with foot traffic and sales, and I'm glad that everything is still thriving there. I can personally attest to the fact that, with time and attention, you can still find anything you might want at the shows, and that you can find bargains as well.

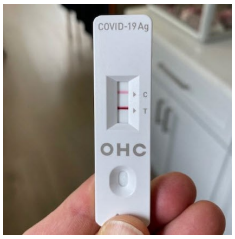
(Continued on page 7)

(Continued from page 6)

I ran across 3 flats of "Ludlow Diamond" calcites from an old collection dated to 1967. These are incredibly rare and have an amazing fluorescent reaction. I bought about one-third of the best pieces. The prices charged were the same as what was indicated on the original labels—bargain alert!



On the administrative front, we need to recruit a new Vice President for 2026. This role includes attending 6 board meetings each year, helping run the Zoom meetings, and serving as a backup when I am unable to run general meetings or board meetings, which is usually a couple times a year. If you would like to step into this leadership role with the club, please let me know. **Bruce Poehlman** has done a fantastic job in this role and we appreciate his service.



I came home from Denver with more than just a few flats of minerals. Ugh, I'm not feeling so great as I am writing this…

(Positive Covid test result)

Enjoy!

Jim Herbold

SCVGMS President

Punny

What did the rock say to the rockhound?

"You rock my world."

What do rockhounds do on Halloween?

They go trick-or-treating for mineral specimens.

Did You Know?

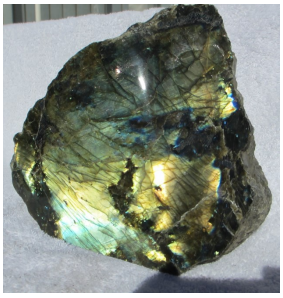
The Club will reimburse you (up to $100!) for refreshments that you purchase for a club meeting. Just bring your receipts to the monthly meeting along with your refreshments for that month. Generally, people bring a little sweet, a little salty and a little protein, but the great thing about volunteering is that you get to bring what you like to eat!

Stephen May raised his hand to bring our treats for our October 28 meeting. We need a volunteer for our November 25 meeting and for our January 27 meeting. (The December monthly meeting is the Installation Dinner.)

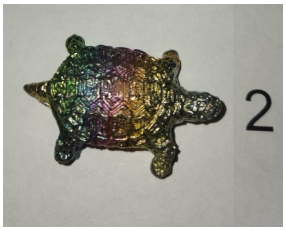
You can sign up for your month at the October meeting or by emailing **Anne Ruiz** at aj-ruiz@earthlink.net.

Bragging Rights

September's Bragging Rights Theme was **"Iridescent"** or **"Pink"**.

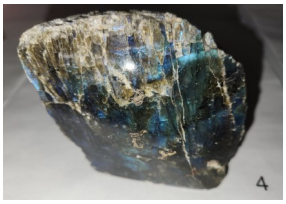


1: Labradorite, **Jim Fox**



2: Turtle, **Michelle Powers**

3: Labradorite and Bismuth, **Simon**

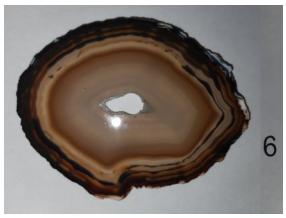


4: Deep Blue Labradorite, **Neil Delfino**

5: Pink Halite from Searles Lake, **Dan Gehret**

The winner is #4, **Neil Delfino's** Deep Blue Labradorite

October's Bragging Rights theme is **"California Agate"**.



6: Brazillian Agate, **John Bahr**

7: Amonite Fossil, **?**

8: Davis Creek Rainbow Obsidian, **Lynn Toschi**

9: Jade from Jade Cove, **Neil Delfino**

Information on Shows

October 1–5, 2025 - Joshua Tree, CA

Joshua Tree Gem & Mineral Fall Show

Joshua Tree Lake RV & Campground, 2601 Sunfair Rd.

Hours: Wed–Sat 10-5, Sun 10-4

October 4, 2025 – Lake Elsinore, CA

Lake Elsinore Gem & Mineral Society

32097 Corydon Rd.

Hours: 10-4

Contact: (909) 208-6956, berylman50@aol.com

October 4–5, 2025 – Anderson, CA

Shasta Gem and Mineral Society

Shasta District Fair and Event Center, 1890 Biggs St.

Hours: Sat 9-5, Sun 9-4

Contact: (530) 356-2378, miller3987@gmail.com

Web: https://shastagemandmineral.org/

October 4–5, 2025–Grass Valley, CA

Nevada County Gem and Mineral Society

Nevada Co. Fairgrounds, 11228 McCourtney Rd.

Hours: Sat 10-5, Sun 10-4

Contact: 530-273-0871, jan.2@att.net

Web: https://www.ncgms.org

October 11–12, 2025 – Redwood City, CA

Peninsula Gem and Geology Society

Redwood City Community Activities Building

1400 Roosevelt Ave.

Hours: 10-5 both days

Contact: (650) 575-3144, cci@pacbell.net

Web: https://pggs.org/

October 11–12, 2025 – Signal Hill, CA

Long Beach Mineral and Gem Society

1800 E. Hill Street

Hours: Sat 10-5, Sun 10-4

Contact: (562) 253-1390, lbmineralgemsociety@gmail.com

Web: https://lbmineralgem.org

October 12, 2025 - Fallbrook, CA

Fallbrook Gem & Mineral Society

123 West Alvarado St.

Hours: Sun 9–4

Web: https://fallbrookgemandmineralsociety.wildapricot.org/

(Continued on page 11)

(Continued from page 10)

October 18, 2025 – West Hills, CA

Woodland Hills Rock Chippers

First United Methodist Church, 22700 Sherman Way

Hours: 10-5

Contact: barnettcelia53@gmail.com

Web: www.rockchippers.org

October 18, 2025 – Anaheim, CA

Searchers Gem and Mineral Society

The Downtown Community Center, 250 E. Center Ave.

Hours: 9-2

Contact: anaheimsearchers@gmail.com

Web: www.searchersrocks.org

October 18-19, 2025 – Santa Rosa

Santa Rosa Mineral & Gem Society

Santa Rosa Veterans Memorial Building, 1351 Maple Ave.

Contact: (707) 583-1824

Web: www.srmgs.org

October 18–19, 2025 – Orange, CA

American Opal Society

Velvet Rose Event Center, 300 S. Flower St.

Hours: Sat 10–6, Sun 10–5

Contact: 714-501-9959, angeldragonofflight@yahoo.com

Web: http://opalsociety.org/

October 24–25, 2025 – Sacramento

Sacramento Mineral Society

Scottish Rite Masonic Center, 6151 H Street

Hours: Sat 10–5, Sun 10–4

Contact: 916-682-5819, gemshow@sacramentomineralsociety.org

Web: https://sacgemshow.com

November 1-2, 2025 – San Diego, CA

San Diego Mineral & Gem Society

Liberty Station Conference Center, 2600 Laning Road (in Point Loma)

Hours: Sat 10-6, Sun 10-4

Contact: 858-945-4762, benton.luannz@gmail.com

Web: https://www.sdmg.org

November 1-2, 2025, Ridgecrest, CA

Indian Wells Gem and Mineral Society

Ridgecrest Desert Empire Fairgrounds

Field trip on Sunday

Hours: Sat & Sun 9-5

Website: iwgms.org

(Continued on page 12)

(Continued from page 11)

November 8-9, 2025 - Concord, CA

Contra Costa Mineral & Gem Society

Centre Concord, 5298 Clayton Rd.

Hours: Sat 10–5, Sun 10-4

Web: www.ccmgsclub.com/show

November 14–16, 2025 - Santa Ana

West Coast Gem, Mineral & Fossil Show – Fall

Holiday Inn – Orange County Airport

2726 South Grand Ave.

Hours: Fri & Sat 10–6, Sun 10–5

Web: www.mineralshowslld.com

November 22–23, 2025 - Lakeside

El Cajon Valley Gem and Mineral Society

Lakeside Rodeo Grounds, 12584 Mapleview St.

Hours: Sat 10–5, Sun 9–4

Contact: Palmer Taskerud, ecvgms@gmail.com

Web: www.ecvgms.org

# # #

Membership Dues for 2025 Are Due

SCVGMS membership dues are due for the year 2025. Your dues are essential to the operation of SCVGMS.

Dues are $5.00 for Junior, $20.00 for an individual, and $30.00 for the household.

You can now easily pay online, at https://www.scvgms.org/product/membership-dues/

Or

Pay Frank at a meeting

Or

Send your check to Treasurer, Santa Clara Valley Gem and Mineral Society, Box 54, San Jose, CA 95103-0054, or to: Frank Mullaney, 5705 Begonia Drive, San Jose, CA 95124

Thank you.

Pineapple Opals

From: The Opal Express, The American Opal Society, September 2025

Pineapple opals are pseudomorphs—minerals that have replaced another mineral while preserving the original crystal shape. In this case, opal replaces ikaite (a hydrated form of calcium carbonate).

- ◊ Ikaite forms only under specific conditions—low temperatures, high alkalinity, and elevated pressures—typically in deep marine or cold sedimentary environments.
- ◊ Over time, as environmental conditions shift, the unstable ikaite decomposes and is replaced molecule by molecule by silica-rich fluids, forming opal.
- ◊ The original crystal habit of ikaite, which features radiating spear-like formations, is preserved—resulting in the iconic spikey "pineapple" shape.

Opal pseudomorphs are created by the deposition of opal in casts (molds) of fossil bone, teeth, shell, belemnoids (ancient relatives of cuttlefish), crinoids (sea lilies), wood, fir cones and even skeletons of large prehistoric animals. Many of these fossilized forms contain exceptional quality noble opal. White Cliffs is the only place where these marvelous (and very rare) pseudomorphic opals have been found.

White Cliffs is a small town in outback New South Wales in Australia, in Central Darling Shire. White Cliffs is around 255km northeast of Broken Hill, 93km north of Wilcannia. At the 2021 census, White Cliffs had a population of 156.

To the objective observer, White Cliffs is really a single purpose town. Miners started coming here (the local Aborignes found it far too hot for permanent settlement and occasionally visited the place as they traveled to and from the Darling River) in the 1880's and, apart from its minor function as a service centre for the surrounding properties, it remains a town driven by opals.

(Continued on page 14)

(Continued from page 13)

The summer temperatures, typically over 40°C (104°F), forced the miners underground. The 100 million years old sandstone conglomerate in which the opal seams were buried carried two advantages. It was remarkably stable (no one has ever died from a mine collapse in White Cliffs) and it was relatively easy to dig. By around 1900 miners were burrowing into the hills in an attempt to find opals and escape from the heat. The real way to see White Cliffs is from the air. It appears like a strange moonscape with an estimated 50,000 disused diggings.

Fewer than a few hundred authentic pineapple opals have ever been documented, making them one of the rarest opal types on Earth. Their scarcity, combined with their bizarre and beautiful form, makes them highly coveted by mineral collectors and museums. Top specimens can command very high prices in the collector's market.

Pineapple Opals: Rare Pseudomorphs from White Cliffs, Australia

Photo: Grant Pearson

Pineapple Opals: Rare Pseudomorphs from White Cliffs, Australia.

Photo: RedEarthOpal

The Heart of Australia, a 3,510 ct double pseudomorph ikaite-calcite-opal gem specimen, is considered one of the finest ever unearthed. (Pineapple Opal Fossil)

Courtesy of Graeme Dowton.

(Continued on page 15)

(Continued from page 14)

Reference Material:

www.geologyin.com

Wikipedia

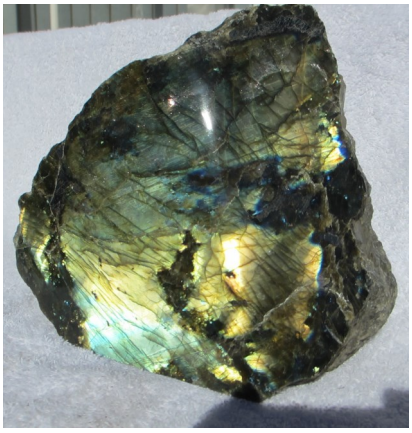
www.aussietowns.com.au/town/white-cliffs-nsw

www.whitecliffsopal.com/

Pictures found at: www.geologyin.com/2016/08/gorgeous-opal-pineapples.html

Jim Fox's Touch Table

Labradorite



Labradorite was first found in 1770 on Paul's Island located in Labrador, Canada. It can also be found in Norway (called spectrolite stone) and various other locations worldwide.

It's composition is a sodium calcium aluminum silicate with a Mohs hardness of 6 - 6.5. The base color is a dark smoky gray but, when light strikes the stone from a particular direction, spectacular flashes of iridescent blue, green, purple and sometimes pink, orange and yellow can be seen. Labradorite is so well known for these spectacular displays of color that the phenomenon is known as "labradorescence". Specimens with the highest quality color display are often selected for use as gemstones.

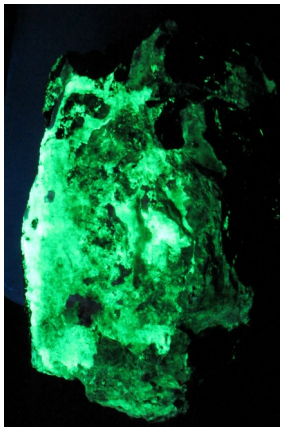
Labradorescence is not due to actual colors in or on the stone, but from the effect of light that enters the stone and is reflected back to the observer at a different angle, producing different colors. A Canadian Eskimo legend states that the colors are due to some of the Northern Lights being trapped within the stone.

(Continued on page 16)

(Continued from page 15)

Bertrandite

Bertrandite, commonly called **Tiffany Stone**, is composed of predominantly Opalized Fluorite (the blues, purples and whites) often mixed with many other minerals such as quartz, chalcedony, dolomite, rhodonite, manganese oxides (blacks) and beryllium (the whites, yellows or pinks). Fine quality tiffany stone has purple coloration and can even be a pure dark, translucent purple color.



Tiffany Stone is a beautiful and very rare stone. Tiffany Stone is only found in Utah, specifically at the Brush Wellman Beryllium Mine near Delta, Utah. The mine is no longer open for collecting, and all of this beautiful material is now ground up for beryllium ore. Beryllium is lighter than aluminum and stronger than steel. Bertrandite is a beryllium sorosilicate hydroxide mineral that was discovered by a French minerologist Emile Bertrand.

Many opalites can contain some fractures, as does the opalite in this tiffany stone. Some uneven hardness can be encountered in this material, but tiffany stone generally cuts easily and takes a fine polish with diamond, tin or cerium oxide. Mohs hardness is 5 to 6. It fluoresces bright green under a (shortwave) UVC light.

"Jurassic Poop"

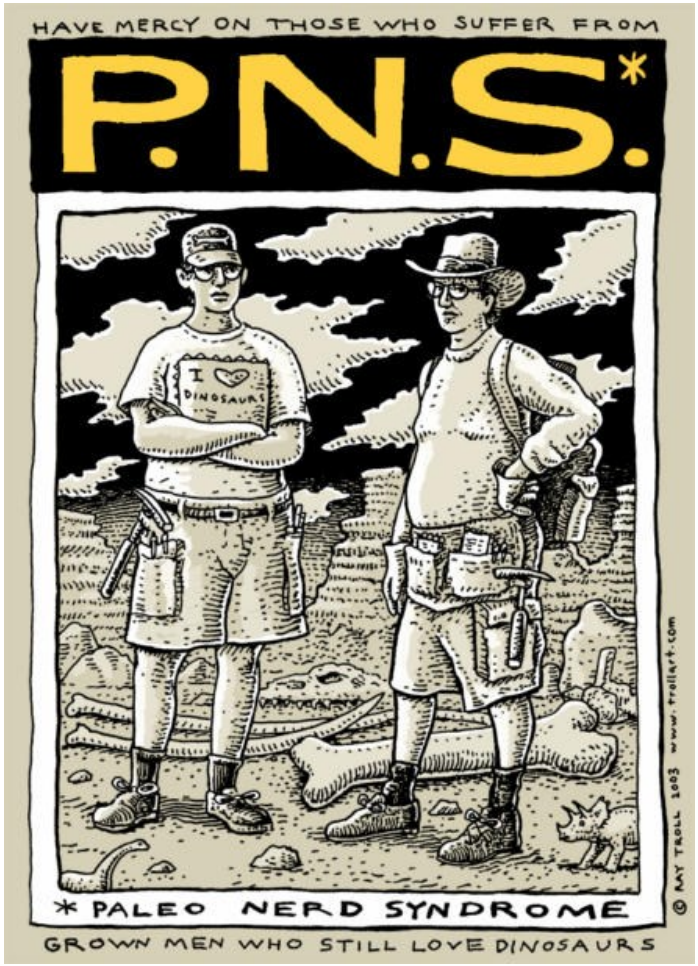
Coprolite is fossilized dung or feces. Besides being interesting and novel to the collector, coprolites provide scientists with information on the diet and sometimes on the digestive system of a prehistoric animal. Size can range from a fraction of an inch to well over 2 feet. The original fecal material has been

(Continued on page 17)

(Continued from page 16)

replaced with agate, jasper or calcite. Scientists can use an electron microscope to identify plant material and sometimes broken bones or scales have been found in the Coprolite indicating that the predator animal was a carnivore.

These specimens came from the Henry Mountain area near Hanksville, Utah where many Dinosaur remains have been found.



Tourmaline

By Philip R. Kesten, Ph.D.

Got a rock in your pocket? You might, and although you probably do not have a specimen of tourmaline in there… you should definitely have one (or a few!) in your rock and mineral collection. Tourmaline is both visually interesting and also exciting from the perspective of its atomic structure. And on a personal note, tourmaline is one of my favorite minerals.

Before I get to tourmaline as a rock, though, I would like to consider the interesting etymology of the word "tourmaline". (You have, I am sure, noticed that I am a fan of the etymology of words.) It is widely believed that "tourmaline" came to us from the language spoken by the Sinhalese people in Sri Lanka, back some twenty-seven hundred years ago… likely a descendant of tōramalli, the Singhalese word for carnelian, a brown-red semiprecious stone. "Tōramalli" could also mean a precious stone which exhibited a mixture of colors. (If you are familiar with tourmaline, that probably sounds about right, yes?) Although on this topic of etymology, and in the interest of full disclose, there are also those who would say that our English word came to us from the French word "tourmaline", which itself came from the Singhalese word. Either way, it would appear that name of this rock comes to us from the language spoken in ancient Sri Lanka. Which I would say is kind of cool: we do not have many words in English that are descendants of Singhalese words.)

Let us start our pursuit of the rock tourmaline by considering its appearance. In doing so, it is important to note that tourmaline is not one single mineral. Rather, the name "tourmaline" is shorthand for a group—a large group—of minerals that have a similar structure, but that are built up from atoms of different elements.

Consider dravite, for example, a relatively common variety of tourmaline. The chemical formula of the molecules that form dravite is $NaMg_3Al_6Si_6O_{18}(BO_3)_3(OH)_3OH$; this complex (wow, really complex!) molecule is formed from atoms of

(Continued on page 19)

(Continued from page 18)

sodium (Na), magnesium (Mg), aluminum (Al), silicon (Si), boron (B), oxygen (O), and hydrogen (H)… all linked together by chemical bonds. And there are several varieties of tourmaline that are similar to, but slightly different from, dravite. The molecules in chromium-dravite, for example, are $NaMg_3Cr_6Si_6O_{18}(BO_3)_3(OH)_3OH$… the same as dravite except that the magnesium atoms in dravite have been replaced by chromium (Cr) atoms. (Some scientists refer to chromium-dravite as "chromdravite".) And the molecules in fluor-dravite are $NaMg_3Al_6Si_6O_{18}(BO_3)_3(OH)_3F$—again, similar to dravite except that the OH (hydroxyl) group in dravite has been replaced by a fluorine (F) atom. All in all, there are well over thirty varieties of different minerals in this tourmaline "group".

And back, now, to the appearance of tourmaline. You will probably not be surprised to learn that, because the term "tourmaline" encompasses so many different minerals, tourmalines are found in a wide range of colors. Yes, there is dravite, which is usually light or dark brown, but which can also be orange or orange-brown. Crystals of schorl, a variety of tourmaline in which the magnesium atoms have been replaced by iron atoms, are black. (Molecules of schorl have the chemical composition $NaFe_3Al_6Si_6O_{18}(BO_3)_3(OH)_3OH$). The variety of tourmaline known as rubellite is a red, purple-red, or orange-red stone. And tourmaline that is found as a blue or a green-blue crystal carries the name "indicolite".

Trace amounts of chromium or vanadium will cause tourmaline to become tinted with a greenish hue; this stone is verdelite. (Yes, at the heart of the word "verdelite" is "verde", which comes to us from the Latin word "viridis" meaning "green".) And tourmaline can also be found as a yellow crystal, sometimes called "canary tourmaline". Check out the images in Fig. 1a., Fig, 1b., Fig. 1c., Fig. 1d., Fig. 1e., and Fig. 1f. Red, orange, yellow, green, blue, purple… the colors of the rainbow!

(Continued on page 20)

(Continued from page 19)

Fig. 1a. 

Fig. 1b. 

Fig. 1c. 

Fig. 1d. 

Fig. 1e. 

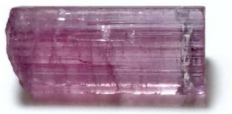
Fig. 1f. 

Fig. 1a. A specimen of rubellite, a red variety of tourmaline.
https://www.crystallight.com.tw/co/image/ci/ca/pi/82/829/1/8298-3-rubellite-tourmaline-facet-rough-specimen-435x360x2.webp

Fig. 1b. An orangish specimen of dravite.
https://prettyrock.com/cdn/shop/products/golden-tourmaline-03102012-1-4.jpg

Fig. 1c. A specimen of canary tourmaline, a yellow-colored variety of this stone.
https://www.crystal-treasure.com/images/product_images/info_images/bb08-022-1.jpg

Fig. 1d. A specimen of chromium tourmaline, which is green.
https://www.coppercanyonlapidary.com/wp-content/uploads/2021/07/Green-2.jpg

Fig. 1e. Blue tourmaline carries the name "indicolite".
https://www.crystalarium.com/products/blue-tourmaline-34-75-carat-natural-gem-crystal-brazil?_pos=12&_sid=37acfa7d6&_ss=r

Fig. 1f. Siberite is a purple-colored tourmaline.
https://i.ebayimg.com/images/g/mY0AAOSwBn1iS-1D/s-l1600.jpg

And yes, those colors of tourmaline do indeed represent all of the colors of the rainbow! And here is some bonus information: you can remember the colors of the rainbow, and the order in which they appear, by remembering the name of the famous, albeit fictitious, scientist **R**oy **G**. **B**iv—that is, **R**ed, **o**range, **y**ellow, **G**reen, **B**lue, **i**ndigo, and **v**iolet. And by the way, we have to thank Sir Isaac Newton for declaring these to be the colors of the rainbow, back in the early part

(Continued on page 21)

(Continued from page 20)

of the eighteenth century. And just to fill out the color aspect of tourmaline, some crystals of this mineral are transparent, some are translucent, and others are opaque.

One of the more common colors exhibited by tourmaline crystals is pink, as shown, for example, in Fig. 1a. And on "pink", just as an aside, here is some other bonus information… information that has nothing to do with tourmaline per se. The word "pink" has (in my humble opinion) a fascinating etymology. This word, as the verb meaning "to decorate with frilled edges", dates back to the fourteenth century. (Think "pinking shears".) And the color pink? A certain plant, in the genus Dianthus, has flowers with frilled edges (see Fig. 2.). Because those frilled edges appear to have been cut with pinking shears, the color of those flowers became known as "pink"! So: Frills – pink. Flowers with frilled edges – pink. Tourmaline – pink!

Fig. 2. The flower of the Dianthus plant is pink.
https://upload.wikimedia.org/wikipedia/commons/9/93/Dianthus_chinensis_korea_2010.JPG

As is the case for most minerals, the color of a specimen of tourmaline often results from the trace elements that are present as the crystal forms. This is not true for pink tourmaline, as well as some of the other colors of tourmaline, however! Rather, the color of many crystals of tourmaline comes about when the crystals are subjected to prolonged radiation. When tourmaline crystals form in an environment in which there is a higher-than-usual level of radiation, that radiation can cause the manganese atoms in tourmaline to take on an extra electron. This, in turn, changes the way that light interacts with the atoms and molecules that make up tourmaline… which can, for example, make what was initially a rather pale crystal become pink or even red.

The appearance of any crystal is, of course, more than just its color or colors. So let us consider the shape, that is, the crystal habit, of crystals of tourmaline. For starters, a glance at the images in Fig. 1a., Fig, 1b., Fig. 1c., Fig. 1d., Fig. 1e., and Fig. 1f. should convince you that different crystals of tourmaline exhibit different shapes as well as different colors. Many—but not all—crystals of

(Continued on page 22)

(Continued from page 21)

tourmaline are "trigonal"; a trigonal crystal is built around the atomic lattice structure sketched in Fig. 3a. Trigonal tourmaline crystals tend to be acicular, that is, the crystals tend to be long and slender. (The word acicular comes to us from the Latin acicula, meaning "needle"!) A slender, acicular crystal of green tourmaline is shown in Fig. 3b. In addition, some crystals of tourmaline grow in a fan shape, as in Fig. 3c. And finally, tourmaline crystals often grow at ninety degrees, or at close to ninety degrees, from the surface of the matrix in which they are embedded. (See Fig. 3d.)

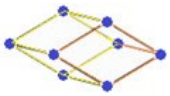
Fig. 3a.  *Fig. 3b.*  *Fig. 3c.*  *Fig. 3d.* 

Fig. 3a. The atomic structure of the molecules around which a trigonal crystal grows. Made by prk

Fig. 3b. A slender, needle-like crystal of tourmaline.
https://geology.com/minerals/photos/tourmaline-2.jpg

Fig. 3c. A fan-shaped crystal of tourmaline.
https://i.ebayimg.com/images/g/qikAAOSw6DVkbe--/s-l1600.jpg

Fig. 3d. A columnar crystal grows at close to ninety degrees from the matrix in which it is embedded.
https://www.minerals.net/MineralImages/schorl-albite-skardu-pakistan.jpg

Another aspect of tourmaline that makes it fascinating is the wide variety of its crystal shapes. Two stunning crystal clusters that go beyond the crystal habits already mentioned are shown in Figs. 4a. and 4b. And Fig. 4c.—oh, my!—shows a slice, taken across the crystal, of so-called "watermelon" tourmaline. In crystals of this variety of tourmaline, pink, white, and green layers grow one on top of

(Continued on page 23)

(Continued from page 22)

the other. Note that you can also clearly see the trigonal shape of the crystal in this slice. The colored layers of watermelon tourmaline can also grow as the crystal grows in length, resulting in a crystal like the one shown in Fig. 4d. There are essentially three colors—pink, white, and green—in the watermelon tourmaline crystals shown in Fig. 4c. and Fig. 4d., but spectacular specimens of this crystal have been found exhibiting as many as fifteen colored layers. The colors of the layers in a crystal of watermelon tourmaline change as the concentration or composition of the trace elements—trace elements in the environment in which the crystal is forming—change over time.

Fig. 4a.  *Fig. 4b.*  *Fig. 4c.*  *Fig. 4d.* 

Fig. 4a. A stunning cluster of green tourmaline crystals.
https://i.ebayimg.com/images/g/IqMAAOSwg8dkr-Pa/s-l1600.jpg

Fig. 4b. A stunning cluster of pink tourmaline crystals.
https://i0.wp.com/geologyscience.com/wp-content/uploads/2018/04/Tourmaline.jpg

Fig. 4c. A cross-crystal slice of a specimen of watermelon tourmaline.
https://theeyeofjewelry.com/wp-content/uploads/2018/05/watermelon-tourmaline-stone.jpg

Fig. 4d. A specimen of watermelon tourmaline in which the colored layers grew as the length of the crystal grew.
https://5.imimg.com/data5/IOS/Default/2023/1/AO/EF/JZ/65594152/product-jpeg-1000x1000.png

Specimens of tourmaline make great additions to any mineral collection. They are also favorites of folks who make—or who wear—jewelry. But tourmaline is far more versatile than these applications might imply. For example, many varieties of tourmaline produce negative ions when heated, which can neutralize positive

(Continued on page 24)

(Continued from page 23)

ions in their environment. Positive ions that, for example, can cause hair to become frizzy. So add a bit of powdered tourmaline into your hair care products, and you will reduce frizzy hair! In addition, tourmaline added to shampoos and conditioners will seal moisture into hair, a good thing if you want your hair to look vibrant and healthy!

But another, perhaps more important, application of tourmaline relies on it being one of only a few crystals that are piezoelectric. A piezoelectric material is one that produces an electric current when it is squeezed. ("Piezoelectric" is derived from the ancient Greek πιέζω (piézō), meaning "to squeeze" and ἤλεκτρον (élektron), meaning "amber". In ancient Greece, amber was known to produce electric charges when rubbed with fur or a dry cloth.) Most crystals have an underlying symmetric structure, that is, the structure is the same in all directions. But in a piezoelectric material, the structure is not symmetric, so deforming a crystal (by, say, squeezing on it) changes the spatial relationship between its component atoms. This, in turn, changes the electrical properties of the crystal. There are only a few minerals that are piezoelectric; notable among these are tourmaline and quartz.

Let us go off topic for a moment and consider the piezoelectric properties of quartz. Yes, if you are a rock collector you no doubt have quartz specimens in your collection. (On a personal note, quartz was the very first stone I myself collected. That was long before I knew I would become enamored of collecting rocks, and long before I acquired the nearly one thousand specimens I have in my curated collection!) But many others of us who are not collectors of rocks and minerals nevertheless own some quartz. In a so-called "quartz watch", for example!

Oh my, quartz watches have a well-deserved reputation for being incredibly accurate. And these watches are so accurate because they are driven by a crystal of quartz cut into the shape of a tuning fork. When an electric current is applied to such a crystal, it vibrates… and it vibrates at a rate (a rate of nearly thirty

(Continued on page 25)

(Continued from page 24)

thousand vibrations per second) that is always precisely the same. (This current-to-vibration process is, effectively, the piezoelectric effect in reverse.) So making a watch using a quartz crystal makes it both accurate and precise... something we all want in our watches! Yes, piezoelectricity is a big deal. And tourmaline? Because of its piezoelectric property, tourmaline is also a big deal. Tourmaline is pretty special.

Even if the applications of tourmaline due to its special properties do not excite you, think about the rainbow of colors tourmaline exhibits, and think about the wide variety of the shapes of tourmaline crystals. Yes, tourmaline is an exciting mineral. Or, really, tourmaline is many exciting minerals! So I encourage you to collect some specimens of tourmaline, or to add a few more specimens to your collection.

Prof. Philip R. Kesten, Ph.D., Department of Physics, Santa Clara University

Proverbs

42.7 percent of statistics are made up on the spot.

99 percent of lawyers give the rest a bad name.

Half the people in your life are below average.

The second mouse gets the cheese.

Imagine getting half scared to death twice.

On the other hand you have different fingers.

He who laughs last thinks the slowest.

A day without sunshine is like night.

SCVGMS ELECTED OFFICERS

President: Jim Herbold, 650-743-3254

Vice President: Bruce Poehlman, 818-912-1866

Secretary: Cynthia Porter, 408-978-5848

Treasurer: Frank Mullaney, 408-691-2656

Board Members at Large

Jo Borucki, 408-245-2881

Jim Fox, 408-356-7711

Missy Fox, 408-356-7711

Cathy May, 408-248-3993

Michele Smith, 408-374-1897

Stephen May, 408-306-6782 (Federation Director)

Paul Kidman, 408-356-4995 (Alternate Federation Director)

SCVGMS COMMITTEE HEADS

Bragging Rights Chair: Cesar Nuñez

Donation Receiving Committee Chair: Michele Smith

Editor: Deb Runyan

Fairgrounds Booth Chair: Michele Smith

Fairgrounds Liaison: Frank Mullaney

Fairgrounds Volunteer Coordinator: Margo Mosher

Field Trip Coordinator: Stephen May

Founder's Day Bingo: Sonia Dyer

Founder's Day Picnic Chairman: Jim Herbold

Founder's Day Raffle: TBD

Hospitality: TBD

Installation Dinner: TBD

Librarian: Deb Runyan

Member Displays: TBD

Refreshments: TBD

Show Chairpersons 2026: TBD

Silent Auction: TBD

Sunshine: Margo Mosher

Trophies: Frank Mullaney

Santa Clara Valley Gem and Mineral Society

P.O. Box 54, San Jose, CA 95103-0054

Website: www.scvgms.org

Email: inbox@scvgms.org

Phone Number 408-265-1422

Like us on Facebook:

https://www.facebook.com/santaclaravalleygemandmineralsociety

An Invitation

This society is pleased to invite guests to attend general meetings, study groups, and field trips. **General meetings are held the fourth Tuesday of every month with meet and greet time beginning at 7:00 followed by the meeting at 7:30 PM at 100 Belwood Gateway (the Cabana Club), Los Gatos, CA 95032.** Belwood Gateway is just south of Blossom Hill Road between Leigh Avenue and Harwood Road.

Our Society's Purpose: The inculcation of a love of rocks and minerals by the furtherance of members' interests in the earth sciences and by education in all facets of related educational activities with the promotion of good fellowship, proper ethics, and conduct.

Our Membership Requirements: Attendance at two general meetings within twelve months.

This society is a member of the California Federation of Mineralogical Societies (CFMS) and is affiliated with the American Federation of Mineralogical Societies (AFMS).

Our Newsletter, the Breccia, is published 11 times annually. The deadline for all articles is the Sunday after each general meeting. The Breccia editor is **Deb Runyan** who may be contacted by email at editor@scvgms.org and by phone at 408-628-7789. The Breccia is proofread by **Pat Speece** and **Sonia Dyer**.

Exchange bulletins may be emailed to editor@scvgms.org. Permission to copy is freely granted to American Federation of Mineralogical Societies (AFMS) affiliated clubs when proper credit is given.