



Bulletin of the Mineralogical Society of Southern California

Volume 95 Number 7 – July, 2022

The 1,003rd meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

July 8th, 2022 at 7:30 P.M.

Program : Minerals in 19th Century America, Scientists,
Dealers and Collectors Presented by Howard Heitner

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About the Program: Minerals in 19th Century America, Scientists, Dealers and Collectors *Presented by* Howard Heitner

At the beginning of the 19th century most of the men who studied the natural sciences were physicians. Among these physician/mineralogists were Lewis Beck, Samuel Robinson and Ebenezer Emmons. The earliest academic mineralogist was Benjamin Silliman who started the Yale University collection. Minerals were studied in detail even in the absence of modern atomic theory and structural analysis. By the 1850s a number of private collections had been started. Specimens were obtained by field collecting, trading and purchasing. Among the more prominent collectors were Washington Roebling and Clarence Bement. Their collections became the starting point of museum collections. Among the dealers supplying collectors at this time were A. E. Foote, Henry Ward and George English. A monthly journal; The Mineral Collector was started in 1894.



The speaker has been collecting minerals for sixty years. He started as a field collector, collecting in New York, New Jersey, Maine and other States. Later he started purchasing specimens. He purchased several Old collections and became interested in the history of mineral collecting and dealing in the United States. Other interests include fluorescent minerals and pseudomorphs. He was the president of the Stamford Mineralogical Society for many years. In his professional career he was a chemist specializing in water soluble Polymers. Most of his career was spent at Cytex Industries in new product development of chemicals used to process minerals. His post retirement mineral time has been spent finally organizing and cataloging his collection. He spent several years as an explainer at the AMNH. He is also working on new Zoom presentations on mineral related topics.

How to Join our ZOOM Meetings by Rudy Lopez

MSSC members are automatically included in the invite list each month.

For non MSSC Members who want to join this meeting. You must respond to our Programs chair, Rudy Lopez at programs@mineralsocal.org no later than Tuesday July 5, 2022. Please include "July ZOOM Meeting" in the subject line of your response. This response date will allow time for us to send you the information needed to participate in the ZOOM meeting and also will allow time to get everything organized.

From the Editor: Linda Elsnau

Well, summer is officially here! Along with summer comes hot weather and fewer shows to attend. If you plan any field collecting, be safe, carry plenty of water and don't go alone. Aren't we lucky we can enjoy our hobby via our ZOOM meetings and stay safe and hopefully cool at home. It looks like we have another fascinating program planned for your enjoyment at this month's meeting.

The second part of the special announcement from our Board of Directors is attached to this Bulletin as well.

FROM THE PRESIDENT: Mineral Groups. Installment 2 "The Beryl Group" by George Rossman

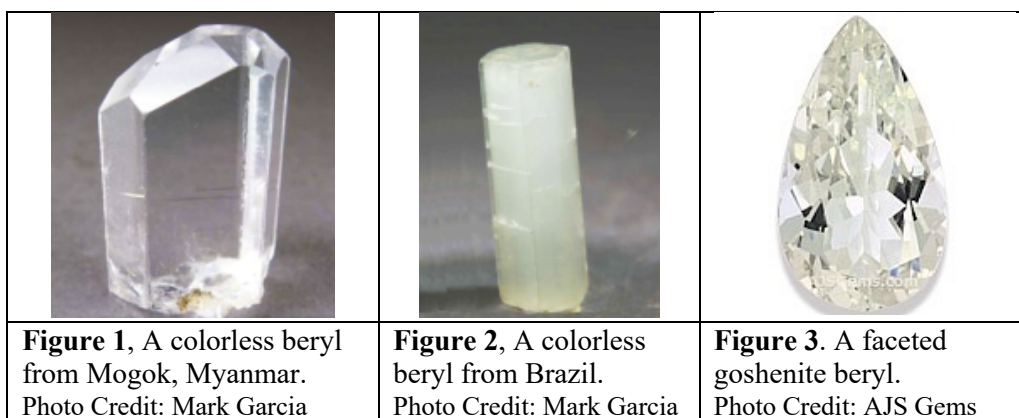
Next, I discuss a favorite group of minerals for collectors to acquire and for the public to buy. It is the beryl group.

The most important mineral in the beryl group is beryl itself. The name beryl goes back far in time. In antiquity, the Greek word "beryllos" was used to describe a variety of blue to blue-green minerals and stones. It is from that word that the modern term beryl likely originates.

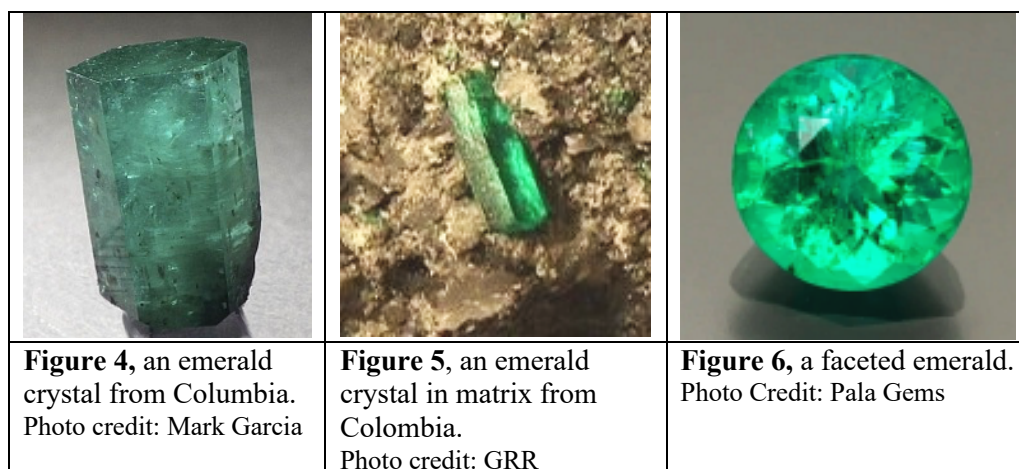
On page 11 of Gesner (1565) we see a translation of the Greek that says that "beryl is a gem in the color of the sea, or of a more dilute blue color."

Beryl is found commonly in granitic pegmatites such as those in southern California. It also occurs in mica schists and limestone deposits. Beryl has been an important ore of the element beryllium, a lightweight, strong metal with a variety of uses.




Beryl is a beryllium aluminum silicate. The general chemical formula for the beryl is $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$. Neither beryllium (Be^{2+}), aluminum (Al^{3+}), nor silicate is capable of causing color, so ‘pure’ beryl would be colorless. Such crystals do occur (**Figures 1,2**). As a gemstone, colorless beryl is commonly sold under the name goshenite (**Figure 3**).




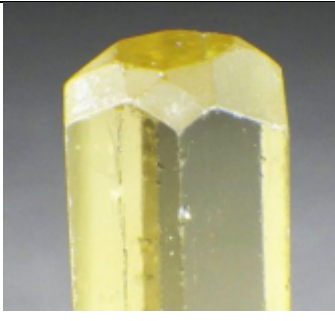

Fortunately, a variety of other elements are capable of replacing some of the aluminum in the beryl structure. Many of these cause color. An example known since ancient times is emerald, the variety of beryl that most commonly contains chromium (Cr^{3+}) as a coloring agent. (**Figures 4-6**). In some localities, vanadium (V^{3+}) is the ion responsible for the color. But both chromium and vanadium produce nearly the same color in emeralds. Emerald, of course, is an important gemstone in the commercial market.



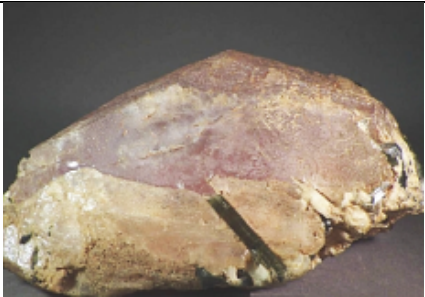
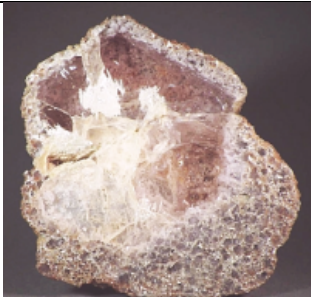

The most common color-causing substitution in beryl is from iron. When iron enters the beryl structure in the $2+$ oxidation state, it gives rise to the blue variety of beryl known as aquamarine (**Figures 7-9**), a well know gem variety of beryl.

		
Figure 7 , beryl from Afghanistan. Photo credit: Mark Garcia	Figure 8 , beryl from the Erongo Mtns, Namibia. Photo credit: Mark Garcia	Figure 9 , faceted aquamarine. Photo Credit: Pala Gems




Over time, blue beryl in nature is irradiated by gamma rays from the decay of potassium-40, a minor component of all potassium minerals such as feldspars with which beryl is commonly associated. The gamma rays will strip an electron from the iron 2+ converting it (oxidizing it) into iron 3+. It is the iron 3+ which is the origin of color in yellow and golden beryl (**Figures 10-12**). Sometimes the oxidation is not complete, and we get greenish-blue beryls which are the result of the combination of both Fe²⁺ (blue) and Fe³⁺ (yellow) colors in the crystal.

		
Figure 10 , a crystal of golden beryl from Brazil. Photo credit: GRR	Figure 11 , beryl, variety heliodor from Tajikistan. Photo credit: Mark Garcia	Figure 12 , a faceted golden beryl. Photo Credit: Pala Gems

Manganese is another element that enters the beryl structure and causes color. Commonly, the color is a light to moderate pink (**Figures 13-15**). This variety is known as morganite, named after John P. Morgan, a financier and investment banker in late 1800's and early 1900's. Spectacular specimens have been found in the pegmatites of San Diego County. The color comes mainly from a small amount of manganese in the 3+ oxidation state.




		
Figure 13 , morganite from Mesa Grande, CA. Photo credit: Mark Garcia	Figure 14 , morganite from the White Queen Mine, Pala, CA. Photo credit: Mark Garcia	Figure 15 , a faceted morganite. Photo Credit: Pala Gems

If there are significant amounts of manganese 3+ in the beryl, we get red beryl such as is found in the Wah Wah Mountains of Utah (**Figures 16-18**). Formerly, it was sometimes marketed as bixbite in honor of a Utah miner and mineral dealer. But this is not a good name as it can be easily confused with the manganese oxide, bixbyite. Now it is generally called red beryl.

		
Figure 16 , red beryl from the Wah Wah Mtns, Utah. Photo credit: GRR	Figure 17 , red beryl from Wah Wah Mtns, Utah. Photo credit: GRR	Figure 18 , a faceted red beryl. Photo Credit: Pala Gems

Another blue variety of beryl was first found in the Maxixe Mine in Minas Gerais, Brazil. It is known as Maxixe beryl (**Figures 19-21**). It was different from aquamarine in that the color tended to fade upon extended exposure to light. It also does not contain iron but may contain some manganese. The color is ascribed to radiation damaged carbonate (CO_3^-) ions in the structure (Nassau et al, 1976).




Nassau K, Prescott BE, Wood DL (1976) The deep blue Maxixe-type color center in beryl. *American Mineralogist* 61, 100-107.

		
Figure 19 , a beryl crystal from Brazil with part of the crystal with Maxixe blue color. Photo credit: GRR	Figure 20 , a blue Maxixe beryl from Mozambique. Photo credit: GRR	Figure 21 , a faceted Maxixe Beryl. Photo credit: GRR

A fairly recent new member of the beryl group (Laurs et al, 2003; Hawthorne et al, 2004) is the mineral species, pezzottaite, named after Federico Pezzotta, curator of the Milan, Italy, museum (**Figures 22-24**). It is a cesium member of the beryl group with the chemical formula, $\text{Cs}(\text{Be}_2\text{Li})\text{Al}_2(\text{Si}_6\text{O}_{18})$.

Laurs BM, Simmons WB, Rossman GR, Quinn EP, McClure SF, Peretti A, Armbruster T, Hawthorne FC, Falster AU, Günther D, Cooper MA, Grobety B (2003) Pezzottaite from Ambatovita, Madagascar: a new gem mineral, *Gems & Gemology*, 39, 284-301.

Hawthorne FC, Cooper MA, Simmons WB, Falster AU, Laurs BM, Armbruster T, Rossman GR, Peretti A, Günther D, Grobety B (2004) Pezzottaite $\text{Cs}(\text{Be}_2\text{Li})\text{Al}_2\text{Si}_6\text{O}_{18}$ A spectacular new beryl-group mineral from the Sakavalana pegmatite, Fianarantsoa Province, Madagascar, *The Mineralogical Record*, 35, 369-378 .

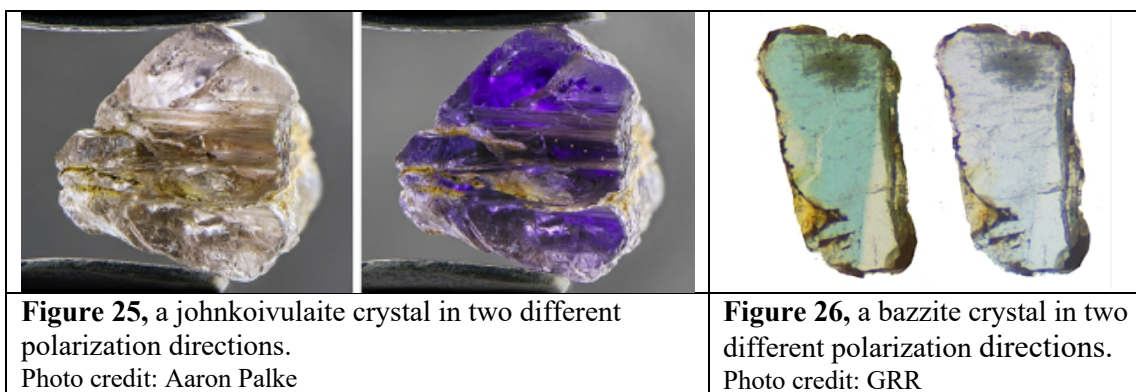
		
Figure 22 . Pezzottaite from Mondrosaonaro, Madagascar. Photo credit: GRR	Figure 23 . Pezzottaite crystal from the Sakavalana mine, Madagascar. Photo credit: Rob Lavinsky & irocks.com.	Figure 24 , a faceted pezzottaite from Madagascar. Photo credit: PalaGems

There are several other species in the beryl group, but they are quite uncommon. Johnkoivulaite, the newest member of the beryl group (**Figure 25**), is a violet-colored mineral that was first described by Palke et al. (2019). It is a cesium member of the beryl family where the element boron partly replaces the beryllium $\text{Cs}[\text{Be}_2\text{B}]\text{Mg}_2\text{Si}_6\text{O}_{18}$

It was found in secondary alluvial gem gravels near Pein Pyit, Myanmar, near the city of Mogok, an area famous for gems. These gravels are mined for primarily ruby and spinel, but many pegmatite minerals occur with them. The color of johnkoivulaite is associated with intervalence charge transfer between Fe^{2+} and Fe^{3+} , a process in which incoming light causes electrons to be transferred from Fe^{2+} to the Fe^{3+} . This process also occurs in dark blue aquamarine.

Palke AC, Henling LM, Ma C, Rossman GR, Sun Z, Renfro N, Kampf AR, Thu K, Myo N, Wongrawang P, Weeramonkhoniet V (2021) Johnkoivulaite, $\text{Cs}(\text{Be}_2\text{B})\text{Mg}_2\text{Si}_6\text{O}_{18}$, a new mineral of the beryl group from the gem deposits of Mogok, Myanmar. *American Mineralogist* 106, 1844-1851.

The same process of transferring electrons from Fe^{2+} to the Fe^{3+} is the case of color in another member of the beryl group known as the species bazzite (**Figure 26**). Bazzite, named in 1915 for the person who discovered the mineral, is the scandium analogue of beryl. In bazzite, the element scandium (Sc) replaces the aluminum. The chemical formula for bazzite is $\text{Be}_3\text{Sc}_2(\text{Si}_6\text{O}_{18})$. Again, as is the case for other members of the beryl group, iron can enter the structure in two different oxidation states and give rise to color.



Like the tourmaline group, members of the beryl group occur in a wide variety of colors. Luckily for MSSC members who like to collect minerals, they are available at many localities in Southern California and adjacent areas. How many different colors do you have in your collection?

MINUTES of the June 10, 2022 ZOOM Meeting

Call to Order (Dr. Rossman):

At 7:32 p.m., the 1,002nd Membership Meeting of the Mineralogical Society of Southern California (MSSC) was called to order by President Dr. Rossman, Ph.D. It was MSSC's 25th ZOOM conference Membership meeting. [Secy Note: This is our 8th ZOOM under MSSC's own license. ZOOM's conferencing protocol has allotted MSSC's Membership Meetings to expand its audience base, for which we are pleased and grateful.]

President's Remarks (Rossman)

Dr. Rossman reports that the International Mineralogical Association (IMA) has announced that there are 5,809 valid mineral species. It's interesting, he says, because a few of the newer ones are the key elements titanium, thallium and tellurium. Four of the new ones are *amgaite*, a tellurite from Russia, *griffinite* an aluminum titanate from Israel and *magnéliite*, a titanium +3 plus +4 oxide also from Israel and *murphyite*, a lead tellurite from the USA (AZ) and, of which neither Dr. Tony Kampf nor Dr. Robert Housley had anything to do with, very unusual. We're getting close to 6,000 known mineral species. How many are in your collection?

Regular Business (Rossman)

Approval of Minutes: First order of business was approval of the May 13, 2022 Membership Minutes as published in the June 2022 Bulletin. Dr. Rossman called for any corrections or additions and seeing none made a call for a Motion to approve the minutes as stated. The Motion was made by Carolyn Seitz and seconded. There was no further discussion. The vote was called and the **Motion passed** unanimously.

Announcements and Reports

1. Informal social gathering (Ahni Dodge): Ahni announced that there will be an informal dinner at Kathleen's (on Lake Ave. in Pasadena) on June 11, 2022 at 5 p.m. Please e-mail Ahni if you're interested in joining the informal discussion of minerals. Her e-mail address is ahni@me.com.

2. Fieldtrip Report (Marek Chorazewicz): Marek reported (a) there will be a fall field trip to the San Benito Mountains, with the help of our friends from Northern California Micro Mineral Association. This trip will probably be at the end of September. Minerals to find include jadeite and green plasma agates at the Aurora Mine and mercury, garnets and carbonates in other nearby locations. Permits are required in the area. Entry to the Benitoite Mine is not available to the public. However, as an alternative for some, there is tailings dig (think Himalaya Mine), reservations are required and the fee is \$100 per person. Another prospect is possible access to an area where we can find small benitoite specimens, clear and pale blue. The trip is still in planning stages. More information will be forthcoming; (b) the two other trips, Tecopa for opals and Barstow for hematite, the rare phosphate, lazulite, will be postponed until beginning of November and December 2022. Check the website and Bulletin for more information and updates.

There being no other MSSC business, the meeting was turned over to Program Chair, Rudy Lopez to introduce the night's speaker. Rudy, our avid fisherman, recently returned from one of his deep sea bluefin tuna fishing trips where he met a fellow angler from Virginia. They started talking and the result is that Mr. Ronning and his family accepted Rudy's invitation to tonight's ZOOM meeting. Their young son, Jack Ronning (6 or 7 yrs. old) wants to become a geologist! Rudy sent him a few rock samples to get him started. Welcome, Ronning Family!

Program

Rudy introduced Dr. George Rossman, Ph.D. who was kind enough to fill in this evening. Dr. Rossman will speak on jade and his journey to Myanmar, the source of jade. Myanmar, formerly Burma, produces spectacular minerals and gem specimens of world class quality. Dr. Rossman is Mineralogy Professor at Caltech where he earned his Ph.D. in Chemistry and he is the renowned authority on spectroscopy and color in minerals and gems. He has taught and been affiliated with Caltech for 50 years, he is well published, has received prestigious honors in his field and is widely respected. George has given countless presentations to countless institutions, schools, societies, clubs and others and we are honored to have him speak tonight. He currently serves as President of the Mineralogical Society of Southern California.

Dr. Rossman starts "A Journey to the Source of the Jade" by first telling us a little about the mineral jade. There are two types of minerals commonly called jade. One type is a member of the amphibole group and is called nephrite. It is the other type, however, that is the topic of tonight's talk.

The other type is a member of the *pyroxene group* and is called jadeite, a sodium aluminum silicate, commonly called jade. Jadeite is the more valuable of the two types and is the so-called imperial jade or precious jade. It has been used for hundreds of years for carvings, tools, weapons and a few other things. Jadeite rock is an extremely tough material and is extraordinarily hard to scratch. Everything else but diamond is brittle. If you drop a diamond on a concrete floor, it may well shatter, but jadeite is made up of many microcrystals and when it hits the concrete, a crack begins to propagate between the boundary of the microcrystals and that makes the jade impervious to shattering. It is both the physical appearance and the extreme toughness of the material that made it valuable in societies for a variety of different purposes.

Looking at pure jade, sodium aluminum silicate, and if it had that exact chemical formula, jadeite would be absolutely colorless. Sodium ion, aluminum ion and silicate are all incapable – by themselves – to have causing color so pure. Jadeite would be colorless. But, in imperial jade, the high, extremely high, valuable jade,

chromium in the plus 3 oxidation state replaces a little of the aluminum and that makes the green color we see in most jade.

How did Rossman get into jade? Many years ago, when he was first starting out at Caltech, a member of the Venice Lapidary Guild brought him a sample of lavender jade. The person wanted to know if he could tell if the color was natural or a product of technology. Understand, many jade samples are dyed, they're treated with acid to dissolve away some secondary minerals then back-filled with epoxies or other materials. They're waxed and other treatments are sometimes applied to them. So, how to tell if it was natural lavender? At that time, he had no standard to make the distinction. You would need an *authentic sample* and various *tests* would need to be done. At the time, though, he didn't have a sample. So, that problem, back in the late 1970's, had to be put on the shelf with no clear resolution.

As we know, jadeite comes from Mendocino County in California, some from Siberia in Russia and quantities from Guatemala (in jadeite and jade is a mineral called omphacite that compose some of the jadeite there). But, if you want the best jade in the world, you go to Burma for Burmese jadeite, which, by far, is far superior to any other in the world. Rossman showed a slide of samples of Burmese jade, gorgeous colors from white to reds, purple, green to black. But to understand the origin of jade, he said he needed to get a sample of authentic lavender jade for comparison in the various laboratory instruments.

Myanmar, formerly Burma, is the only source for some of the best jadeite. It is also source of some of the world's best, most beautiful rubies, sapphires and other fantastic minerals such as topaz and moonstone. Here Rossman shows slides from Bill Larson's Pala International collection. Beautiful pieces!

But, to understand about the lavender jadeite, he had to go to the source, to Myanmar. In 2002 he was given the opportunity to go and didn't need to think twice about it. He and a few others went on this adventure and journey. They flew to Bangkok for their entry visas. At the time, there were sanctions against Myanmar by the US. The embassy tried to dissuade them from traveling; the country was in a military dictatorship. Keep in mind, this was about 20 years ago. The group flew into Yangon (Rangoon), capital city at the time. They continued northward to Bagan, on to Mandalay, current capital city, then Sagying, Nam Ya (Ruby Mine #1) and ultimately to Hpakant. The Hpakant mines produce the highest quality jadeite in the world! For westerners, travel north of Mandalay is forbidden! It is rare to get north of Mandalay and even rarer to get to Hpakant.

The trip was arranged by Bill Larson of Pala International; he has been to Burma about 30 times. Also traveling was George Harlow, curator of the American Museum of Natural History, Loretta Costello, at the time, a buyer for a big international jewelry corporation and Marcus Oliveri, now a Tucson mineral dealer. Some of the group only travelled in the southern part of Myanmar while the others actually went into the northern segment.

The group's first experience was in Yangon, Myanmar's largest city. Yangon has spectacular monuments, many covered with gold leaf. It is beautiful to see. There are many smaller monuments dedicated to various departed people. By the way, local currency is required to make any purchase in the country. The dollar is not accepted for transactions except at the bank and airport. An exchange of US dollars for Myanmar Kyat notes had to be made. Because of the unrest (military), the government closed down the universities. The university geology students went out into the countryside to collect minerals and gems. They brought them back into Yangon to sell to tourists. There were trays of pearls, moonstone, spinel, topaz, tourmalines, sapphires and other gems – all for sale.

Larson would buy large quantities of minerals for Pala International, and Harlow would make purchases for the museum. Bill would say, "...I will buy all of these if you give this professor, who has no money, a crystal of topaz for his research". And that is how some Myanmar samples ended up at Caltech. Dr. Rossman expressed his gratitude to Larson and Harlow for their contributions to his research of the minerals.

After Yangon, the next stop was the ancient city of Bagan: in the old days the city was known as Pagan. Bagan is a 13th century city. Bagan's temples, Sulamani and Shwezigon, are quite spectacular; they are gold color, not painted but coated in layers and layers of thin gold film covering the exterior of the buildings. Rossman's group did a tour of the Shwezigon temple. It is customary, in Burma, to take your shoes off inside the sacred structure. The one disadvantage to this open structure, however, is that the rafters were home to large colonies

of pigeons and bats living near the roof. Walking barefoot was messy, to say the least. Rossman said he was amazed that he only saw 2 other tourists! He said it is an amazing city, located on the flood plain of the Irrawaddy River and has more than 1,000 temples and pagodas. Today, the city, with its temples and other fine structures, is a huge tourist attraction.

Onward, the group flew to Mandalay, a former capital of Myanmar. Mandalay is home to the world's largest book, stay tuned for that momentarily. The thing that was amazing was the Mandalay airport. It is about as large as Ontario (CA) or Burbank (CA) airport; it's a modern airport. But there were only 4 cars in the entire parking lot! In the airport, restaurants and shops were closed. Outside, the group caught a taxi to take them north in the city. The driver wanted to know where they were going, they said, "...way up north", the driver said they were crazy. He took them to a hotel where there were 2 other parties in the entire 15 story hotel.

Getting around the city was an experience in itself. A "taxi" Dr. Rossman hired was a modified bicycle with a side seat for one passenger. The price was right but the ride was a little rough. Another kind of taxi was a small truck, the bed had been converted to a small canopied open air riding area. There was various signage around the city announced messages such as, the "People's Desire", a listing of policies relating to the political view of the day. There were lots and lots of youth, 20-year-olds, carrying military weapons, they were part of the army. As for the largest book, it consists of large rectangular carved marble slabs of which there are 729 "pages" of religious text. It is at the Kutodaw Pagoda which is surrounded by 729 stupas, each containing one marble slab. *[Secy Note: A stupa is a mound-like structure containing relics and used for meditation.]*

Mandalay is important because it is the country's official location for evaluation of jade and extracting tax on sales. It is where jade is cut into cabochons, fabricated, carved and sold to international, mostly Asian, markets. The jade market is free to enter if you're a local but foreigners must pay \$1 to enter. It is a fascinating place, people selling merchandise such as cabs, beautiful imperial green jade, many merchants and vendors. Workers breaking large boulders, cutting huge stone, operating man-powered grindstones, using their feet on pedals. It's a crude but effective means to create cabs and polish the jadeite using the silica from bamboo shoots. It was fascinating to watch. In the jade market there were literally hundreds of hundreds of people working on and selling jade.

Sagying was the next destination, due north to the marble hills, the hills of limestone. This city is known for their limestone carvings of the Buddha, as it has been done for hundreds of years. Even today, spinel and sapphires can be found in limestone as the workers are carving their statues. Long ago, weathering caused cracks in the limestone, water would flow into the cracks, the gems (spinel, rubies, etc.) would fall to the bottom of the cracks. Rossman's group was about a couple of hundred years too late to get any of those gems, because the first people to go there got them. This is where the first big batch of the precious gems were obtained, from the cracks, openings and fractures of the limestone hills. George shows a photo of fabulous dark colored spinel in the stark limestone. WOW!

Why is Myanmar such a treasure trove for the gems? Dr. Rossman gives us the science: 90 million years ago, India is in southern Africa and, what is now Myanmar and Sri Lanka are in southern Asia. In the mix, is Ireland's Shallow Sea Islands. In between the islands are huge carbonate deposits. Continental Drift happens, India migrates north, heading toward Asia 35 million years ago. India collides with southern Asia.

Geologically, the migrating was a very violent episode. The carbonates and limestone in ocean deposits also had clays, weathered off the land, and at the collisions, there was a lot of heat. Things got pushed down deeper in the Earth and were heated up. Chemical reactions occurred, aluminate clays interacted with carbonate shells and materials from marine organisms to form limestones and various gems, which crystalized. Inside the limestone, volcanic activities took place, because of the collisional activity, which gave rise to volcanic materials like peridot. Pegmatites erupted in volcanic activity and that gave rise to beryl, aquamarine and a whole host of other minerals. Today, Myanmar, with the Irrawaddy River running through the center of the country, thanks to India's collision with southern Asia, has that spectacular mineralogy created over the course of millions of years.

One of the things the translator said is to look away to let the seller know you're not interested in the gems they present to sell. George shows a photo of himself and Loretta Costello, the buyer for international jeweler, looking away from beautiful gems.

Next, north to Myitkyina and on to Hpakant. At the time of this trip, travel guides say that Hpakant is forbidden to foreigners, miles from the nearest provincial capital, Myitkyina (open but not safe), passage on heavily rutted dirt roads that is regulated by dozens of checkpoints, manned by armed guards and the roadsides are studded with land mines. Jade mines in the area have long been notorious for high rates of drug addiction and HIV infection and is off-limits due to ongoing civil wars. Hpakant is in the middle of an inhospitable and malaria infested jungle (high risk of Malaria). Yet, Hpakant produces some of the world's highest quality jade and is among the least developed towns in Burma, with no proper electricity, sanitation or drainage system – even by standards of Myanmar, Hpakant is a dark and depraved place.

There they were, 3 Americans (Rossman, Costello and Harlow, the others did not travel to the north), in 3 trucks, with 2 armed military intelligence officers, 2 translators and 2 other people, whose purpose was never explained. One of the translators was the head of the Ruby Miner's union and a medical physician and the other, a geologist. The vehicles were provided by Pa-O a military organization at the time, now a political party. They provided transportation north to jade country. One of the vehicles' undercarriages literally ripped out on the rutted road! Rossman showed a photo of the car and it showed the car and one of the military escorts, gun at his waist, a rare photo of one of the armed escorts.

They went to Nam Ya Ruby Mine #1; it operates using hydro power for mining. The material is processed through a concentrator that literally vibrates the gems out while the vast materials are directed out into the countryside. Rossman was told his group was the first to see this mine. Interesting because, about 2 weeks later a group from Europe visited the mine and were told the same thing.

While in Nam Ya they stopped at a restaurant and the Americans were the attraction!

Many villagers came and brought bags of concentrate materials to sell to the Westerners. Harlow negotiated and bought spinel crystals, magnesium aluminum oxide, red color made beautiful by chromium plus 3, like a ruby. The pieces were a little too small as high- quality gemstones but perfect for science or the museum. George was interested in a little blue plastic bag of concentrate material. The seller, a lady said \$500, the translator told George, NO, no way can you spend \$500 for this concentrate. George spent a lot of money getting to this place and this is what he wanted for science, but said no to the lady. 45 minutes later, the lady said \$250, again, NO...1/2 hour goes by and again the lady comes up with another price, \$100. Translator says NO, George tells the lady no. Next offer \$50, George tells his translator that he'll buy it. The translator again says NO. Now they're gassed up, ready to move on, depart from the gas station and she bangs on the window and says \$25. George is ready again, and again translator says NO. George says no to the lady. They start off and the lady runs after the truck, she knocks on the window and says \$10. Translator says ok, now he can buy. George pays the lady \$10 and gets his bag of concentrate. This is what was in the little blue bag: a lot of zircons, a ruby, some spinel and 2 **painite**, $\text{CaZrBaAl}_9\text{O}_{18}$, **one of the rarest minerals on earth**. WOW! At the time, those 2 *painite pieces were 1/7th of the world's market* and George owned them!

Rossman took them to Caltech, did research on them, studied the inclusions along with the coexisting minerals, wrote back to Myanmar and told the people there the type of geologic environment in which this material probably occurs. Within 2 weeks, they had gone out and actually found a deposit where it did occur and then more than 1,000 of them entered the market! What might have been a \$10,000 crystal became worth a lot less because of the thousands coming out of Myanmar and flooding into the market. But, for a time George owned a significant quantity of the world's rarest mineral, purchased for \$10 from a lady who knocked on the car window and said, \$10.

Finally, after driving through the jungles of northern Myanmar, they arrived at Hpakant. The jade mines are all along the Uru River. All of the mines are under military control, some of them are operated by the PNA, the Pa-O, the same organization that gave them the transportation vehicles. George shows a sign that read: "Welcome to the Golden Dragon Company Nam Maw No.109 Jade Mine". This is a very significant

monument in the country (the mine had been designated a national monument). The mine is located at the contact between serpentinite and jade - all the (white) material above is low quality jade. Inside the mine, above their heads is an enormous boulder of jadeite. The contact between the schists at the edge of the jadeite, the green color oozing into the jade is in contact with the chromium amphibole, coloring it the valuable green color and, oh my, LAVENDER.

First though, that massive jade boulder is a jade dike found in No.109 at about 900 feet above sea level; the area of the mining block is about 1 acre. The massive jade stone was found 40 feet in the ground. It can be known as the jade dragon partly because it is the world's largest jade stone and chiefly it is a rare find of good quality and weighs over 3,000 tons. It is 70' long, 20' high and 16' wide. Its crystal composition is smooth, delicate jadeite; color ranges from white to purple, blue and deep green. There are also many dykes promising to be precious ones. Dr. Rossman shows photos of where No. 109 is located.

Hpakant District, Mine #2 is an underground mine that goes into the side of the mountain. What they find in the sediment are boulders of jade. The jade boulders are extracted, blade cut using human power, controlling blade speed by their feet pedal movements. Someone comes to inspect the already cut jade and uses a light to test for translucent, transparent and color qualities. The inspector marks the jade with a code letting the evaluators in Mandalay know how much to tax before it is released for international sale. Amazingly, there were thousands upon thousands of pieces of jade strewn around; hundreds and hundreds of pieces of lavender jade littering the ground at the entrance to that mine. George found nirvana; he was within grasp of what he needed for his research! They informed him he couldn't have any even though he was sitting, standing and walking on literally hundreds and hundreds of small fragments of lavender jade. And they made sure George did not take any of the jade. **All** of Myanmar's jade had to go to Mandalay to be evaluated and taxed.

The group traveled on to Hpakant District, Mine #3 where the jadeite layer is greater than 300 feet below the ground surface. There were giant trucks in a huge pit; there are vertical shafts going into the mine, as well. The material taken from the mine are taken to a dump. George shows a photo of a huge dump truck atop a giant tailing mound. Lined up and down the edges are many, many people, migrant workers, who are ready to sift through the material to see if they can find bits and pieces of jade, missed by the mining company. The danger here is the landslides of the unconsolidated material, as it is, or during rainfall. There have been several (more recent) landslides, killing several people at a time, for instance: in 2015, 113 were killed; in 2018, 15 died, in 2019, 50 people were killed and in 2020, 162 workers were killed in the landslide.

While in Hpakant, the group stayed at the Jade City Hotel. In February 2015, 2,000 Hpakant residents were displaced after clashes between Kachin Independence Army and the Burmese Army, including bomb attacks outside the well-known Jade City Hotel. The locals have said they continue to fear for their safety. This is another reason it was and is difficult to obtain entry to this area, instability.

The hotel provided pets in each room. George had a house gecko and Loretta had a different pet, a tarantula. The night before leaving the district, there was a knock on Rossman's door and in comes the head military commander of the district and several other fellows. The commander approaches Rossman and says, "A present for the American" and hands him a box with several pieces of lavender jadeite. Fantastic! There's a hitch, the jade had to be taken back to Mandalay to be evaluated and taxed before it could be taken from the country. In Mandalay, Rossman went to the bank to pay the taxes and to get a certificate that proved he paid the tax. There was a slight problem, the bank would not accept local Burmese currency, only American dollars. That problem was rectified out of Rossman's wallet and he was able to get his certificates, important documents to show at various airports to prove he had permission to take the jade and other gem purchases with him. They each had to have certificates for their gems, minerals and jade. Ironically, though, no one ever asked to see a certificate or the gems, minerals or jade. [*Secy Note: Go figure.*]

Dr. Rossman brought the lavender jade to Caltech to determine the chemical composition, doing X-ray fluorescence analysis and semi-quantitative analysis of solids and the result is there is gallium (does not cause color), zinc (does not cause color), iron (very weak), and there was manganese inside the jade. The manganese was measured on an optical spectrometer (absorbance and wavelength) eliminating the center portion of the spectrum allowing the reds and the blues come in making the lavender color. This feature is due to the

manganese +3 oxidation state plus the little, teeny feature of the iron, it was clear that the color was authentic lavender. After all that, Rossman had his answer, the lavender color in jade was natural, not a product of technology!

Thank you, Dr. Rossman, for a fabulous look at Myanmar and your quest for lavender jade. Quite an experience, fun stories and great photos of the temples and other structures, THE BIG BOOK, the treks to the cities, towns and mines. A little exotic, somewhat dangerous, but what a time!

There was an informal Q&A after the presentation. Dr. Rossman told us that Harlow was able to bring back a number of minerals, jade and other gemstones for the American Museum of Natural History. Also, he was able to compare Burmese jade to Guatemalan jade. As for Rossman himself, he was able to bring spinel, ruby, sapphire, jade and his \$10 little blue bag of mineral concentrate, which contained the precious (2) painite specimen. His gems were not gem-quality, but adequate for his research purposes. Rossman paid \$80 for taxes; he did not get malaria but had a queasy stomach in Mandalay; he did not eat the fish eye soup. Overall, I'd say a wonderful adventure albeit a little scary. Dr. Rossman thanked Bill Larson for arranging the trip. Last thing, upon departing and back in Yangon, Rossman bought a souvenir of a carved jade elephant figurine for \$1. The jade was lavender!

Adjournment

There being no further business, the meeting was adjourned at 8:38 p.m.

This was a fascinating saga full of wonder and intrigue; my Minutes are a little longer than usual for your benefit. I hope you didn't miss Dr. Rossman's Myanmar jade presentation. It was so good! Attend next month's ZOOM presentation, you won't regret it. Contact our Program and Education Chair, Rudy Lopez. Check the website or **Bulletin for information** to get on the invitation list if you are not a member.

Respectfully submitted, Angie Guzman, MSSC Secretary

With Knowledge Comes Appreciation

List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	ZOOM August, 13, 2022	Scott Braley – Collecting at the Red Cloud Mine in Lincoln County, New Mexico
	ZOOM Sept. 9, 2022	Wes Andree; "JMDC: A gem of the Inland Empire
	ZOOM Oct 14, 2022	Leyla Namazie: The structural deformation and evolution of Terranes in the North American Western Cordillera using Paleomagnetism. Undergraduate Geophysics major at UC Berkeley
	ZOOM Nov.11, 2022	Aaron Celestian – TBD
Board Meeting	ZOOM July 10, 2022	ZOOM at 1:00 PM
Field Trip	TBA	No Field Trips Planned at this Time

Note: Dates and programs shown above are subject to change. Check your bulletins to confirm final information each month.

The Ride Share Listing is being temporarily discontinued until such time as MSSC starts holding in-person meetings again.

A letter to MSSC from Julie Curtis:

After much deliberation, I have returned the rest of my mom's Juanitaite to the Natural History Museum of Utah.

I was finally able to connect with Dave Richerson and we discussed this at length. The museum does not have it in their collection.

I flew up there last Tuesday and turned it over.

While I was there, Dave and his wife hosted me and we had 3 awesome days filled with memories, trips and general fun. It was good for me to get my brain in gear and relive so much. I finally got to see the Rio Tinto pit; the Museum of Early Life in Lehigh is not to be missed! Mineral Collectors of Utah had their annual picnic while I was there and that was a treat. Reminders of how friendly this hobby is. I took the original SEM's, Mineralogical Record and the old Gems and Mineral magazine with mom's paintings. My last day was spent at the Natural History Museum, touring the Dino's and other critters and was treated to a visit behind the scenes. They took me up Cottonwood canyon to see geological formations. It is so gorgeous up there.

Juanitaite has been found at two other locations in Utah.

For those of you who remember my daughter Sarah, she is now 51 and living in England. She is very glad this material is back where it belongs. Now to get rid of some more stuff. I have quite a bit of things off the give-away tables, needs to be mounted if anyone is interested. I have no more Juanitaite other than my personal specimen which will have a new home when I'm gone.

I am now 78, COPD is a major issue but I cope. I am happy, still enjoy mineral news and miss so many of you.

My Email is: carolenjulie@gmail. Feel free to contact me.

Julie

PS: I have legally changed my name back to Curtis for old time sake!

OTHER FREE THINGS TO DO...by Ann Meister

The **Watson Lecture Series at Caltech is on hiatus until the Fall semester**. Stay tuned until October! Find past Watson Lectures on [Caltech's YouTube channel](#).

The **Von Kármán Lecture** is on Thursday, **July 21** at 7:00 PM. Available live on YouTube with link at [July 2022 - Curiosity – A Decade on Mars \(nasa.gov\)](#). The speakers are Dr. Ashwin Vasavada, Curiosity Project Scientist and Keri Bean, Curiosity Rover Planner Deputy Team Lead, both NASA/JPL. The title of the presentation is, "**Curiosity – A Decade on Mars.**" Ten years and over 17 miles of driving has taught us there is more to Mars than we could ever imagine. We'll take a look at highlights from the past decade of this extraordinary mission and see where it's leading us next. For more, check the website: [Lecture Series \(nasa.gov\)](#)

The **UCLA Meteorite Gallery** monthly lecture will be presented on-line on Sunday, **July 17** at 2:30 PM. The speaker and title have not been announced. Also see the 2022 Poetry Contest winners on the website.

Zoom Registration: https://ucla.zoom.us/meeting/register/tJEqduyupj0vGd3S0_52FsbHTbPjYr0sZQUj

If you need detailed instructions on [how to join a meeting](#) via Zoom please contact our Curatorial Assistant, Juliet Hook, at jahook@ucla.edu. Note: Registration is only needed once as this is a recurring meeting in Zoom. The speaker and topic will be announced on the website. Visit the website and check on events and videos and other neat things about meteorites, go to <https://meteorites.ucla.edu>

MSSC Advertisement Policy:			
Mineral-related ads are allowable in the MSSC bulletin. Below is the price per month			
	Business Card	\$5.00	
	1/3 page	\$10.00	
	1/2 page	\$20.00	
	Full Page	\$35.00	
In addition, any advertiser who purchases 12 months of space in advance will receive a discount of 12 months for the price of 10 months. The copy for the ads should be mailed to the editor at bulletin@mineralsocal.org and the payment should be sent to the MSSC Treasurer 13781 Alderwood Lane, #22-J, Seal Beach, CA 90740			

Calendar of Events:

Only local area shows are listed here. Other CFMS Club shows can be found at: <http://www.cfmsinc.org/>

July 16-17, 2022 – Culver City, CA

Culver City Gem & Mineral Society

Fiesta of Gems

Veterans Memorial Auditorium, 4117 Overland Ave.,
Culver City, 90230

Hours: Sat 10 AM – 6 PM, Sun 10 AM – 5 PM

Website: <http://CulverCityRocks.org/fiesta.htm>

August 5-7, 2022, Nipomo, CA

Orcutt Mineral Society

Nipomo High School, 525 N. Thompson Ave.,
Nipomo, CA 93444

54th Annual Rainbow of Gems Show & Sale – “OMS
Rocks the Central Coast”

Hours: Friday & Saturday 10 AM – 5 PM,

Sunday 10 AM – 4 PM

Website: <http://omsinc.org>

August 20-21, 2022 – Arcadia, CA

Pasadena Lapidary Society

“Inspiration Unearthed”, 62nd Annual Tournament of
Gems

Arcadia Masonic Center, 50 W. Duarte Rd., Arcadia

Hours: Sat. 10 AM- 6 PM, Sun. 10 AM – 5 PM

Website: <https://pasadenalapidary.org/>

August 20-21, 2022 – Tehachapi, CA

Tehachapi Valley Gem and Mineral Show

500 East “F” Street, Tehachapi, CA

Hours: 9 AM – 5 PM

Rocks, Minerals, Fossils, Beads, Gifts, Collectables,
Gemstones and Jewelry

Website: <http://tvgms.org>

Mineral of the Month: Thénardite: Na₂SO₄

System: Orthorhombic

Color: Colorless, very light grey, light brown; colorless in transmitted light

Hardness: 2½ - 3

Name: Named after Louis Jacques Thénard (1777-1857), Professor of Chemistry, University of Paris (France). Originally named thenardite; renamed thénardite in 2014 (IMA 14-A).



Thénardite : Na₂SO₄,
Mirabilite
Na₂SO₄·10H₂O
Locality: Boron,
Kramer District, Kern
Co., California, USA
Dimensions: 3.8 x 3.8 x
q.0 cm.
tan Thénardite
pseudomorphing
mirabilite crystals



Thénardite :
Na₂SO₄
[Soda Lake, Carrizo](#)
[Plain, San Luis](#)
[Obispo Co.,](#)
[California, USA](#)
Dimensions: 4.5 cm
x 3.9 cm x 3.3 cm

2022 MSSC Officers:

OFFICERS		
President	George Rossman	president@mineralsocal.org
Vice President	Cheryl Lopez	vicepresident@mineralsocal.org
Secretary	Angie Guzman	secretary@mineralsocal.org
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2021--2022	Rudy Lopez	
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Field Trip	Marek Chorazewicz	
Historian	Ann Meister	
Hospitality	Laura Davis	
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Micro Mount Conf. Chairman	Al Wilkins	
Program and Education	Rudy Lopez	programs@mineralsocal.org
Webmaster	Leslie Ogg	webmaster@mineralsocal.org

About the Mineralogical Society of Southern California

Organized in 1931, the Mineralogical Society of Southern California, Inc. is the oldest mineralogical society in the western United States. The MSSC is a member of the California Federation of Mineralogical Societies, and is dedicated to the dissemination of general knowledge of the mineralogical and related earth sciences through the study of mineral specimens. We are a scientific non-profit organization that actively supports those endeavors through public outreach, field study and related programs. The Bulletin of the Mineralogical Society of Southern California is the official publication of the Mineralogical Society of Southern California, Inc.

The MSSC meetings are usually held the second Friday of each month, January, February and August excepted, at 7:30 p.m. in Building E, Room 220, Pasadena City College, 1570 E Colorado Boulevard, Pasadena, California. However, due to current health considerations, MSSC meetings are held via ZOOM conferencing until further notice. The annual Installation Banquet is held in January, and the annual Picnic and Swap Meeting is held in August. Due to PCC holidays, meetings may vary. Check the Society website for details.

The Society also sponsors the annual Pacific Micro mount Symposium held at the Fallbrook Mineral Museum during the last weekend of January.

Annual Membership dues for the MSSC are \$30.00 for an individual membership, \$40.00 for a family membership. Bulletins are delivered by email, there is an additional annual fee if you prefer paper bulletins mailed to your address. The Society's contact information:

Mineralogical Society of Southern California

13781 Alderwood Lane, #22-J, Seal Beach, CA 90740

E-mail: treasurer@mineralsocal.org

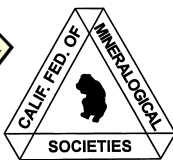
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To:



**With Knowledge Comes
Appreciation**

***Your MSSC
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Here!***

