Bulletin of the Mineralogical Society of Southern California

Volume 94 Number 9 - September, 2021

The 993rd meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

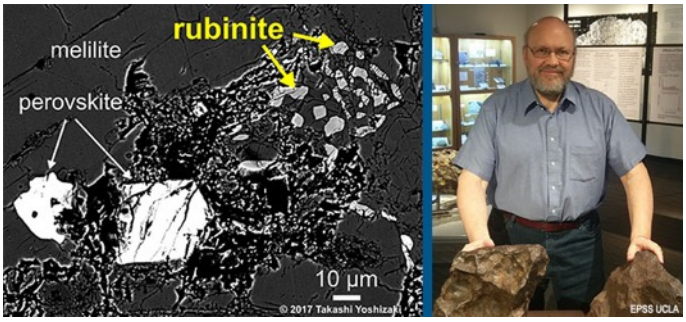
September 10th, 2021 at 7:30 P.M.

Program : **Origin of Chondrules** Presented by Dr. Alan E. Rubin,

In this Issue:

Remember: If you change your email or street address, you must let the MSSC Editor and Membership Chair know or we cannot guarantee receipt of future Bulletins

About the Program: **Origin of Chondrules** Presented by Dr. Alan E. Rubin,
Chondrules are the most abundant components of chondritic meteorites, constituting up to 75% of ordinary chondrites (the most meteorites observed to fall). They come in a variety of textures – from radiating pyroxene pinwheels to porphyritic bodies rich in olivine. Some chondrules are under a micrometer in size; the largest are the size of a golf ball. They are among the oldest objects formed in the Solar System, forged in an epoch before our planet was born. For more than 200 years, scientists have been debating the origin of these ubiquitous igneous spherules. Recent work detailing the petrologic and isotopic characteristics of chondrules, along with laboratory experiments reproducing chondrule textures, have allowed important constraints to be placed on the formation of these objects. Many chondrules preserve evidence indicating they were melted more than once; some may have been melted many times. Chondrules in some chondrite groups hail from dusty regions of the solar nebula; others come from regions with little ambient dust. In contrast, chondrule-like objects in lunar rocks formed by impact melting by micrometeorite impacts into the lunar regolith.



Alan Rubin has a B.S. in Astronomy (University of Illinois, 1974), an M.S. in Geological Sciences (University of Illinois at Chicago, 1979) and a Ph.D. in Geology (University of New Mexico, 1982). He was a post-doc at the Smithsonian for a year (1982-1983) and has been at UCLA since 1983. He is currently a Research Geochemist and an Adjunct Professor in the Department of Earth, Planetary and Space Sciences. He has published about 190 research papers on meteorites in peer-reviewed journals and about 50 popular articles on meteorites, asteroids, astronomy and space science; seven of these won awards for popular science writing. His popular science book "Disturbing the Solar System" was published by Princeton University Press in 2004. In honor of his research contributions, asteroid 6227 was named Alan Rubin in 2002.

How to Join our ZOOM Meetings by Rudy Lopez

MSSC paid members will automatically be added to the invite list each month.

Non-Members must request to attend MSSC zoom meeting each month.
Please go to the MSSC website, http://www.mineralsocal.org to read our Bulletin for upcoming programs, then send Rudy Lopez an email, no later than the Tuesday before the meeting, to programs@mineralsocal.org and he will make sure your contacted.

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From the Editor: Linda Elssnau
This time last year I was telling everyone to stay safe careful & healthy—looks like that request continues for the forseeable future and for the same reason! Looks like a good program this time, try not to miss it.

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FROM THE PRESIDENT: Interesting Minerals, A to Z. Round 2, installment 18, the letter "R": by George Rossman

Rutile **TiO_2**

Rutile is one of five polymorphs of titanium dioxide. Titanium, incidentally, is the 9th most abundant element in the crust of the earth. Rutile was known since ancient times, but was formally named 'rutile' in 1800 by the Abraham Werner, a German geologist, as reported in Lampadius (1800). The name comes from the Latin word, *rutilus*, which means reddish.

Lampadius W A (1800) Noch ein Paar Bemertungen über den Uran- und Titangehalt einiger Fossilien. Der rothe schörl (Rutil, nach herrn Bergrath Werner), in Sammlung practisch-chemischer Abhandlungen und vermischter Bemerkungen, Volume 3, Walther (Dresden)

Mindat.org gives a nice review of the history of the different names rutile was called prior to 1800. Names such as ‘basaltes crystallisatus ruber’ (red crystalline schorl) appeared in the 1772 catalog of von Born. In 1783, Romé de Lisle called the phase ‘schorl rouge ou purpre’ (red or purple schorl). In 1796 De Saussure used the term ‘sagenite’ to describe rutile from Switzerland. In 1795 Klaporth reported on the new element, titanium, obtained from a specimen he called ‘hungarischen rother schörl ‘(Hungarian red schorl). And more names were used: ‘titanite’ in 1796 by R Kirwan, and ‘titane oxydé’ in 1801 by Haüy. With all this confusion, you can see why the International Mineralogical Association formed a committee to formalize mineral names.

If you want more confusion, we can discuss the type locality for rutile. Werner original name was after a sample from Horcajuelo de la Sierra in the province of Burgos in Spain. That is commonly stated as the type locality. But it was originally reported in error as Cajuelo, not Horcajuelo. For more confusion, we go the work of Papp in 2004 who argues that the type locality should be Revúca, Slovakia, based on Klaporth’s description of ‘Hungarian red schorl’ in 1795. But the first detailed description of rutile was by De Saussure in 1776 who described a sample from St. Gothard, Switzerland. However, he used the name ‘sagenite’, not rutile. But because this is the first published, detailed and accurate description of the phase we now know as rutile, many feel that St Gothard should be the type locality.

Papp, G., (2007) On the type locality of rutile (review of contemporary data about the occurrence of the “Hungarian red schorl”). In: Jancsy, P. (Ed.), Prvenstvá nerastnej ríše Slovenska — The unique minerals of Slovakia. Slovenské banské múzeum, Banská Štiavnica, pp. 51–55.

Saussure, Horace Bénédict de (1796) Voyages dans les Alpes, précédés d'un essai sur l'histoire naturelle des environs le Genève.

Because titanium is a common element, rutile is found in many localities, world-wide. Crystals are commonly prismatic and in shades of red to brown **(Figures 1,2).** It can often be elongated along the c-axis [001] **(Figures 3,4)**

Figure 1. Rutile from the White Mountains, Mono County, California. Photo credit: Mark Garcia

Figure 2. Rutile from Magnet Cove, Arkansas.
Photo credit: Mark Garcia

Figure 3. Rutile from Hiddenite, North Carolina.
Photo credit: Mark Garcia

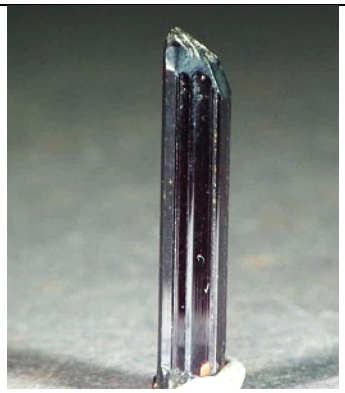

Figure 4. Rutile from near Diamantina, Minas Gerais, Brazil.
Photo credit: Mark Garcia

Rutile often forms twins on {011}. The old term 'sagenite' used by Saussure in 1796 comes from the Latin word '*sagena*' that means 'net', referring to the net-like appearance of rutile with multiple crystals in the twinned orientation **(Figures 5,6).**

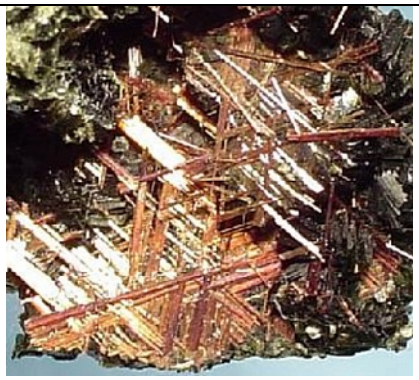

Figure 5. Rutile, variety sagenite, from Rauris, Salzburg, Austria. Photo Credit: Rob Lavinsky & irocks.com

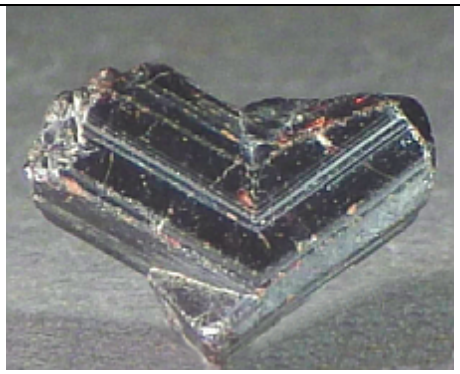

Figure 6. Twinned rutile from Blumberg, Adelaide, South Australia. Photo Credit: Mark Garcia

Rutile is also found in rutilated quartz, a variety of quartz that contains many fine rutile crystals as inclusions. It is found in many localities around the world, but is particularly known for its occurrence in Bahia, Brazil, which has particularly attractive golden needles of rutile **(Figures 7,8).** If you want to see a particularly spectacular example of rutilated quartz, make arrangements to go to Carlsbad, CA, where a beautiful, large, polished sculpture of rutilated quartz weighing over 425 pounds is on display in the lobby of the Gemological Institute of America's museum in their main building.

Figure 7, Rutilated quartz crystal from Ibitiara, Bahia, Brazil Photo Credit: Rob Lavinsky & irocks.com

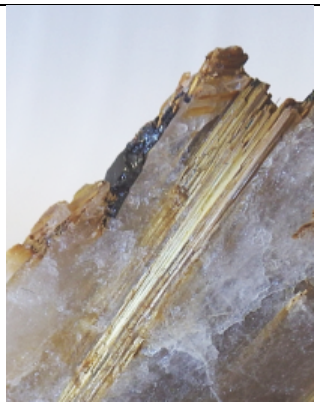

Figure 8. Rutile needles in quartz from the Pyramid mine in Bahia. Photo Credit: GRR

Rutile's name came about because rutile often has a deep red color. Rutile usually contains a significant amount of other chemical elements, some of which are responsible for its color. We will look at that later. But first, we need to ask 'what color would rutile be if it were purely titanium oxide with no other minor components?'

We get a hint from some natural rutiles that are close to colorless **(Figure 9).** But for the best comparison, we need to look at a crystal of high-purity synthetic rutile. That is easy to do because rutile has been grown synthetically into boules multiple centimeters in size for laboratory studies. **Figures 10 and 11** show what high-quality synthetic rutile looks like. It former times it was used as a synthetic gem because of its high refractive index and high dispersion that gives rutile gems a flash of color like a diamond.

Figure 9. Rutile from Tingha, New South Wales, Australia. Photo Credit: Mark Garcia

Figure 10. A boule of synthetic rutile. Photo Credit: GRR

Figure 11. A slab of high-purity synthetic rutile. Photo Credit: GRR

If pure, synthetic rutile is colorless, why are most crystals red to black? To determine that, we conduct a type of analysis known as X-Ray Fluorescence (XRF) analysis. We shoot high energy X-rays at the crystal and measure the wavelength of lower -energy X-rays that are given off. Each chemical element has its own characteristic wavelengths of X-rays that come out. Let's start with the golden rutile from the Pyramid Mine in Figure 9. It has a percent iron in it plus nearly a percent of niobium, a quarter percent of vanadium, and lesser amounts of tungsten, tin and tantalum. The deep red rutile from North Carolina has a couple tenths of a percent of iron, but also nearly 4 tenths of a percent of vanadium and one tenth a percent of chromium. The black rutile from Magnet Cove contains over 2.5% iron, and a half-percent vanadium plus a significant amount of niobium and traces of tungsten, manganese, zinc, and zirconium. It is the iron, the vanadium and the chromium that give the color to many rutiles.

White Pigment Technology

The high index of refraction of rutile and is colorless nature when pure and in small particles, coupled with the great abundance of titanium in the crust of our planet gives rise to the most important white pigment now in use, namely TiO_2. Both synthetic rutile and anatase have found application as a white pigment in paint, although rutile pigment has a better hiding power than anatase. Rutile pigment found in most paints has the ability to absorb nearly all of the UV light that strikes it, thus protecting the underlying organic resins in the process. Ultrafine TiO_2 is used as a major component of sunscreens to protect the skin from damaging ultraviolet light. Titanium for pigment use is obtained most commonly from ilmenite, but also from rutile and anatase sands, often from beach sand concentrates of these dense minerals. These minerals are treated commonly with a chlorine process or process involving sulphate. Generally, rutile is the product that is formed, but the sulphate process can be modified to produce anatase which is often used as a pigment in fibers and in paper due to its lower hardness.

What is the ideal particle size of rutile for use in paint? You should make it around 0.2 micrometers in size to obtain the best ability to reflect visible light. However, someone beat you to this. Now, more than 4 million tons of TiO_2 is produced for pigments worldwide, each year.

Other Polymorphs of TiO_2

Anatase and brookite are two common, naturally occurring polymorphs that have been known for about two centuries. Anatase **(Figure 12),** a tetragonal polymorph, was named from a Greek word meaning 'extension' which refers to the fact the pyramidal faces of anatase are comparatively longer than those of many other tetragonal minerals. Brookite **(Figure 13),** an orthorhombic polymorph, was named after an amateur English mineralogist who discovered 12 new minerals.

Haüy R J (1801) Anatase, Traité de Minéralogie 3, 129-136
Levy M (1825) An account of a new mineral, The Annals of Philosophy 9, 140-142

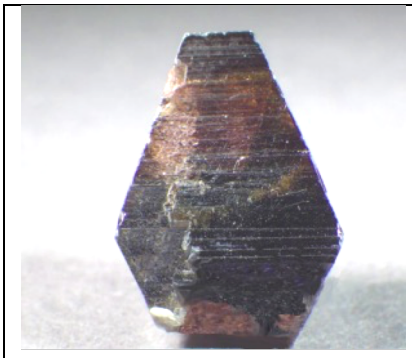

Figure 12. Anatase from Baluchistan Province, Pakistan showing the elongated prismatic faces.
Photo Credit: Mark Garcia

Figure 13. Brookite from Magnet Cove, Arkansas.
Photo Credit: Mark Garcia

In addition to rutile, anatase and brookite, there are 2 other fully-described polymorphs of TiO_2. Two of them were formed as microscopic grains when a 1.5-kilometer diameter meteorite impacted the Earth to form the Ries Crater in southern Germany about 15 million years ago. The shock wave compressed and heated the local rocks causing akaogiite and riesite to form. Akaogiite, first published in 2007 has a density of 4.72 g/cm^3. Riesite, first published in 2020, has a density of 4.37 g/cm^3.

El Goresy A, Dubrovinsky L, Gillet P, Graup G, Chen M (2010) Akaogiite: An ultra-dense polymorph of TiO_2 with the baddeleyite-type structure, in shocked garnet gneiss from the Ries Crater, Germany, American Mineralogist 95, 892-895.

Tschauner O, Ma C, Lanzirotti A, Newville M G (2020) Riesite, a new high-pressure polymorph of TiO_2 from the Ries impact structure. Minerals 10, 78.

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MINUTES of the August 13, 2021 ZOOM Meeting

At 7:30 p.m., the **992nd Membership Meeting** of the Mineralogical Society of Southern California (MSSC) was called to order by President Dr. Rossman, Ph.D. It was MSSC's 15th ZOOM conference meeting.

Message from the Chair (Dr. Rossman):

Dr. Rossman welcomed everyone. He reports that the International Mineralogical Association's (IMA) has approved 5,744 species of minerals. In related news, the IMA voted to use "symbols" for their approved minerals. As an example, kampfite is *Kpf* (named for Dr. Tony Kampf), rossmanite is *Rsm* (named for Dr. George Rossman) and housleylite is *Hou* (named for Dr. Bob Housley). All three distinguished scientists, Kampf, Rossman and Housley, are MSSC members. Tony Kampf, US delegate to the Commission on New Minerals, Nomenclature and Classification of the IMA, commented that he voted against the symbols because some people won't know what they mean, and the minerals will still be defined in paper submissions. He was out voted.

Regular Business (Dr. Rossman)

Minutes: Dr. Rossman called for approval of the July 9, 2021 Membership Meeting Minutes as published in the August 2021 Bulletin. Dr. George asked if there were any corrections or additions and hearing none, called for approval of the minutes. Seeing no objections, Dr. Rossman declared the July 9, 2021 Minutes approved.

Other Business (Angie Guzman)

Approval of Bylaws and Operating Rules and Regulations, revised as of August 13, 2021:

Angie Guzman thanked all who contributed to the revision. These documents were e-mailed for review to the membership with the August 2021 Bulletin. For those with no e-mail, the hard copy documents were sent with the August 2021Bulletin via USPS. Angie gave a brief description of the changes. She then opened the floor for general questions. There was a question about when the dues rate change was to take effect. The answer is, beginning the 2022 membership term.

Regarding the Bylaws, the floor was opened for questions and discussion: **a motion was called to approve the *Bylaws*, revised August 13, 2021, as published in the August 2021 Bulletin.** The motion was made by Tony Kampf and seconded by Marek Chorazewicz. Vote: *unanimous to approve. Motion passed.*

Regarding the Operating Rules and Regulations, the floor was opened for questions and discussion: **a motion was called to approve the *Operating Rules and Regulations*, revised August 13, 2021, as published in the August 2021 Bulletin.** The motion was made by Laura Davis and seconded by Marek Chorazewicz. Vote: *unanimous to approve. Motion passed.*

Angie thanked the MSSC membership for their cooperation on this undertaking.

Dr. Rossman explained that mailing expenses are going up, the operating expenses for the society are going up and the Federation expense is, as well. Angie added that USPS postage rate will increase $0.03 to $0.58 for the first ounce as of August 28, 2021.

Announcements and Reports

1. Program/Education Chair Rudy Lopez announced that the Orange County Park annual event will take place October 9, 2021. We need help; volunteers are welcome! MSSC has participated at this event for 5 years. The children who attend look forward to expanding their little collections and they visit our exhibit/booth for their next free specimen. At the OC Park event, MSSC has handed out hundreds of specimens, answered countless questions and reached out to fellow exhibitors; we've even recruited some of them to speak at our meetings. Your help at this event would be appreciated. Contact Rudy at programs@mineralsocal.org to help or for more information.

2. Rudy reports that a donation of five 20-gallon barrels was retrieved just yesterday. Once sorted, members will be notified to take a look see.

3. Rudy reports on MSSC's donation to Caltech of agate and dendrites.

4. Marek Chorazewicz announces the field trip over Labor Day is set for Topaz Mountain in Utah. There will be 2 days of collecting. Camp out and some hiking to get into the collecting area. Check the website to updated information.

Program

Dr. Rossman turned the meeting over to Programs Chair, Rudy Lopez. Rudy introduced the night's speaker, Dr. Krista Sawchuk, Ph.D. Krista is a recent graduate of UCLA with her Ph.D. in geochemistry. Her dissertation research focused on high-pressure behavior and chemical reactions of volatile-bearing minerals in the Earth's mantle. Currently, Krista is doing postdoctoral research at Los Alamos National Lab in New Mexico, continuing her high-pressure work. She enjoys mineral collecting and curates her personal mineral collection. Krista also has an eye for detecting meteorites.

Dr. Sawchuk takes us on a journey to the interior of our planet, the deep Earth. To get to the center of the Earth, you'd have to travel in 3,959 miles. Thus far, we have a good understanding of only the top 35km (21¾ miles) of Earth's surface, the continental crust 1% of the Earth. The deep Earth consists of the mantle and the core. The mantle (upper and lower) is 2,885 km (1,792.7 miles) thick. The core (outer and inner) is 3,486 km (2,166 miles) thick. Together, the mantle and the core make up the remaining 99% of Earth.

But why would we want to study it if we can't get there? The deepest humans have drilled is only 7.5 miles – only 0.02% of the way to the center of Earth. Rocks are dense, pressures are extreme and temperatures are high, high, high. It is rare to find pristine rocks from the deep Earth that have been brought to the surface.

Scientists study the deep Earth using earthquakes, inclusions trapped in minerals (i.e. diamond inclusions) carried from deep Earth, meteorites (fragments hurled to Earth) contain minerals from deep Earth conditions that we wouldn't otherwise be able to find.

Mineral physics experiments are conducted in the lab by simulating deep Earth conditions: (a) pressure can reach over 500 Gpa, by comparison, the center of the Earth is only 363 Gpa and (b) use of laser temperatures of 10,000K, by comparison, the center of Earth is only 7,000K. *[Secy note: Gpa stands for gigapascal. 1Gpa is equal to 10,000 atmospheres of pressure. K stands for Kelvin, a thermodynamic temperature measurement of change. As an example, pure water freezes at 273.15K.]*

What we know. Earth formation began as dust particles colliding and sticking to form clumps, clumps continue colliding forming planetesimals. Planetesimals become large enough to gravitationally attract other planetesimals to them then they form protoplanets. Protoplanets keep attracting planetesimals. The heat of collisions causes them to melt. According to hypothesis (Chamberlin and Moulton), the belief is this is how planetesimals formed in our solar system 4.6 billion years ago. Krista's graphics at this juncture are good, visual displays of how this process progressed.

Why does the Earth have layers? This is an interesting question. The **crust** is 4-15 miles, has 0.0001-0.5Gpa with temperature of 50-900°F (280-750K) and is composed mostly of oxygen and silicon with small amounts of aluminum, iron, calcium, sodium and potassium. Common minerals are feldspars and quartz. **The Upper Mantle** is 25-410 miles, 900-3000°F (750-1900K) with 0.5-13 Gpa. Different phases due to pressure distortion of crystals and minerals are olivine, wadsleyite to ringwoodite. **The Lower Mantle** is 410-1,800 miles, 3,000-5,000°F (1,900-3,000K) with minerals bridgemanite and magnesiowustite. **The Outer Core** is 1,800-3,150 miles, 5,000-8,500°F (3,000-5,000K) with 136-321 Gpa. Here, minerals are molten iron with trace amounts of nickel. **The Inner Core** is solid iron with trace nickel, silicon, oxygen and sulfur. It is 8,500-12,000°F, has 321-363 Gpa and is 3,150-3,950 miles

The deep Earth interacts with the surface and it is the largest reservoir of carbon on Earth. Carbon enters through subduction then is released through volcanic activity. The carbon entering deep Earth exceeds the amount released! So, where is the "excess" carbon stored in deep Earth? The excess is stored in carbides, carbonates, graphite (under high pressure converts to diamond), diamond, cohenite (iron meteorites) and rhodochrosite (manganese carbonate).

How does carbon react with other metals at mantle conditions? Dr. Sawchuk, as part of her dissertation, performed several experiments in the lab to find out the answer. She shares the experiments with us now. Krista did mineral physics experiments, experiments using synchrotron, a cyclic particle accelerator (located in Chicago) and X-Ray diffraction using Braggs Law (reflections of waves from crystal lattice planes). She tested manganese and carbon dioxide at different Gpa and K temperatures to simulate both upper and lower mantle conditions. In several instances, the result reaction was rhodochrosite, a manganese carbonate. It showed these levels of the carbonate phase were stable. When she used iron with carbon dioxide at higher Gpa and K levels, the resulting reaction was siderite, an iron carbonate. She then experimented with nickel and carbon dioxide at 40 Gpa and 2,500K. She could not be sure the result was gaspeite, a rare nickel carbonate. Three more experiments were performed on the nickel and carbon dioxide using neon gas. The results showed no structural changes (stable), no new peaks on the graphs and no delay on decompression.

What does it all mean? The implications are: (a) metals prefer to form carbonates over oxides at high pressures, (b) carbonates are likely to be present in the mantle (i.e., diamond) and (c) recent observations confirm this, there is direct evidence of carbon in the deep Earth.

Krista was kind enough to take questions which included: Does carbonate in the ocean contribute to (deep) Earth carbon via subduction zones? What about isotopes in boron, blue diamond? There are over 5,700 minerals on the surface of the planet; do we have any real idea of the number of minerals in deep Earth? What of the velocity zones in the mantle (chemistry and pressure are different)? Comments: Complex phase diagram for CO_2 and bridgemanite (believed to be most abundant mineral on Earth) comes up slowly temperature hot, pressure decrease over millions of years.

Dr. Sawchuk's presentation has a high WOW factor, lots of material, well presented. Her research of the deep Earth and the carbon cycle within it are interesting and fascinating. Justice could not be done of Krista's dissertation in this written report, but be assured, the substance was compelling. Thank you, Krista!

Please join us at the next ZOOM meeting, September 10, 2021. The scheduled presenter is meteorite expert, UCLA's Dr. Alan Rubin, "The Origin of Chondrules".

There was no other society business and the meeting was adjourned by Dr. Rossman at 8:39 p.m. Dr. Krista Sawchuk took a few more questions after adjournment.

Respectfully submitted, Angie Guzman, MSSC Secretary

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List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	**ZOOM** October 8, 2021	Dr. Sarah Milkovich - MARS
	ZOOM November 12, 2021	Paolo Sanchez, UC Berkeley, Geology & Geophysics ' 22 -Important Minerals You Probably Never Heard Of
	ZOOM December 10, 2021	Dr. George Rossman TBA
	ZOOM January 14. 2022	Denise Nelson: TBA
Board Meeting	**ZOOM** October 24, 2021	ZOOM
Field Trip	September 4-6, 2021	Topaz Mountain, Thomas Range, Utah
	October 16 & 17, 2021	Cady Mountains

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

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Minutes of the MSSC Board Meeting July 11, 2021 via ZOOM

Call to Order and Roll Call

The MSSC Board meeting was called to order at 1:00 p.m. by President Dr. George Rossman. The following Officers, Directors and Committee Chairs were present: George Rossman, Ahni Dodge, Carolyn Seitz, Angela Guzman, Ann Meister, Pat Caplette, Leslie Ogg, Rudy Lopez, Cheryl Lopez, Patrick Stevens, Bob Housley and Marek Chorazewicz. Excused were Al Wilkins, Linda Elsnau and Laura Davis.

Action Item (s)

Approval of the April 2021 MSSC Board Meeting Minutes as posted in the May 2021 Bulletin: Dr. Rossman asked for any corrections or additions and seeing none, asked for a motion to approve the minutes as published. **MOTION to approve** the Board Minutes as written and published was made and seconded. Dr Rossman called for a voice vote to approve the motion. The vote was unanimous to approve, **the motion passed**.

Reports, Items and Discussions

1) Comments and questions from the President (Dr. Rossman)

The Bulletin and website still do not agree on committee members: Historian and Field Trips are missing from the Bulletin but are on the website.

Board discussion result: Carolyn Seitz said she will notify Bulletin Editor Linda Elsnau and ask her to make changes.

2) Treasurer's Report (Carolyn Seitz)

a) *Status of MSSC banking accounts*: Treasurer reported on the financial status of the society.

b) *Status on using PayPal for membership renewal* – Carolyn reports that PayPal verified our status as non-profit; Leslie Ogg (Webmaster) is working on building link for website but is running into problems with the set up; Cheryl Lopez (Membership Chair) wanted to know when set up is completed so she can submit a modified Membership Application Form for posting on the webpage.

3) Membership Chair Report (Cheryl Lopez)

a) *Report on current membership numbers*: Cheryl reports the following data: 103 total members includes: 7 Life, 4 Honorary, 50 Individual and 42 Family. What are ages of our young members? Our current Membership Application does not ask for ages of youngsters, although approximately 5-7 of them are children.

b) *Report on effectiveness of the change in membership form about to whom to send checks*. Form changes have been made (see 2. b) above).

4) ZOOM Meeting considerations:

a) *If we go back to PCC for meetings, can they be Zoomed?* Vice President Ahni Dodge reports the "I.T. Help" currently closes at 8pm. Computers are available but we could connect our own computer/laptop; not sure when the wi-fi goes down or if it does. Discussion followed. **ACTION**: Ahni will set up meet at PCC with Rudy to see if this issue can be resolved and will report at next meeting. Also, an informal poll taken to show how many would drive to PCC for meetings, about 50/50;

b) *Should we just continue with ZOOM? How? Where?* Board discussion included how ZOOM meetings have helped to increase MSSC membership; our experts are Dr. George and Cheryl; we are still using CalTech license (thank you, CalTech!); should we purchase a license under MSSC (a $200/yr back-up plan)?; COVID-19 impact; outreach is wider using ZOOM format; check to see if CFMS can announce MSSC's meetings, field trips, etc. (Angie-follow-up) and we announce and promote MSSC membership at our meetings. Discussion to be considered and continued at a later Board meeting.

5) Question about the Publicity Committee's job:

a) *Under our Bylaws, the Publicity Chair is for any mineral show the society might have: We need to correct the Bulletin.* Ann Meister states this chair is for the society's mineral show, which we haven't had for many years, and not for society publicity. She also stated that there should be a committee listed for Pacific Micromineral Conference (PMC). Secretary Angie Guzman comments Publicity Chair under SHOW in the Operating Rules and Regulations (ORR) is specific to a mineral show MSSC may have. The marketing of MSSC is not a committee that is included as a "typical committee", as listed in the ORR. PMC is listed in ORR as a committee and states chair(s) may appoint sub-committees. Currently, Bob Housley, one of the chairs and he does marketing for the conference.

b) *The current "Publicity" chair* (as listed in the Bulletin, Linda Elsnau) *requests to resign that designation*. Board discussion resulted in Angie Guzman making a **MOTION to accept resignation request for designation of Publicity Chair made by Linda Elsnau.** Motion was seconded by Pat Stevens. Dr. Rossman asked if there was further discussion or comments, hearing none, called for the vote. **Motion to accept Linda's resignation request passed unanimously**.

Discussion regarding the need for a Marketing Committee and how and where the public gets information about our society. Methods mentioned included Face- Book", Tok-tok, Young Mineral Collectors (YMC) and Instagram. **ACTION:** Leslie set up MSSC Instagram account (see Item 15 below)

6) Secretary Remarks (Angie Guzman, Cheryl, Pat S)

a) *Review of Bylaws and Operating Rules as distributed first week of July*: Where can the Board get an updated master? Angie will send to George to forward to Board. Why did we undertake this exercise? To bring our Bylaws and Operating Rules up-to-date and current with Board approved rules, to correct grammatical and punctuation errors and to include suggested changes.

b) *Discuss the Pro-Rated Dues in the Operating Rules and Regulations. We touched it at the last Board meeting but did not come to a resolution.* Cheryl read the existing Article II, Section 2, "Pro-Rated Dues: New members shall pay dues upon acceptance of membership. The dues shall be prorated to one-half if membership is effective after the month of June". Cheryl offered why this no longer works, given that current MSSC dues would not cover CFMS dues and place MSSC in a net zero or negative position. [Note: CFMS collects dues based on membership as of the end of the year, regardless as to when anyone joined MSSC.]

Discussion followed including showing the Federation dues amounts; a couple of members are willing to take loss on the trivial amount of dues we pay; MSSC dues have not been increased in 20 years and, MSSC dues are low compared with other societies, even though we have a lot to offer including high level expertise by some members (professors, long-time mineral collectors and other experts).

ACTION: Cheryl will work with Carolyn and Angie to clarify the numbers.

7) Time to think about a slate of officers for next year (should be done by the end of September, President thinks the end of a 4-year term night be the time for rotation.):

Dr. Rossman did not state if he will run, Ahni Dodge stated she intends to step down, Carolyn Seitz will continue(*) as Treasurer, Angie Guzman will continue (*) as Secretary and California Federation Director and Ann Meister will continue as Past President providing Dr. Rossman remains President. President and Vice President are open.

Ahni asked about the need for a Vice President: The state does not require a vice president, but MSSC does have that position.

Comment: Dr. Rossman stated he would like to see younger members participate in the society's governance. He stated that collecting is becoming more difficult because of restrictions and while young people are interested in minerals they are not coming into these types of "social" environments when their options include Tok-tok, Face Book, YMC and other global media venues.

8) Is it time to think about 2 board members for election for 2022-2023? *Yes.*

Currently up for re-election are Pat Caplette and Cheryl Lopez. Both women agreed to continue in their director positions when nominated.

9) Review of MSSC support programs (refer to Bulletin for goal description):

a) *Is the $500 donation to PCC being used for what we intend?* No. Ahni Dodge reported that MSSC's donations are now co-mingled with others and are allocated to various departments and purposes within the college. MSSC does not have control as to where or how our donation is distributed. Originally, our donations were intended as Van Amringe Scholarships awarded to students who were interested in minerals and mineral collecting. Later when Dr. Carter set his up, the focus was changed. Now, as Ahni stated, MSSC's donation is pooled with Foundation funds with no control afforded us. Discussion also included PCC's Dana Club: members used to receive extra credit to attend MSSC meetings but their participation in the past 10 years is practically nil, but not for lack of outreach. They're not interested in spending Friday evening with a bunch of older mineral collectors (OMC).

b) *Do we actually support L A County museum?* No, not monetarily. Board discussion included donations had been contingent upon net proceeds received from mineral shows. However, our current financial situation (plus no shows for some years) does not allow for high or many donations, to like-minded entities.

c) *Do we really now support SB County museum?* No, not for some years now.

d) *Discussion: How is MSSC actually disseminating knowledge through the study of mineral specimens?* Dr Rossman suggested we think about these for the next meeting:

i) What the society should be doing to meet the stated objectives of the society;

ii) How we pay homage to the historical significance of PCC re: MSSC;

iii) How we worry about using PCC as a meeting place (sans or with ZOOM);

iv) How we contribute to the support of mineral specimens as stated in our goals statement.

Question/Comment by Bob Housley mentioned the SB County museum's mineral collection and what may have become of it since Bob Reynolds was in charge. Bob will check with the museum as to its status.

10) Planning for the 1,000th meeting of MSSC – History of MSSC (Rudy Lopez)

Rudy says MSSC will do a PowerPoint presentation commemorating the 1,000th meeting. He wants members to contribute photos, stories, and any historical information about the society. The April 8, 2022 meeting will be the date. Contact Rudy for help or to submit your presentation, story or a photo gallery. Suggestion was made to put a notice in the Bulletin announcing the upcoming historic 1,000th meeting. Rudy will put the notice together and submit to Linda for publication in the Bulletin.

11) Status of Field Trip Planning (Marek Chorazewicz):

The next field trip will be to Topaz Mountain (Utah) over Labor Day weekend, unless the weather is too hot. And, just in, there could be another field trip, near Lone Pine (Inyo Mountains) for amazonite and other goodies, in October. Both will have a lot of mineral collecting. Check the website for information or changes.

12) Federation Director's report (Angie Guzman):

The latest Federation Director's Meeting was held June 2021 via ZOOM. Regular business included committee reports and positions are opening as some members are leaving CFMS (aging, resigning, moving, etc.). The next meeting will be in Visalia in November. Comment: We need to take aging of our society, a global problem we are experiencing, into consideration for our plans to expand with a younger membership.

13) Program Chair's report (Rudy Lopez):

Rudy reports that speakers are booked through April 2022, May is open, June is good, July is open, August booked. September through end of 2022 is open but there are people interested and in the wings. Rudy reminds us that MSSC is looking for member involvement, so contact Rudy to book your presentation! Discussion mentioned Bill Larson, Blue Cap's Bryan Swoboda (Mineral Talks Live), GIA and others.

14) Bulletin Editor's report (comments from Linda Elsnau):

Linda conveyed cost of mailing will increase (USPS postage is going up in August 2021)

There are 6 people who get hard copies mailed each month and the current average annual cost is $28.15 per member. So, hard copies mailed out to members - taking toner, paper and postage into consideration - will increase to $35/year/member effective immediately. **ACTION:** Cheryl will update the Member Application to reflect the change and Leslie will add the change to the website.

Linda has unreimbursed expenses totaling $135. A **MOTION** was made by Angie and seconded by George **to approve $135 as payment of her expenses**. The vote was called and the **motion to approve payment passed unanimously.** (Receipts to Treasurer.)

15) Webmaster report (Leslie Ogg):

If mistakes are found in the on-line Bulletin, can they be corrected or does the webmaster have a PDF document? Yes, they can and have been corrected;

a) Leslie reports the Instagram account she just created is: MSSC1931. The profile will be enhanced; b) Also, our website was entered to the CFMS contest and we received Honorable Mention even with suggested changes by CFMS. They will send a little certificate. Angie said it was not even mentioned at the June CFMS meeting!; c) As for statistics, most of the accessing over the past 3 months has been by phone. [NOTE: Secretary's wi-fi went down and the rest of Leslie's report could not be recorded – apologies to all, especially Leslie.]

16) From Al Wilkins: The re-scheduling of the NCMA annual MM conference for September 24-26, 2021 in El Dorado, CA (near Placerville), with a field trip to follow. So far, there are 40 prospective attendees registered.

17) Next Meeting Date? October 24, 2021, Sunday at 1:00 p.m.

Adjournment: The Board meeting was adjourned at 3:11 p.m.

Respectfully submitted Angie Guzman, MSSC Secretary

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September 2021 Fieldtrip Update 8/28

Hi, everybody! Ready to have some fun after a long hot summer? The fieldtrip is happening the next weekend as planned. The forecast shows a cooling trend to around 85F next weekend, below the yearly average, so we should have good collecting weather. There will be some dry wind, which is normal for The Cove. Bring more drinking water to avoid dehydration and don't forget your sunscreen.

There was a big storm over the area 2 weeks ago but the main roads should still be in good condition. I'll be arriving at The Cove on Friday hopefully before sunset. Look for a desert tan Jeep Rubicon on Saturday morning with the MSSC logo displayed under the windshield. Marek C

Hi, fieldtrip friends!

The first fieldtrip of the fall season will continue the old MSSC tradition to visit the Topaz Mountain area in Thomas Range, Utah on this year's Labor Day weekend. If anybody hasn't heard about it yet for some unimaginable reason here is the Mindat link: https://www.mindat.org/loc-14942.html

The bad-weather fallback date would be the weekend after. The average temp for that time of the year is 87 deg in Delta, so watching for fluids and overheat is essential.

The area is 600+ miles and one time zone away from Pasadena, so I suggest leaving early on Fri and get there before sunset to set up camp. The RVs and sedans will make it quite close to the entrance of The Cove, but to drive in a high clearance and 4WD is required.

We will camp out in The Cove and on Saturday walk up to the topaz areas on the western ride, some of the higher areas yield small red beryl too. The dumps on that side are picked over and a lot of topaz is sun-bleached, breaking up a lot of rhyolite is needed. There is a pseudobrookite area nearby too. We will do flashlight mineral collecting after dark, so bring your lights and enjoy the sparkle.

On Sunday we will go to an area on the way to the eastern ridge which gave up some fresher material when I scouted. Also if the heat allows a longer walk to the eastern ridge is an option too. On Monday morning we will drive out of the cove and visit some fluorite localities on Spor Mountain to the East. The mines there have small greenish, lavender, and purple crystals in vugs, some associated with cream-colored dolomite crystals.

There are some other well-known areas outside The Cove e.g. holfertite pit, bixbyite pit, durangite prospect, and Solar Wind claim. They are claimed presently and offered as fee locations -- $40 per 4 hours/half day collecting. If anybody is interested, I can provide the contact. I'm planning to visit at least one of the locations. By the way, we will not visit the Dugway geode beds north of Thomas Range, that would be your own post-trip.

The invitation is on the MSSC fieldtrips webpage too, including maps and some photos of the material. More detailed info will be posted later during the summer.

https://mineralsocal.org/fieldtrip-information-reports/topaz-mountain-ut-sept-2021/

Hope to see you all there!

Marek **Chorazewicz**

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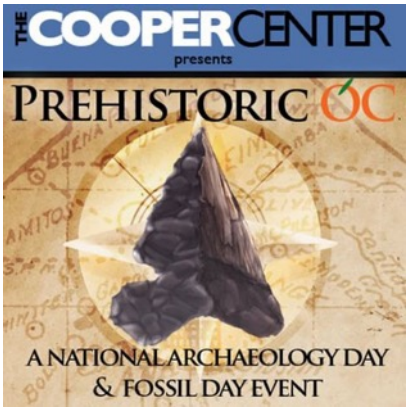
WE HAVE BEEN INVITED BACK TO PREHISTORIC OC



OC Park's special events are back! We are excited to announce this year's Prehistoric OC at Clark Regional Park in Buena Park will take place on Saturday October 9th from 10am-2pm.

Prehistoric OC is a free annual family festival celebrating local archaeology, paleontology, history, and science. A celebration of National Fossil Day and International Archaeology Day in one location.

Ralph B. Clark Regional Park is nestled at the foot of the Coyote Hills.

Any MSSC Members wishing to volunteer to help at the MSSC Booth should contact Rudy Lopez at *programs@mineralsocal.org*

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Ride Share Listing

Can You Provide A Ride?
Would You Like Company On The Drive To Meetings?

We have heard from several of our members that they would like to ride-share with someone to the meetings. We will list the names, general location and either a phone number or an email address of anyone who would like to connect for a ride-share. If you would like to catch a ride or would like company for the trip, let me know at msscbulletin@earthlink.net and I'll put the information in this section of the bulletin. After that, any final arrangements made are up to you. Also, If you make a connection that works for you, let me know so that I can remove your information from the bulletin. The Editor

Looking for	Who	Where	Contact at
A ride	Richard Stamberg		*Meetings cancelled due to COVID-19*

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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!

The **Von Kármán Lecture** on Thursday, **September 16** at 7:00 PM. Available live on YouTube at Instrumental: Engineers Who Make Science Possible (Live Public Talk) - YouTube. The speaker is Janelle Wellons, Instrument Operations Systems Engineer, NASA/JPL. The title of the presentation is **"Instrumental: Engineers Who Make Science Possible."** We'll sit down for a one-on-one with Janelle Wellons and discuss her upcoming work with the Multi-Angle Imager for Aerosols (MAIA), weaving together the challenges of the mission with her journey to JPL. Currently in development, MAIA will make radiometric and polarimetric measurements needed to characterize the sizes, compositions and quantities of particulate matter in air pollution. As part of the MAIA investigation, researchers will combine MAIA measurements with population health records to better understand the connections between aerosol pollutants and health problems such as adverse birth outcomes, cardiovascular and respiratory diseases, and premature deaths.

The **UCLA Meteorite Gallery** is temporarily closed until further notice; however, the monthly lecture will be presented on Zoom on Sunday, **September 19** at 2:30 PM. The speaker and title to be announced. **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. Visit the website and check on events and videos and other neat things about meteorites, go to https://meteorites.ucla.edu**. See the 2021 Poetry Contest Winners at** The UCLA Meteorite Collection - Gallery Events

Calendar of Events:

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

Due to COVID-19 many clubs have cancelled or changed their show dates. CFMS updates this list if clubs notify them. If you have any questions, please reach out to the contact listed to make sure the show is still taking place.

2021

September 11-12, 2021 – Reno, NV
The Reno Gem & Mineral Society, Inc.
Jackpot of Gems
Reno Convention Center, 4390 S. Virginia St., Reno
Saturday 10 AM-5 PM, Sunday 10 AM – 4 PM
Website: www.renogms.org

September 18-19, 2021 – Chico, CA
Feather River Lapidary and Mineral Society
Silver Dollar Fairgrounds, 2357 Fair St., Chico, CA 95928
Saturday 9 AM – 5 PM, Sunday 9 AM – 4 PM
Website: http://featherriverrocks.org

September 24, 25, 26, 2021 – Stoddard Wells, CA
Victor Valley Gem and Mineral Club
45th Annual Stoddard Wells Rockhound Tailgate.
Location: Dale Evans Parkway and Stoddard Wells Road, Apple Valley, CA. Go straight on Stoddard Wells Road, will turn to dirt. Follow 7 miles to "Tailgate". Signs will mark the road. Cars & RV's can make it with ease, go slow. See our website for additional details and directions.
Hours: 9 AM – 5 PM daily
Free event, everyone is welcome!. Saturday field trip 9 AM – 1 PM.
Website: http://www.vvgmc.org

October 1-3, 2021 – Vista, CA
Vista Gem and Mineral Society
Vista Gem and Mineral Open-Air Market
Antique Gas and Steam Engine Museum, 2040 N. Santa Fe Ave., Vista CA 92083
Friday and Saturday 10 AM – 5 PM, Sunday 10 AM – 4 PM
Website: http://www.vistarocks.org0

October 8, 9, 10 & 11, 2021, Clovis CA
Fresno Gem & Mineral Society
Clovis Rodeo Grounds, 445 Clovis, CA 93613
Time: Friday-Sunday Oct. 8th-10th – 10 AM – 5 PM, Monday Oct. 11th – 10 AM – 4 PM
Website: http://www.fgms.us/

October 10, 2021 – Fallbrook, CA
Fallbrook Gem and Mineral Society
Fall Festival of Gems
Location: Across the street from the Fallbrook Gem and Mineral Museum, 123 W. Alvarado St., Fallbrook, CA in the parking lot.
October 10th, 9 AM – 4 PM

November 6-7, 2021 – Ridgecrest, CA
Indian Wells Gem & Mineral Society, Inc.
Desert Empire Fairgrounds, 520 S. Richmond Rd., Ridgecrest CA 93555
Time: Saturday & Sunday 9 AM – 5 PM
Fieldtrip November 7th at 9 AM

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With Knowledge Comes Appreciation !

2021 MSSC Officers:

OFFICERS		
President	George Rossman	president@mineralsocal.org
Vice President	Ahni Dodge	vicepresident@mineralsocal.org
Secretary	Angie Guzman	secretary@mineralsocal.org
Treasurer	Carolyn Seitz	treasurer@mineralsocal.org
CFMS Director	Angie Guzman	
Past President	Ann Meister	
DIRECTORS		
2020-2021	Pat Caplette	
2020-2021	Cheryl Lopez	
2021--2022	Rudy Lopez	
2021--2022	Pat Stevens	
2021--2022	Leslie Ogg	
COMMITTEE CHAIRS		
Bulletin Editor	Linda Elsnau	bulletin@mineralsocal.org
Field Trip	Marek Chorazewicz	
Historian	Ann Meister	
Hospitality	Laura Davis	
Membership	Cheryl Lopez	membership@mineralsocal.org
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. The MSSC is a scientific non-profit organization that actively supports the geology department at Pasadena City College, Pasadena, California. Support is also given to the Los Angeles and San Bernardino County Museums of Natural History. 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. 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 $20.00 for an individual membership, $30.00 for a family membership. Bulletins are delivered by email, there is an additional annual $20.00 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
Glendale, CA 91202-1053
E-mail: treasurer@mineralsocal.org

Website: ***www.mineralsocal.org*** **The Mineralogical Society of California, Inc.**

MSSC Bulletin Editor

3630 Encinal Ave.

Glendale, CA 91214-2415

To:

With Knowledge Comes Appreciation

Your MSSC Bulletin Is Here!