

Lake George Gem & Mineral Club

Club News

August, 2019



NOTE: LGGM Club meetings in April through October will start at 9:00 a.m.

Program for the Month: Saturday, August 10, 2019, 9:00 a.m.

Cripple Creek's Cresson Mine: The Untold Stories

Ben Elick

Ben will reveal the secrets of this famous mine through old letters, newspaper clippings, crumbling documents, and rare photos. Learn about the mine's storied underground cavern of gold. It was so rich that the miners shoveled gold crystals into bags for weeks. This is a story so big, so bold, that only the World's Greatest Gold Camp can hold it.

Ben's Biography: Ben is a junior member of the Lake George Gem and Mineral Club. He is the program assistant for the Pikes Peak Pebble Pups. Ben recently presented a paper at the Geological Society of America's North-Central Section Meeting.

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Scheduled Programs at Club Meetings:

September - Steve Gorman, History of the Gold City Claim

October - Bob Carnein, Central Colorado Geology

November - Doug White, Newmont CC&V, Geology of Cripple Creek-Victor Gold Mine

December - Towel show, no presentation

Silent Auction: We need donations for the silent auction at our club meetings! If you have "extras", whether minerals, fossils, books, or other items, and if you have a label saying what the item is and where it came from, we can use it. If not, bring some cash and be prepared to help support Club activities, including scholarships, Pebble Pups, and other items.

LGGM Club Field Trips:

A note from the Field Trip Coordinators:

We have several great upcoming field trips close to Lake George. We still have a couple of open dates available in August and the first couple of weeks in September; so we are looking for ideas for trip destinations and for volunteers field trip leaders. In late September we have two joint trips with the Littleton Gem & Mineral Club to our claim and theirs, so this will be a great time to meet new people! We also have a great two-day educational trip hosted by Bob Carnein in October that will be available for sign up soon.

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Field Trip Sign-up: Thanks to everyone who was registered for the Topaz and Smoky Hawk trips that unregistered when they couldn't make it. That opened up spots on these full trips for others to join. This is going to be even more important for future field trips. We're adding a Wait List feature to our field trip online sign-ups. We will be testing it on the Honey Bee/Queen Bee Claims trip. We hope to have this feature functional by the end of July, so add yourself to the Wait List for the joint trip with the Littleton Club since we've reached the quota that the Littleton Club has dictated. If you have issues or questions, please contact me at dave@davealex.com.

Please share your pictures of your finds and adventures on our trips on our Facebook page and with Jerrolynn at jerrolynn@wildblue.net so that they can be included in our newsletter.

Finally, I want to extend a huge thank you to the volunteers we've had so far. This field trip season has been amazing! I also want to extend a huge shout out to Joey K for his great work on adding features to our website to make it easier for you to register for field trips and to make leading our field trips simpler for the volunteer leaders with fewer glitches in the sign-ups.

Thanks, and happy digging!
--dave and Laura

Change in Field Trip Leader for Book Cliffs field trip October 5-6, 2019: Please note that LGGM Club field trip leaders Dave Alexander and Richard Kawamoto will not be available to lead this trip. Chris Rayburn, from the Mile High RAMS is leading the trip and welcomes our members. The group of RAMS and LGGM Club members will be meeting at 9:00a.m. at a site near Grand Junction. Detailed directions and a map along with Chris's contact information will be posted the field trip signup page on line within the next few days.

Change in dates for Colorado Springs Area Geology trip led by Bob Carnein:

Please note that these trips will be Saturday 10/12/19 at 10:30 (after Bob's presentation of the and Sunday 10/13/19 at 9:00 a.m.

SCHEDULE OF LGGM CLUB PROGRAMS, FIELD TRIPS & EVENTS			
Date(s)	What	Where	Leader/Notes
Sa 8/10	Pebble Pup Presentation	LGGM Club Presentation	Steven Veatch
Sa 8/10	Gold City Claim – Full Moon Fluorescent Adventures	Lake George Community Center	Bob Baker
F 8/16 – Su8/18	LGGM CLUB ANNUAL GEM & MINERAL SHOW	Lake George (between Post Office - Starkeys)	See lggmclub.org for more details
Sa 9/14	History of Gold City Claim	LGGM Club Presentation	Steve Gorman
Sa 9/21	Honey Bee/Queen Bee Mines – quartz, amazonite, fluorite, topaz	Harris Park Community Center – 154 Shelton Dr. Bailey CO 80421	Dave Alexander
Sa 10/5	Book Cliffs - Day 1	Grand Junction Area	Joint trip with RAMS – RAMS Field trip leader is Chris Rayburn
Su 10/6	Book Cliffs - Day 2	Grand Junction Area	Joint trip with RAMS – RAMS Field trip leader is Chris Rayburn
Sa 10/12	Central Colorado Geology	LGGM Club Presentation	9:00a.m. Bob Carnein
Sa 10/12	Central Colorado Geology #1	GOG, Manitou Spr, Cave of the Winds, Crystola	10:30a.m. Bob Carnein
Su 10/13	9:00 a.m. Colorado Springs Area Geology Day #2	Ute Pass (Woodland Park to Rainbow Falls)	Bob Carnein
Sa 11/9	Newmont CC&V Geology of Cripple Creek-Victor Gold Mine	LGGM Club Presentation	Doug White
Additional Presentations and Field Trips to be added after they are confirmed.			

Other Upcoming LGGM Club Events:

LGGM CLUB SHOW August 16-18

Vendors: A few booth spaces are still available. Contact our Vendor Contact/Show Host: JAY PENN (505) 883-4195 jaypenn246@gmail.com

VOLUNTEERS FOR LGGM CLUB SHOW

Hello Club Members,

We are the Volunteer Coordinators for the Lake George Gem and Mineral Show and are very pleased to announce that a total of 44 members have volunteered to work the show. Several are working more than one shift and more than one day. Thank you to all who volunteered. We also wish to thank our club secretary, Lorrie Hutchison. Lorrie forwarded our e-mails requesting volunteers to all of you. Thank you, Lorrie.

We are also pleased to announce that the following shifts are filled:

Field Layout: Saturday, 8/10, immediately after the club meeting: 12 volunteers.

Show Teardown: Sunday, 8/18, after 5pm: 7 volunteers.

Parking Helper: Friday, 8/16: 8 volunteers

Club Tent Hosts: Friday, 8/16, Saturday, 8/17, and Sunday, 8/18: 8 volunteers per day.

We still need a total of 4 additional volunteers:

Parking Helpers:

Saturday, 8/17: One volunteer for the 1pm-3pm shift and
One volunteer for the 3pm-5pm shift.

Sunday, 8/18: One additional volunteer for the 9am-11am shift.

Show Teardown:

Monday, 8/19, at 9AM: **One** additional volunteer is needed.

To volunteer for one or more shifts please contact us at: donk1244@yahoo.com

Please note: We will be sending e-mails to all who signed up to remind you of the shift(s); date(s); and time(s) for which you volunteered.

Thank you,

Don & Beverly Keith, Volunteer Coordinators, donk1244@yahoo.com

ADDITIONAL COMING EVENTS OUTSIDE THE LGGM CLUB: (Nearby gem, mineral, fossil and geology events that you may enjoy.)

- **Cañon City Geology Club**, meets on the 2nd Monday of the month at 6PM in the United Methodist Church, Cañon City
- **Columbine Gem & Mineral Society**, meets on the 2nd Thursday of each month, 6:30PM in the meeting room, Mt. Shavano Manor, 525 W. 16th (at J St.), Salida
- **Colorado Springs Mineralogical Society**, meets on the 3rd Thursday of each month at 7PM in the Mt. Carmel Veteran's Service Center, 530 Communication Circle, Colorado Springs;
- **Pueblo Rockhounds**, meets on the 3rd Thursday of each month at 6:30PM in the Westminster Presbyterian Church, 10 University Circle, Pueblo.

Pete Modreski suggests the following upcoming events:

Aug. 2-4, Creede, CO Rock & Mineral Show, at the Creede Underground Mining Museum and Community Center. See <http://creederocks.com/> .

Aug. 8-11, Contin-Tail rock & mineral show, Buena Vista Rodeo Grounds, Buena Vista, CO; see www.facebook.com/ContinTail

Aug. 15-18, Woodland Park Rock, Gem, & Jewelry Show, Woodland Park, CO; see <https://www.facebook.com/woodlandparkrockandgemshow/>

Aug. 16-18, Lake George Gem & Mineral Show, sponsored by the Lake George Gem and Mineral Club, Lake George, CO. See <http://www.lggmclub.org/>

Sep. 6-15, Colorado Mineral and Fossil Fall Show, Crowne Plaza Hotel - Airport, 15500 E. 40th Ave. Denver, CO.

Sep. 7-8, 1st Annual Denver “Just Minerals Event”, Embassy Suites Hotel, 4444 N. Havana St., Denver; wholesale and retail mineral dealers.

Sep. 8-16, Denver Coliseum Mineral, Fossil, and Gem Show, Denver Coliseum; see <http://www.coliseumshow.com/>

Sep. 11-14, Denver Fine Mineral Show, Denver Marriott West, 1717 Denver West Blvd.; see <http://finemineralshow.com/denver/>

Sep. 13-15, 52nd Annual Denver Gem and Mineral Show, Denver Mart, 451 E 58th Ave., Denver, CO. **Minerals of Canada** is the 2019 show theme. See <http://denvershow.org>

For more lecture series during the year see:

Colorado Beer Talks (2nd Tuesday, 6-8 p.m.), Windy Saddle Café, 1110 Washington Avenue, Golden, “Golden’s grassroots version of TED talks, Expand your mind with a beer in your hand”, <http://goldenbeertalks.org/>

Colorado Café Scientifique in Denver, monthly lectures on science topics held either at Blake Street Station or Brooklyn’s, Denver; open to the public, no charge other than refreshments you may choose to purchase; see <http://cafescicolorado.org/> .

Colorado Scientific Society (3rd Thursday, 7 p.m.), see <http://coloscisoc.org/> . Meets at Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO, except when noted.

CU Geological Science Colloquium (Wednesdays, 4 p.m.) see <http://www.colorado.edu/geologicalsciences/colloquium>

CSU Dept. of Geoscience Seminars (Fridays, 4 p.m.), see <https://warnercnr.colostate.edu/geosciences/geosciences-seminar-series/>

Van Tuyl Lecture Series, Colorado School of Mines, (Thursdays, 4 p.m.): <https://geology.mines.edu/events-calendar/lectures/>

Denver Mining Club (Mondays, 11:30), see <http://www.denverminingclub.org/> .

Denver Museum of Nature and Science, Earth Science Colloquium series, 3:00-4:00 p.m., VIP Room unless noted, day of the week varies. Museum admission is not required; see <http://www.dmns.org/science/research/earth-sciences/>

Denver Region Exploration Geologists Society (DREGS; 1st Monday, 7 p.m.), <http://www.dregs.org/index.html>

Florissant Scientific Society (FSS); meets monthly in various Front Range locations for a lecture or field trip; meeting locations vary, normally on Sundays at noon; all interested persons are welcome to attend the meetings and trips; see <http://www.fss-co.org/> for details and schedules.

Nerd Night Denver is a theater-style evening featuring usually 3 short (20-minute) TED-style talks on science or related topics; held more-or-less monthly at the Oriental Theater, 4335 W. 44th Ave., Denver; drinks are available; for ages 18+. Admission is \$6 online in advance, \$10 at the door. See <https://www.nerdnitedenver.com/> .

Rocky Mountain Map Society (RMMS; Denver Public Library, Gates Room, 3rd Tuesday, 5:30 p.m.), <http://rmmaps.org/>

Western Interior Paleontological Society (WIPS); beginning January 2019, WIPS will meet on the 1st Monday of the month, 7 p.m., at Lowry Conference Center, 1061 Akron Way, Denver. See <http://westernpaleo.org/> .

RMFMS Annual Convention --The Lake George Gem & Mineral Club is a member of The Rocky Mountain Federation of Mineralogical Societies (RMFMS). This year, the 2019 RMFMS annual convention will occur in Prescott, Arizona on August 2-4. Full details are available at <http://www.prescottgemmineral.org/wp-content/uploads/2019/03/2019-rmfms-convention-packet-final-v2.pdf>

LGGM Club News:

On Saturday, July 13th, Rick Sauers, Curator of the Western Museum of Mining and Industry presented a talk about the collections and exhibits of the Museum. He offered to provide a free guided tour of the museum for a field trip to the club. And he talked about the need for volunteers to help them organize and catalog some of their collections.

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From Wayne Orlowski we have the following links:

<https://www.msn.com/en-us/news/technology/massive-1100-pound-bone-of-worlds-biggest-dinosaur-found/ar-AAEU1q7?ocid=spartandhp>

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This discovery not only uncovers a new species of ancient lizard, it shakes up our understanding of the food web 140 million years ago.

https://www.nationalgeographic.com/science/2019/07/new-fossil-lizard-found-inside-microraptor-dinosaur/?cmpid=org=ngp::mc=crm-email::src=ngp::cmp=editorial::add=Science_20190717::rid=00000000000017167166

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Everything you need to know about the Colorado sand dunes - good article!

https://www.rockngem.com/colorados-great-sand-dunes/?utm_source=newsletter&utm_medium=email&utm_campaign=rg_Newsletter070519

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View Earth Thru History: Use the up/down arrow keys to step thru time & read lower left corner. Click on the earth to rotate the globe during each time line display. This is a very good teaching tool.

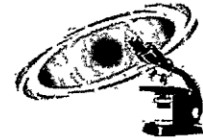
<http://dinosaurpictures.org/ancient-earth#0>

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Did I Find a Meteorite?

Have you ever wondered if that blackish/brownish heavy metallic-looking rock you found might be a meteorite? **John Rakowski** received the following information from a Massachusetts company which does examination and testing of suspected meteorites at a reasonable price. They prefer samples of about a half ounce in size (marble size) but will handle larger samples, you just need to pay for return postage. This testing is essentially non-destructive and your sample is returned. The cost of analysis is low because this is being done as an educational outreach effort according to the company. Their costs of analysis is about \$25 for small pieces and results are reported in two to three weeks. Contact Bob Carnein or John Rakowski for a preliminary review of your piece and it is possible that LGGMC funds may pay part or all the costs of having the item checked out.

(If you have difficulty reading this photographic copy of the info John received in the mail, you can also find a clearer original version on the website <http://meteoritetesting.org/FAQ.htm>.)



FAQs – Answers to your Questions and Commentary

Laboratory testing and examination of submitted samples for a meteoritic origin.

Commentary

Learn before you send.

This page will take you between 5 to 8 minutes to read. It's a frank synopsis of the many questions we receive and will answer many or most of your questions.

We recently examined and appraised what is arguably one of the most historic meteorite collections in the world, the "Huss - Ninninger Collection of Meteorites and Tektites" at the University of Hawaii. It was a "hand's on" examination and appraisal of over 4,000 meteorites and more than 2,000 tektites.

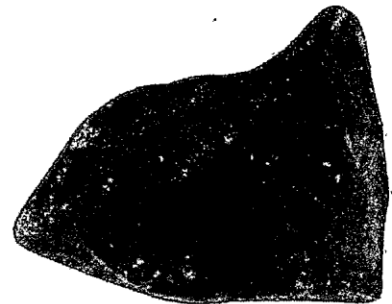
Dr. Harvey H. Ninninger began the collection in 1925 when little was known and agreed upon about meteorites. Along with his son-in-law, Glenn Huss, Dr. Ninninger collected every curious stone, questioned shapes, noted any unusual characteristics, kept meticulous records, and ultimately acquired the majority of meteorites available for study up until the 1980s.

Look closely at the meteorite in the photograph, it's one of the specimens in the Huss - Ninninger Collection and a rare classification of stone meteorite - a carbonaceous chondrite, CM2.

Look at the blackish fusion crust and the structural cracking that occurs during the violent passage through the Earth's atmosphere as the pressure of rapidly building air molecules slow it down from cosmic velocities to the terminal "dark flight" phase of the fall - all in a matter of tens of seconds.

This is one of the Murchison meteorites. It's more like a "soft" stone when compared to Earth geology.

Even more important is what's inside - amino acids - a precursor of life. That amino acids can form and survive the harsh radiation and temperature of space gives rise to many questions. Look closely at this image. Study it. The Murchison Fall consisted of thousands of individual meteorites. Find a basket full of these and you'll be happily retired in days.



Don't waste your time studying "meteor-wrongs", study the real thing. The more that you know, the more likely you will recognize a meteorite.

Frequently Asked Questions.

This program has been testing samples for the public since 1994. It does not operate in a vacuum. Over the past couple of decades, we have built relationships with universities and researchers. It is this access and collaboration that keeps us on the front lines of meteoritic research enabling the Testing Program to be successful, providing accurate and economic screening of samples for the public quickly.

#1 "Will my samples be returned?"

Yes, all samples sent from within the USA are returned. For International mailings, we ask for the return postage to send them back. Please keep the sample size small, 10 to 20 grams. Larger samples may require additional return postage. If you want to send a larger sample it may be a few dollars more in postage. Email us - Lab@meteorlab.com

#2 "Will my sample be damaged in testing?"

No, we do not do what is known as "destructive testing". We may make a small slice on the oxidized exterior, marking the area, to examine the interior mineralogy but even this is not usually noticeable.

#3 "How do I cut a sample to send you?"

Sometimes cutting a sample for testing can be hard, sometimes not. Many people will use a hacksaw for metallic specimens. For rocky specimens, they often use a Dremel tool or a cold chisel to break or pry off a small sample. We can take larger samples if you do not want to cut but you'll have to pay the return postage. However you do it be sure to wear eye protection.

#4 "Can I find a meteorite with my metal detector?"

Yes, around 95% of all stone meteorites contain some degree or percentage of ferric iron. Metal detectors will react to this. However, there is also quite a bit of felsic iron in Earth's mineralogy, it's the 4th most common element in the Earth's crust. So, while Earth rocks do contain varying amounts of iron it's mostly in an oxidized, nonmetallic form. This is different than the iron/nickel seen in meteorites, but metal detectors can detect this. Metal detectors will also react to iron-rich sediments such as hematite, magnetite, goethite and can react to many foundry artifacts and byproducts.

#5 Actual email: "You tested my sample and said it was not a meteorite but you also said that you did not make thin sections or test for nickel in my sample. Then how do you know it's not a meteorite?"

The short answer is that we know because you sent us a double terminated quartz crystal, also known as a "Herkimer Diamond", found in Herkimer, New York. We understand that many people are not familiar with the mineral diversity seen in terrestrial rocks but for us, this is recognizable geology. It is the same if we receive a garnet-studded rock (eclogite) or a limestone (a fossil-laden sedimentary rock) for example. This is known geology with structures, textures, and crystallization not seen in meteorites but common in earth rocks. These can be quickly identified without additional testing.

But it's the longer answer that's important here. There is a lot of misleading information on the web about meteorites. It's not that the information is wrong but more that it's easily taken out of context. People will read that the "only way to know if it's a meteorite is with thin sectioning (a 30 micron thick sample on a glass slide), SEM testing (scanning electron microscopy), and chemical testing, including nickel" because, as some write, "if you find nickel in a sample then it's most likely a meteorite". In truth, these different tests are mostly done to confirm iron meteorites or for the classification phase of a stone meteorite. They are tests not always needed for the initial examination and determination. As for nickel, it is also present in terrestrial nickel-bearing ore rocks, laterites, and can be found in association with mafic and ultramafic intrusive rocks.

Note: Martian and Lunar basalts, angrites, ureilites, and several other very rare types require additional collaborative testing protocols.

#6 "Do you test all samples for the chemical element nickel? "

Many websites write about the need for nickel testing of all specimens. This is misleading.

Nickel testing is important for some submitted samples but not all. Finding nickel in the range of 4 to 30 percent Ni in an iron sample is a pretty good beginning argument for an iron meteorite.

We receive a huge diversity of samples sent to us from around the world from people, museums, and universities who believe or hope that they may have a meteorite. Some of these - granite, lava's, limestones, magnetite, hematite, foundry objects, "slag" byproducts, etc., are all easily identified in a few minutes with microscopy. Nickel testing is not needed for samples of known geology.

So, no, we do not test everything for Nickel.

#7 "I found a meteorite, how do I sell it?"

The first thing that you need to do is to have it examined and verified as a meteorite from a testing lab that verifies and or classifies meteorites. If verified, you can then sell it as an unclassified meteorite if you like. Additionally, you can move towards formal classification and registration with the Meteoritical Society, and then sell it as a classified and registered meteorite. Classification is not part of the initial verification.

#9 "How large a sample do you need for testing?"

Small samples are fine, 10 to 20 grams is ideal. This is roughly the size of a marble.

#10 "I think I found a meteorite. It's heavier than any other rocks in the area, has a burnt looking covering but does not attract a magnet. I broke off an edge and can see shiny flakes. Do you think that I should send it for testing?"

Yes, for two reasons.

One, because it's important enough for you to write and ask. Two, because if you don't send it then you'll always be wondering. The testing service is very inexpensive so send it and find out. Or, if not to us, then to any other lab or university that works with and tests meteorites. But find out!

#11 "How can you test a sample for only \$25.00?"

We can't. Examining your sample can be a fair amount of work. One person from China complained that it can't be done for the \$20.00 or \$25.00 testing charge. He was right, but this is an educational outreach program. The additional cost is funded by New England Meteoritical Services.

#12 "How long have you been testing meteorites?"

~~For over 30 years, with about 25 years for the general public. Our website, meteorlab.com is one of the oldest meteorite sites on the web, started in 1994.~~

#13 "Testing labs have complaints and negative reviews on web blogs and social media, can a jeweler test a meteorite instead?"

Jewelers do not test meteorites and as for the negative reviews, yes, of course. Any lab, researcher, university or museum that tests meteorites for the public has some negative reviews online, often being called "charlatan's or "fraudulent". Why?

Because we often have to tell people "no, I'm sorry, your sample is not a meteorite". "No" is not the word people want to hear. Some will drive several hundred miles to a lab, bringing a rock they have had in their family for decades, absolutely convinced it's a meteorite. It almost never is and it's a long ride back for them.

Some people will argue with you, some to the point where they become angry and some threaten to "expose" you online as a fraud or charlatan if you do not agree with them.

So, let's put this another way: You go before a Judge or Magistrate, you present your problem, they listen, evaluate any information you supply and render an opinion. If the Judge decides in your favor you love them. But if the Judge decides against you, well, not so much love is there?

This is similar to what we or any testing lab does. We examine and evaluate what you send and render an opinion based upon accepted academic standards pertaining to peer-reviewed, scholarly, published definitions of meteorites.

Negative reviews are not written because we or a testing facility were wrong in our testing results, they are written by people who were told "no".

If you want to know if you found a meteorite, send it to us. You'll be happy with the informational return package that we send even if the answer is "no".

Now, let's get back to the fun stuff.....

#14 We receive variations of this one several times a year: "My meteorite was tested by a scientist. They said they had never seen anything like it and found elements, not, on the Periodic Table, can you tell me what it is?"

Other than being one of the great movie lines, "Not found on the Periodic Table", how do you answer this?. As far as we know, the seventh row of the Periodic Table is complete although some argue for the existence of an Island of Stability somewhere around "element 126". If anyone has a rock or meteorite with elements beyond 118 then they probably should call the SyFy channel.

#15 "I think I found a meteorite, will send for testing. If it's not a meteorite can you tell us what it is?"

If your sample is a meteorite, we will tell you the type, probable classification, and estimated value.

There are over 6000 accepted minerals on Earth. Their identification is beyond the scope of the testing service program, but we do try to give you an opinion of what it is.

#16 Although not a FAQ, it's a good question and is worth reading: "I sent in a couple of specimens for testing, I got the response that they were not meteorites. I recently had one XRF tested and it came back 99.9% iron. This rock needs to be looked at again, would you do a retest?"

Verbatim response: "Sure, happy to re-examine it for you. But, there are no meteorites that are 99.9% Fe (iron).

All iron meteorites are the formative end product of asteroid or large-body differentiation and have from 5 to 30% Ni (nickel) as a Fe/Ni alloy resulting in the formation of the meteoritic minerals taenite, kamacite, schreibersite, and others.

The chemical composition of iron meteorites is dominated by the elements Fe, Ni, and Co, which make up more than 95% of the meteorite, with somewhere around 5% being silicate-rich inclusions or other trace mineralogy. Ni is always present; the concentration is always higher than 5% and may be as high as about 30%.

I think that you may be looking at the term "iron meteorite" as meaning 100 percent iron but it is not, they are always alloyed with Ni (nickel). ~~We hold that our analysis is correct; your sample is an igneous foundry artifact. But, if you would like us to look again at it then we are happy to do so, please send it to us.~~

#18 "I have a large collection of over two hundred meteorites that I found in my yard. Can I send 30 at a time for certification?"

You can send as many meteorites as you like but let's test a sample group of three first and take a look at what you have before you start spending money testing large groups.

#19 "I see many references to the Meteoritical Society. What do they do?"

The Meteoritical Society is an international organization composed of over 1,000 scientists and contributors representing 52 countries. The Society writes and publishes meteoritical guidelines and classification criteria needed for acceptance into their registry database.

They also maintain the records of all known meteorites in the Meteoritical Bulletin and publish "Meteoritics and Planetary Science", a leading peer-reviewed journal of planetary science. For more information see: meteoriticalsociety.org

#20 "I am certain that I have a meteorite. It passes every test on websites online - the "streak" test on porcelain, it attracts a magnet and has lots of fusion crust and flow lines. I am sending it for you to register it with the Meteoritical Society."

Hmmm, well, let's make sure that it's a real meteorite and we can go from there.

As mentioned in previous questions, much of the information online can be easily taken out of context, but maybe you're right, maybe you do have a meteorite. After doing the suggested online "home" tests the most important thing that you can do is to put your suspected meteorite in the hands of someone who can tell you for certain. So, send it to us, another lab, or to a university that is still testing. It doesn't matter which.

What matters is that you follow through and have it examined. If it turns out to be a meteorite, great, congratulations. If not, it's disappointing but not the end of the world. Meteoritics is a fun and fascinating interdisciplinary science, learn more about it and keep looking.

Note: This FAQ and Commentary is Copyright protected, 2017, 2018, 2019, New England Meteoritical Services.

MeteoriteTesting.org

Email: Lab@meteorlab.com

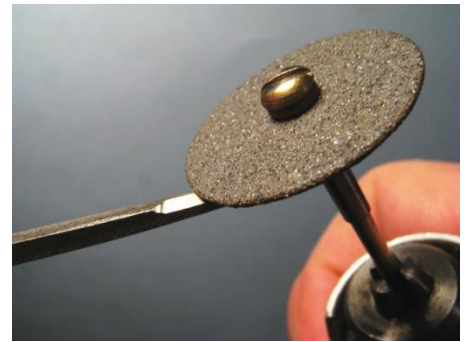


Laboratory Services – Meteorites - Analysis – Authentication – Geology Samples
Examiners and Appraisers of the Historic "Huss / Nininger Collection of Meteorites and Tektites"

Here is the latest installment of “**Bench Tips**” by **Brad Smith**: (www.BradSmithJewelry.com)

FINISHING PIERCED PATTERNS

After sawing patterns there's always a little cleanup to do, and the smaller cutouts can be a challenge. Needle files (7-8 inches) can get into the larger areas, and escapement files (4 inches) can get into some of the corners. But I often find myself wanting even smaller files. I couldn't find them even at a watchmaker tools supply company, so I had to try something else. I ended up grinding down the tip of a 4" barrette file using a separating disk (or cutoff wheel) in the Dremel or Foredom. Be sure to wear your safety glasses when using this tool. A flake of steel in your eye makes for a bad day.



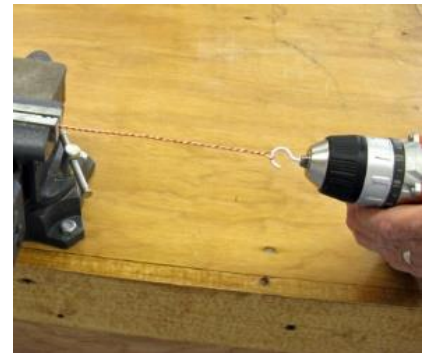
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MAKING FILIGREE WIRE

Making wire for filigree is quite simple. Take a double strand of 24-26 gauge silver wire, twist it tightly, and then flatten it a bit. While the basics are straightforward, here's a few tips that will quickly make you an expert with filigree.

Filigree looks best when the wire has a very tight twist. The way I do this is to start with dead soft wire and twist it until it breaks. It always seems to break on one end or the other.

I like to use a screw gun, although a Foredom also works well. You'll need a small hook in the spindle, either a cup hook from the hardware store or a nail that has been bent into the shape. Be sure to keep a little tension on the wires as you twist. Then to get a real tight twist, I anneal the wire and twist it a second time until it breaks.



The final step in prepping the filigree wire is to flatten it slightly with a planishing hammer or rolling mill. The amount of flattening is a personal preference. I like to reduce the diameter about 25%. The wire will be quite stiff at this point, so it's best to anneal it again before starting to make the filigree shapes.



Work Smarter With Brad's "How To" Jewelry Books
www.Amazon.com/author/bradfordsmith

Happy hammering,
- Brad

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As early as the 19th century, paleontologists suspected that all birds evolved from two-legged, meat-eating dinosaurs known as theropods. In the following article, **Paul Combs** summarizes five different types of recent research which strongly suggest that the ratite (non-flying) group of birds (ostriches, kiwis, emus, etc.) and the volant (flying) birds are two separate groups, and that the ratites evolved much earlier than the volant birds.

WHY ALL FANS OF DINOSAURS SHOULD TAKE UP BIRD-WATCHING

by **Paul Combs**

Paleontology Study Group

Back in the 19th century, museums were beginning to reassemble the skeletons of 2-legged meat-eating dinosaurs (the theropods) and they couldn't help noticing that those skeletons bear a striking resemblance to the skeletons of birds. Besides that, the preserved tracks of those dinosaurs look precisely like the tracks of a turkey or almost any other bird. On top of that, birds do not have "scales" on their legs like fish; they have scutes like reptiles. There are other similarities. German quarry workers discovered a further connection in the 1860's, when they found a fossil named *Archaeopteryx lithographica*. This 150-million-year-old animal has a skeleton that is very much like that of a reptile, but with wings and well-preserved feathers. That discovery happened shortly after Charles Darwin had published his ground-breaking book, *On the Origin of Species*, which explains evolution. More and more paleontologists began to assume that birds had evolved from theropod dinosaurs.



This fossil of *Archeopteryx lithographica*, was announced in 1861 and it caused an enormous sensation on both sides of the Atlantic. It is from the late Jurassic (155 million-year-old) Solnhofen limestone near Eichstatt, Germany. It has teeth and a reptilian tail, but it otherwise looks like a bird, including feathers that clearly were used for gliding or flight. Paleontologists consider it to be a feathered dinosaur.

Since then, biologists have discovered strong differences between two groups of living birds, the ratites (ostriches, kiwis and their relatives) and the volant (flying) birds, which includes crows, eagles and hummingbirds. There are significant skeletal differences between these two groups, along with differences in their digestive systems, behavior, tissue chemistry and more. This has led scientists to ask whether these two bird groups are closely related at all. Surely, the two groups must share a common ancestor, but who was it and when did birds begin to separate from that ancestor, or from each other?

All dinosaurs share a common ancestor in an even older group called the archosaurs. The first reliable archosaur fossils date from about 200 million years ago. Unfortunately, the dinosaurs are extinct today, but there are lots of living archosaurs. We call that group “crocodilians”: the alligators, crocodiles, gharials and caimans, which first appear in the fossil record about 55 million years ago. Since these animals are very much alive today, they can provide scientists with plenty of opportunities to unravel the ancestry of birds. We already know that both birds and crocodilians share many important characteristics: they lay hard-shelled eggs, they excrete solid waste (no urine), they have 4-chambered hearts and their lungs use unidirectional air flow, among other similarities. So it is likely that their common ancestor also shared these characteristics. We’re off to a good start!

Let’s look at five very different approaches to the ancestry of birds and see what they show:

IDEA #1 TEETH: Modern birds are toothless, but the teeth of fossil birds, including the most famous fossil bird, *Archaeopteryx*, are much closer to the teeth of fossil and living crocodilians than they are to those of theropod dinosaurs, like *Tyrannosaurus rex*. Unlike the teeth of theropods, fossil birds’ teeth are not serrated and they have constricted bases and expanded roots. Most fossil and recent crocodilians have very similar teeth. Fossils of theropod dinosaurs, on the other hand, have serrated teeth with straight roots and no constriction at the base (Martin, et al., 1980).

IDEA #2 EMBRYOLOGY OF FEATHERS AND SCUTES It is a curious—and extremely useful—fact of biology that an animal's embryonic development can tell us a great deal about its ancestors. Feathers and reptile scutes are composed of different forms of the protein keratin. At least, that was thought to be the case until 2006. That was when three researchers, Alibardi, Knapp and Sawyer, discovered the feather keratin (known as beta-keratin), in the scutes of embryonic American alligators (*Alligator mississippiensis*). As alligator embryos develop, the production of beta-keratin is genetically turned off, so it is not found in the scutes of adult alligators. But the existence of this keratin in birds and archosaur embryos strongly indicates that they share a common ancestor. This discovery caused many biologists and paleontologists to theorize that crocodilian scutes, bird and dinosaur feathers, and the pycnofibers of pterosaurs, are all derived from the same primitive archosaur skin structures. (Alibardi et al. 2006.)

IDEA #3 SKELETONS OF EMBRYOS: Biologist Christopher McGowan used X-rays to study the bone structure and development of the embryos of volant (flying) and non-volant birds. He quickly distinguished two extremely different patterns of embryonic development. The volant birds grow an easily identifiable “pretibial bone” in the lower leg that eventually fuses with the calcaneum (the heel bone in humans). This is much more like the development of crocodilians than any true dinosaurs. The second group of embryos in McGowan's study consisted of ratites, such as ostriches and emus. McGowan found that ratite and volant embryos develop differently. For instance, the legs of ratite embryos grow an “ascending process” that fuses with the astragalus (the ankle in humans). This is very unlike the volant birds (and crocodiles), but very much like the development of theropod dinosaurs. Many scientists now suspect that these fundamental differences point to a very early separation between the volant and non-volant birds (Martin et al., 1980; Whetstone and Martin, 1979).

IDEA #4 BIOCHEMISTRY: In 1984, a paper appeared in *Nature*, offering more evidence to support the theory that ratites and volant birds have very long and separate evolutionary histories. Biologists in the Netherlands performed chemical tests on the amino acids within the protein alpha-crystalline A, which is found in the eye lenses of all vertebrates. What they discovered is intriguing. When the scientists studied the alpha-crystalline A that had been removed from the eyes of emus, rheas and ostriches, they saw almost no differences. This indicates that the ratites in the study are very closely related. But the ratite alpha-crystalline A shows strong differences from that of all volant (flying) birds. In fact, it is closer to the alpha-crystalline A of the American alligator (*Alligator mississippiensis*). This study not only supports the idea that birds are descended from reptiles, its authors assert that ratites split from the reptile line earlier than flying birds in a separate event. In other words, ratites and flying birds are not as related as they appear (Stapel et al., 1984).

IDEA #5 FOSSIL EARS: Two biologists, Whetstone & Martin studied the complex ear structures preserved in high-grade fossils of birds, dinosaurs and very primitive crocodiles, starting in the early Triassic Era (around 250 million years ago). Not only are the ear structures of dinosaurs very different from those of birds and crocodiles, some major features are lacking altogether! These physical features support the growing theory that early crocodilians (the pseudosuchians) are the true ancestors of birds, NOT theropod dinosaurs. Many fossils of theropods have feathers, but this appears to be due to a common ancestor and not because birds are descended from theropods (Martin et al., 1980; Whetstone and Martin, 1979).

So what does all this research indicate? First, it strongly supports the theory that birds and dinosaurs are descended from ancestral archosaurs. Birds and living archosaurs still share an amazing set of characteristics, despite the passage of an incredible length of time. Second, These studies show that there are two very distinct groups of birds: the volant birds (over 10,000 species) and the ratites (about 10 species). Some biologists have suggested that the two groups are so different that they should be separated, like mammals and reptiles. Others disagree, but they do admit that the differences are very strong. Third, it appears very likely that the ratites were the first birds to evolve away from their reptilian ancestor and that they still retain a large number of physical traits that link them to that ancestor. The evidence is very strong that the ancestor of ratites was a theropod dinosaur. Fourth, volant birds could have evolved in four ways: 1) from the same theropod dinosaur as the ratites (which has begun to appear less likely), 2) from a different theropod dinosaur (possible), 3) from a ratite ancestor (possible), or 4) from an archosaur (surprising, but the evidence is strong). Hundreds of scientists around the world have conducted intense studies of fossils, embryology, biochemistry and other areas for decades and almost all of them agree that birds are living dinosaurs. Not only that, dozens of species of feathered dinosaur fossils have been discovered over the past 150-plus years. It is impossible to say whether some of them were feathered reptiles, toothed birds or something in between. The next time you, your child or grandchild wish the dinosaurs hadn't died out, take a trip to the zoo and visit the ostriches. There are some 9-foot "dinosaurs" waiting to meet you.

References & Further Reading:

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Monthly Mineral Quiz



Last Month's Mineral. Gypsum
CaSO₄·2H₂O With a hardness of 2, and with three directions of cleavage, gypsum is a common mineral of sedimentary rocks, especially "evaporites" formed by evaporation of saline water. It occurs in a number of habits, each of which has an informal name. Coarse cleavage fragments like the one to the left are called *selenite*; finely crystalline material is *alabaster*, and fibrous gypsum is *satin spar*. Gypsum is an important industrial mineral used to make plaster, drywall, and to

control the rate at which Portland cement sets. A chemically similar mineral that lacks water in its formula is *anhydrite*.



Specimen from Crystal Peak area,
CO (Carnein photo and collection)

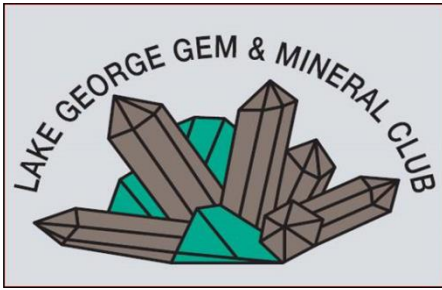
This Month's Mineral. If you collect in pegmatites, you need to be familiar with this mineral. It occurs as platy, light colored crystals that have a vitreous to pearly luster and a hardness of about 6. Its specific gravity is about average (2.6-2.65) (www.Mindat.org) and it has several well developed cleavages. Although it's especially common in pegmatites, it occurs in various igneous and metamorphic rocks and belongs to a mineral series that includes the commonest minerals in Earth's crust. What is it?



Specimen from Connecticut
(Carnein photos and collection)



Specimen from New Hampshire
(Carnein photos and collection)



The Lake George Gem and Mineral Club is a group of people interested in rocks and minerals, fossils, geography and history of the Pikes Peak/South Park area, Indian artifacts, and the great outdoors. The Club's informational programs and field trips provide opportunities to learn about Earth science, rocks and minerals, lapidary work and jewelry making, and to share information and experiences with other members. Guests are welcome to attend, to see what we are about!

The Club is geared primarily to amateur collectors and artisans, with programs of interest both to beginners and serious amateurs. The Club meets on the second Saturday of each month at the Lake George Community Center, located on the north side of US Highway 24 on the east edge of town, sharing a building with the county highway shops. **In the winter, we meet at 10:00AM. From April through October, we meet at 9:00AM, to allow more time for our field trips.**

Our organization is incorporated under Colorado law as a nonprofit educational organization, and is a member of the Colorado, Rocky Mountain, and American Federations of Mineralogical Societies. We also sponsor an annual Gem and Mineral Show at Lake George, where collectors and others may purchase or sell rocks, minerals, fossils, gems, or jewelry. Annual membership dues (Jan. 1 through Dec. 31) are \$15.00 for an individual (18 and over), and \$25.00 for a family (parents plus dependents under age 18). New memberships and renewals are only accepted Jan 1 through March 31 each year.

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