

THE GOLD NUGGET

Dec 2022

The Prez Sez! by Joe Johnston



Greetings fellow prospectors. We have made it to December already and deep into the Holidays. We have had an event filled year with great presentations at our meetings. Now it is time to wrap up the year with our Christmas pot luck before the move into a new year. A topic has come up about Membership dues and I would like to shed some light on the topic. Dues have a primary historic purpose to provide a meeting place and fund a newsletter. We still rely on them for the meeting place, but the printing and mailing costs of a newsletter have shifted into the electronic age of email and web site publishing, helping to reduce, but not eliminate costs. With the current economic shift, we are seeing increased expenses for our meeting place rental and are considering the need to increase membership dues by \$5.00 a year to cover increased rental fees. Watch for this to come up in the New Year.

In early October, I alerted the Board to the fact that the gold nugget drawings were not being covered by ticket sales causing a significant negative draw on our funds and called for changes to correct this. So far I have not been able to get the board to make the necessary changes to stop this over generous practice. If we had a larger membership base we could cover the excess through the membership dues, but this is not presently the case nor should it be. The drawings should be a fund raising activity like the 50/50 drawing, but they have not been run this way.

This year's board had three board members step down at the end of their term. Our new board is short 3 members as of this writing and we need members to step up and fill those vacancies. A full board would consist of 3 officers (President, Vice President, & Treasurer), 4 Two Year board members and 4 One Year board members.

As we move forward I wish the new Board the best of success for the club and wish all the membership a happy safe and blessed holiday season continued through the coming years.

Join us at the Christmas Potluck starting at 6:00 p.m. Wednesday December 21st and don't forget the prospecting related gift exchange (\$15-\$20 limit).

I can be reached at cjoej1@peoplepc.com or my cell phone 303-888-5417 (texting is discouraged).

Vice President's Corner! by Mike Stevens



This past Thanksgiving week didn't go as planned. A few of our friends were in the hospital, a friend's special needs son stayed with us for four days, we took care of two dogs, and the oven and stove completely broke down while cooking our thanksgiving meal, but through it all we still had a good holiday. Let's remember the ones who did not have it so lucky. A simple reminder that not all treasure comes in gold. Family, friends, and good health are priceless treasures that we should never take for granted. With the upcoming Christmas holiday season I hope everyone and their families and friends stay happy and healthy! And maybe finding some new gold equipment under the tree wouldn't be too bad either! Golden Smiles for All!

From the Treasurer/Secretary Ledger by Joe Kafka



It was nice to see everyone at the November meeting. The Club remains in the black and members may request to see the financial report at any time which I have at my table in the back whenever you wish to see it. Hope to see you all at the next meeting in December when we will be having our Pot Luck Christmas Dinner and Awards Recognition Program. We will start our nugget giveaway again in January when we will be giving away seven more gold nuggets, the largest of which is over 1.8 grams....!! Don't forget to buy your 'Special nugget tickets as well. See you all at our next meeting and Merry Christmas!



Board Meeting Minutes From Nov 2022

X	Joe Johnston	X	Andy Doll	X	Robert Ahr	X	Gordon Smith
X	Mike Stevens	X	Joe Kafka	X	Kathy Lemuel		Mike Hurtado
X	Bobby Manning	X	Chris Kafka	X	Kevin Singel		James Long

Quorum Present: _Yes.

Call to Order by: _Pres Johnston_ at _6:03_pm.

Reading and Approval of Minutes: Corrections: _none_ Approved as read/corrected: Yes.

Treasurer's Report: Questions: discussion of how the gold is purchased for monthly drawings was conducted. Proposals will be made at November meeting_ Approved: _Yes.

Correspondence: phone calls/texts: 2_ e-mails 10 _ mail _2_.

Webmaster: Total hits __174 __ Hits in last 30 days 162551.

Committee Reports: Outings planning remains ongoing.

Unfinished Business: Discussion on how to balance the Club income with the value of gold given away each month. Discussion was lively with no consensus so a committee will be formed to include past Pres. Long to prepare a resolution for the Board. BM Manning discussed his attempt to negotiate the increase of rental fee for Clements Center which was to no avail. Rent will be \$190 @ month for 2023. This item had a lot of discussion with potential remedies which were all rejected. Elections are tonight and BM Smith took over the duties due to BM Hurtado being ill. Additional discussions involving the Swap Meet tonight, Finds of the Month and Year tonight, plus the Holiday celebration, the Ken Barker Award took place. BM Ahr discussed the Christmas Dinner and it was determined that he will handle securing the ham and turkey.

New Business: Bill Chapman found the hidden Cache but the nugget prize was not available tonight so will be presented to Bill next month. BM Singel discussed dropping the number of free memberships handed out for 2023 down to 2 from the usual 3 which the Board approved.

Planned Outings: The Outing Schedule has been pretty much established and Andy has published it with the Newsletter. We will continue to schedule as opportunities arrive.

- Nov. 19 Tour of Geology Museum at School of mines in Golden.
- Dec. 21 Annual Christmas Pot Luck Dinner and Recognition Program. No General Meeting that night.

Board Members Items of Discussion: Due to the length of business discussions, there was no time for any additional input.

Tonight's General Meeting Program: A Swap Meet for new and used equipment will be held in back of the room during the break.

Announcements: Next Board Meeting __01/18/23_ at 6:00pm Next General Meeting: __01/18/23_ at 7:00pm.

Adjournment: Meeting stands adjourned at _7:04 pm.

QUESTION OF THE MONTH

NO question this month. Back in Jan 2023.

2022 GPR Board of Directors Members

President

Joe Johnston

Vice President

Mike Stevens

Secretary/Treasurer

Joe Kafka

2 Year Board Members

Bobby Manning (2023)

1 Year Board Members

Andy Doll

Chris Kafka

Robert Ahr

Kevin Singel

Kathy Lemuel

Gordon Smith

Mike Hurtado

Past President

James Long

General Meeting Minutes From Nov 2022

1. Meeting was opened at 7:10 pm by Pres. Johnston with the Pledge of Allegiance.
2. Pres. Johnston then announced that the evening Program was a Swap Meet of new and used mining equipment in the back of the room. Ballots were then handed out for tonight's election of Officers.
3. Pres. Johnston then gave the Metals Report: Gold 1774.50, Silver 21.46, Platinum 1004.00, Palladium 2014.00, Rhodium 12450.00.
4. Web hits for last month was 162/162,713.
5. Treasurer Joe Kafka advised that the Club remains in the black. Report is available for review for anyone who wishes to see it. Also, don't forget to buy tickets for tonight's 9 nuggets drawing, the largest being 2.4 grams. We have a new 'Special Nugget' so buy lots of tickets.



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6. Shelly Zornes reported that we had 51 members in attendance. There were 2 guests present tonight. The total meeting attendance was 53.
7. Pres. Johnston read the ‘Question of the Month’, which was “...58 years ago, a candidate for high office used symbols from the periodic table of elements in their campaign. Name the candidate, the office they were seeking, and the symbols used in correct order. (hint: one is an element and the other is a compound). Winners will receive an extra ticket to the gold nugget drawings later during the evening program.
8. Pres. Johnston advised that there was time to enter items at the break for the ‘Finds of the Month’ table and that the monthly winners from tonight will need to be saved for the Finds of the Year competition in November, 2022. A reminder to all that their gold submissions need to be weighed dry and only one submission per person per category. Be sure to fill out the entry cards completely. Only finds found within the last 30 days may be submitted. There was also the Finds of the Year on another table for the membership to vote on as well.
9. Gordon Smith announced that the ‘Cache’ had been found by member Bill Chapman. A discussion of the Hunt and the clues offered was undertaken. Bill will have to wait until next month to receive his prize nugget. As always, you must be present at the meeting in order to get the Cache clues. Bill presented the first “Cache Clue #1” for the next Hunt which is now under way.
10. Bobby Dehmlo advised that the Club Store had numerous items for sale. Be sure to drop by at the break and support your Club by buying something. We have some more of our gold bags also.
11. Pres. Johnston informed the membership that the Schedule of Outings would start up in January for the coming year so stay tuned for them. The last Outing for 2022 would be a tour of the School of Mines Museum in Golden on Nov. 19.
12. Shelly Zornes advised that the Christmas Dinner sign-up was in the back and ready for folks to indicate what they would be bringing.
13. Bobby Manning conducted the 50/50 raffle which netted \$46 dollars to the Club and \$46 dollars to the winner.
14. Pres. Johnston then announced the results of the election and introduced the new President Bobby Manning, VP Mike Stevens, Treasurer Joe Kafka, Board Members: Gordon Smith, Kevin Singel, Robert Ahr, Andy Doll and , new board member Rodger Schlenger, Past President Joe Johnston.
15. There was a reminder to be sure to vote on the Finds of the Month and to answer the Question of the Month during the break. Members who check things out of the Club Library are reminded to return them promptly. Don’t forget to donate to the Refreshment Table. There was nothing added from the Floor.
16. Pres. Johnston announced the break at 7:55 pm. Meeting was called back to order at 8:30 pm.
17. Pres. Johnston announced the winners of the ‘Question of the Month’. The answer was, “...Barry Goldwater, President of the US, and AuH₂O! There were a total of 31 winners who received an extra ticket for the upcoming gold drawings.
18. Pres. Johnston announced the winners for the ‘Finds of the Month’ for May 2022. Those were:
 - Best Coin – a tie going to Shelly Zornes/Bob Ahr with a 1903 penny/1937 dime, both found in Majestic View Park in Arvada.
 - Best Jewelry – There was no entry in this category for this month.
 - Best Mineral – Ray Vigil with an Opal specimen he found while elk hunting in the San Juan Mountains. Of Colo.
 - Best Artifact – Bobby Manning with an old metal ID plate for a shaker table that he found in the equipment yard of Mountain High Mining.
 - Best Bottle – There was no entry in this category for this month.
 - Most Raw Gold – There was no entry in this category for this month.
 - Largest Raw Gold – There was no entry in this category for this month
19. Pres Johnston then announced the winners of the Finds of the Month. They were:
 - John Olson for Best Coin, Jewelry,
 - Artifact and Bottle, Joe Johnston with Best Mineral, and Joe Fortunato with Largest Raw Gold and Most Raw gold. Those photos will be in the December Newsletter.
20. Pres. Johnston concluded the evening with drawings for the numerous door prizes donated by the GPR, and JJ Long followed by the drawing for 9 gold nuggets. Pres. Johnston also wants to remind that holders of drawing Tickets for the Regular gold drawings who did not win and want to redeem those tickets may present them at the



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end of the Meeting and they will be reimbursed at .01 cents on the dollar, or they shall be considered to have been donated back to the Club. Those assisting in the drawings were John Olson and Joe Kafka.

21. Pres. Johnston reminds the members that sometimes during the meetings, The President's time is overwhelmingly taken up by the many who wish to speak to him and he apologizes if anyone ever feels like he is unavailable. It is not his intent to be inaccessible and he encourages anyone with questions to contact him by e-mail or phone outside the meetings at any time. His e-mail and phone number are on the web site.
22. Pres. Johnston thanked Greg and Nancy Knerl and all those who contributed to the Refreshment Table. All members are encouraged to chip in and add to the spread each month. Don't forget the 'tip jar' also, which helps to defray costs. This really helps the folks who run the table and those who volunteer up front each month. The Club appreciates the efforts of each and every one of you to make the refreshment table enjoyable.
23. The December Meeting Program will be the Members Christmas Program and Recognition Program. There will also be a Gold Elephant gift exchange with a limit of no more than \$20 per gift which should be something mining related. There will be no formal meeting.
24. Having nothing further at this time, remember to prospect safely, and we will see you all at the next get together. Meeting was adjourned at 8:56 pm.

From Your Library by Kathy Lemuel

Our material on Colorado Archeology grew this past month by two books and three publications thanks to the generosity of Greg and Nancy Knerl and their second donation.

Old World Archeology: Foundations of Civilization, Readings from Scientific America provides glimpses of more than 500,000 years of man's cultural evolution and the rise and fall of past civilizations. Also included are maps to reference topics throughout the book.

The Archeology of Colorado by E. Steve Cassells details the prehistory from the Paleo-Indian mammoth and bison hunters through the Archaic, Fremont and Plains Woodland peoples to the Anasazi of the southwest and historic Utes and Plain Indians. A book for both the professional and amateur archaeologist.

If you have books you would like to donate to share with the club, stop by the table.

Mines Museum of Earth Science Outing by Kathy Lemuel

As a first time visitor, I was in awe of the vast quantity of museum quality mineral, gem and fossil collections. Our group of 9 all found spectacular specimens. UV minerals were on display in a walk through mine prop. A moon rock was featured as well as historical mining and mining related equipment. The museum was founded in 1873 and opened in 1874. Specimens were collected from Colorado, the United States and throughout the world. An excellent museum for anyone interested in impressive minerals, gems and fossils as well as mining history.

A Miner's Laugh

The airline had a policy that required the first officer to stand at the door while the passengers exited, smile, and give them a Thanks for flying XYZ airline'. An airline pilot on this particular flight hammered his plane into the runway really hard. In light of his bad landing, he had difficulty looking the passengers in the eye, all the time expecting that a passenger would have a smart comment. However, it seemed that all the passengers were too shell shocked to say anything.

Finally, everyone had gotten off except for this little old retired miner walking with a cane. He said, 'Sonny, mind if I ask you a question?' 'Why no Sir,' said the pilot, 'What is it', the little old miner squinted his eyes and said, 'Did we land or were we shot down?'

(Taken from the internet and revised just for all us 'old miners')



The finds of the Month Nov 2022:

Contest runs from November 2022 thru October 2023. We will be looking forward to seeing what you folks have found since last November.

- **Best Coin** – **Shelly Zornes** with an old 1903 Indian Head penny she found metal detecting at Majestic Park in Arvada, Colo.
- **Best Jewelry** – There was no entry in this category for this month.
- **Best Mineral** – **Ray Vigil** with an opal specimen he found while elk hunting in the San Juan Mtns of Colo.
- **Best Artifact** – **Bobby Manning** with an old shaker table plate he found at a job site in South Park, Colo.
- **Best Bottle** – There was no entry in this category for this month.



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- **Most Raw Gold** – There was no entry in this category for this month.
- **Largest Raw Gold** – There was no entry in this category for this month.

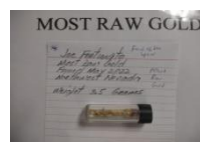
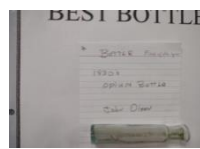
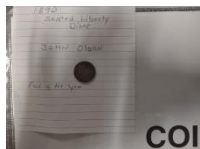


(Photos by JJ Long) Be sure to bring any Finds that you have found in the last 30 days to the next meeting. You must list the date that you found the item and the area you found it when you submit it. All gold entries must be weighed and be dry when submitted. Each monthly winner must save your winning Find and submit them in **November of 2023** for the **Find of the Year** in each category.

Finds of the Year for 2022

The following submissions were selected by the membership as the winning Finds of the Year for 2022. Those who remembered to bring their monthly winners in were in the running and those who forgot, weren't. Congratulations to the following winners. (Photos by JJ Long)

- **Best Coin** – **John Olson** with an 1890 Seated Liberty Dime, a metal detecting find from August, 2022.
- **Best Jewelry** – **John Olson** with a gold bracelet, a metal detecting find from March, 2022.
- **Best Mineral** – **Joe Johnston** with a gold ore sample he found in November of 2021.
- **Best Artifact** – **John Olson** with an old civil war button, a metal detecting find from April, 2022.
- **Best Bottle** – **John Olson** with an 1880's opium bottle, from January, 2022.
- **Most Raw Gold** – **Joe Fortunato** with 3.5 grams of gold, the May winner from 2022.
- **Largest Raw Gold** – **Joe Fortunato** with a 3.1 gram nugget, the winner from October, 2022



Again, congratulations to these winners of the Finds of the Year for 2022. As you can see, some of these finds were nothing less than spectacular and clearly demonstrate that there is some really exciting stuff out there to be found whether you are digging, rock hounding or metal detecting. Treasure aplenty remains undiscovered and you too, can be a winner if you just take the time to get out there and look. Let's have a really good 2023 and we look forward to see what magical treasures you folks can come up with in the coming year.

Obituary



It is with great sadness that we report the passing of **Steven J. Rex, 70**, of Golden, Colorado. Steve was a member of the Club for some time and always enjoyed attending the meetings and programs. Steve had worked for Century Link but also enjoyed being in the out of doors and especially panning for gold. Steve was a quiet man and a good man and enjoyed talking to the other members and listening to their adventures. Rest in Peace old friend, there is gold aplenty where you now live!



2022 Annual Metal Detecting Hunt

We had 18 hunters (and two hunt staff) show up on a breezy 60 degree morning. With 393 targets planted with 18 prizes at stake the hunt kicked off at 11:00 a.m. on schedule just as the breeze dropped off making hunting more pleasant. We picked up two new members that joined the club on site and shared in the fun (we had received and approved a request in advance for this). After one hour the ending whistle was blown and participants gathered for the awarding of prizes and counting of recoveries. Only one prize target was not recovered along with some 40 other targets which the participants were allowed to hunt for afterwards. All had an enjoyable time and departed in good spirits. A special thanks to Rodger



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Schlenger for his donation of over 100 coins used as targets and Joe Johnston for donating two Ike Dollars to round out the finds. (Photos by Joe Johnston)

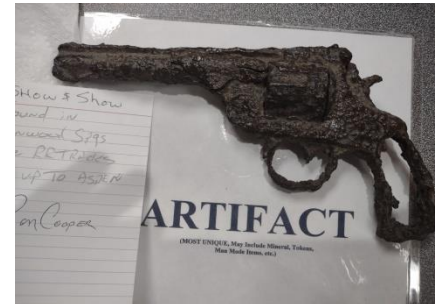


Celtic Gold Heist Possibly the work of Organized Crime (reprinted from the Denver Gazette Newspaper Nov 24, 2022)

A senior official in southern Germany says that organized crime groups were likely behind the theft of a huge hoard of ancient gold coins stolen from a museum earlier this week. The 483 coins were discovered in 1999 during excavations of an ancient settlement near the present-day town of Manchning and were on display at the local Celtic and Roman Museum. Bavaria's minister of science and arts said Wednesday that all of the museum's security systems, along with Manchning's entire telephone network, had been disabled during the heist. Authorities fear that the treasure, worth millions of dollars, will wind up being melted down.

Fantastic Find by Club Member

A very unusual find was reported by member Ron Cooper. Ron stated that several months ago, when the weather was a little better, he was out doing his thing and decided to walk up the old railroad tracks between Glenwood Springs towards Aspen. Railroad tracks are always interesting places to search for unusual things lying around and this particular set of tracks has a long history in Colorado. The **Colorado Midland Railroad** reached Glenwood on December 12, 1887. Its route originated in Colorado Springs, went through Leadville, over the Continental Divide, and down the Frying Pan River Valley to Basalt. It then built tracks to both Glenwood Springs and Aspen. The last train departed Aspen on October 24, 2019. That was plenty of time for things to be lost along those tracks, not counting the occasional train robbery to boot. This find was not submitted to the Club's Find of the Month but was submitted as a 'Show and Tell' item, and a mighty impressive one at that. The weapon, a 6 shot revolver, appears to be possibly a .32 caliber hand gun, but its condition makes it impossible to tell the make, model, or even the caliber with any degree of certainty. Doc Holiday, a famous old west gunfighter who died in Glenwood Springs on November 8, 1887 just a month before the railroad got there, was known in his later years to favor a smaller concealed .32 Remington revolver as well as a .42 Remington derringer, just saying. Thanks Ron for sharing.



Mineral and Crystal Formation by Tracy Repp (Reprinted from the July/August issue of Gold Prospectors)

(I thought this would be a good piece to accompany my discussion last month about gold and its relationship to quartz. When we are prospecting, nearly all of us encounter various crystal and rock specimens that we find intriguing and usually don't know what they are J.J.)

A mineral, by its dictionary definition, is a naturally occurring inorganic solid with an organized crystalline structure that can be represented by a chemical formula. A rock, in contrast, is a solid substance that is a combination of one or more minerals. To understand how minerals and crystals form, it's helpful to know a little bit about atoms, which are the building blocks of all objects in our universe. They are composed of smaller particles called protons, neutrons and electrons. Without getting too technical here, the important thing to know is that the protons which have a positive charge, and neutrons, which have no charge, are at the center - the nucleus - of the atom while the electrons, which have a negative charge, buzz around the nucleus like orbiting planets around a sun. Just like Jupiter and Earth orbit the sun at different distances, electrons move in orbits at varying distances from the nucleus as well. As it turns out, the electrons in the furthest orbit or 'shell' are the ones responsible for forming attachments or bonds with other atoms. These outer electrons try to stay in even numbers, which allows the atom to feel more stable, especially if that number is eight. Now I'm really over simplifying that for our discussion here, but if we follow this 'rule of eight', then when that number is not eight, the atom is unstable and will look to stabilize itself by finding electrons somewhere else (like from other atoms nearby) or by getting rid of some. This transfer or sharing of electrons binds atoms together in a mutual partnership with



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the goal of achieving greater stability. So how do these mechanisms result in crystal formation? Think about the atoms as the building blocks and their bonds as the cement that keeps the blocks together. These blocks organize themselves in very distinct patterns because the atoms have some areas that are positively charged and some that are negatively charged. Since opposite charges attract and similar charges repel, this forces the atoms to orient themselves to achieve balance. This means that the atoms form organized patterns as they attach to each other and this is how the crystals begin to take shape. To demonstrate how this happens, let's briefly look at the bonded atoms silicon and oxygen. These two atoms are the most abundant in rock-forming minerals and are the building blocks of the most abundant mineral group on Earth, the silicate minerals. To achieve stability in this relationship, one silicon atom is surrounded at even intervals by four oxygen atoms. This arrangement of atoms forms a tetrahedron, which is a three-sided pyramid. Now these little pyramids can start attaching to one another and the patterns formed by the attaching pyramids can be endless. These patterns can include chains, double chains, sheets, multi-member rings or any number of 3D structures. These pyramids achieve greater and greater stability by bonding with other atoms and pyramids in repeating and organized patterns, and this is how crystals are formed with this group of minerals. The following are some common silicate minerals with distinctive tetrahedron arrangements.

Even before we would tackle the subject of mineral identification, I have been asked to clarify for our readers the difference between some words and phrases that are sometimes, incorrectly, used interchangeably. Remember that we have already defined a mineral and a rock at the start. Let's add a gem which is defined as precious or semi-precious crystalline minerals, while a precious stone are materials that do not fall into the category of 'crystalline mineral' like amber, obsidian or agate. Now, with those definitions, let's begin with how to tell one type of mineral from another. I get sent photos of rocks and minerals all the time from students, friends and family who want me to identify their found specimens remotely, based solely on a photo. The reality is that, while I can sometimes make an educated guess, it can be a tricky business. Many minerals look similar and are found commonly together, so they can often be mistaken for one another. If no information is known about the specimen, then it is even trickier to identify it from the range of possibilities. There is a simple process involved in specimen identification and, while it may seem a little overwhelming to see the range of mineral properties described in this article, defining all or most of these properties to the best of your ability by making some quick observations and doing some simple tests will have you able to identify the majority of minerals. It is my hope that you will come away having the basic knowledge and tools to be confident using this process in the field or wherever you have an unknown specimen in hand. By looking at several characteristics or properties, most minerals can be quickly identified. Some of the characteristics that we will discuss further are luster, hardness, color, streak, specific gravity cleavage, fracture patterns and crystal habit. Some unusual characteristics particular to only one or a few minerals are discussed also, as these unique characteristics can quickly allow for the identification of certain minerals without having to look at too many other properties. Be advised that there are many minerals that vary greatly in appearance and have multiple presentations within each characteristic. This is further complicated by the poor quality of specimens commonly encountered in the field, such as those embedded in rocks, that make many of these properties difficult to discern. If one property cannot be defined, try for another and use the process of elimination with the help of a good mineral identification flow chart.

Diagnostic Properties

Luster: This property is technically described as the ability of a mineral surface to reflect light. When using a typical mineral identification flow chart, which can be found easily online, you'll find this property to be the first used to narrow possibilities down quickly. Luster is first divided into metallic and non-metallic minerals. Non-metallic minerals are then sometimes broken up further into dark and light colored categories and, from there, further into more descriptive terms such as: Adamantine, which is extremely reflective like diamonds, Resinous like amber or garnet, Glassy (also called vitreous) like quartz, Pearly like talc or muscovite mica, Silky like chrysotile asbestos, Waxy like jade, and Dull which is not reflective at all. A word of caution here is that I have had many students in the past describe a very black and shiny material as metallic. This mistake will guarantee you will be unsuccessful in identifying your specimen. To complicate, there are also sub-metallic lusters that appear metallic but don't reflect as much light as metallic lusters.

Hardness: This property is defined as a mineral's resistance to abrasion or scratching. The Moh's Hardness Scale is a convenient way to estimate hardness and this is done simply by scratching a mineral against another substance with a known hardness. In the field, a hardness range can be determined with a few common items of known hardness such as your fingernail (hardness of 2.5), a copper penny minted prior to 1982 (hardness of 3.5), glass (hardness of 5.5), and a real steel nail or steel file (hardness of 6.5). If your specimen scratches or is not scratched by any of these items, then it is harder. By scratching your specimen against these items, hardness ranges can be determined such as under 2.5, 2.5 – 3.5,



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3.5-5.5, 5.5-6.5, or greater than 6.5, which can greatly increase successful identification. If you look at a mineral identification flow chart, you can see that the minerals are often more simply differentiated into categories of softer or harder than a steel nail or softer than a fingernail. One note of caution here is that you should try to use a fresh specimen edge for scratching. I have had students mis-led in the past after using a specimen edge or corner that hundreds have used before. For example, hard quartz will scratch glass and steel but if its edges are now 'coated' in the glass or steel from many prior scratches, it will no longer scratch those items because glass won't scratch glass and steel won't scratch steel. Hardness should be a key diagnostic for tricky quartz, which comes in many colors and crystal habits and covers a range of luster from vitreous to waxy but not if its edges are covered in other substances.

Color: This property is highly subjective and not often reliably diagnostic since mineral impurities can effectively change overall color. Sometimes, though, this property can be helpful. A good example of how color can vary between mineral varieties and from specimen to specimen is quartz, which comes in all kinds of colors.

For example, the quartz variety known as amethyst is typically purple from iron impurities, while rose quartz is typically pink to rose red from titanium, manganese, or iron impurities.

Streak: This is the color of a mineral in powdered form and is far more accurate a diagnostic than overall mineral color. Powdered residue can be created by scratching a mineral specimen across a piece of unglazed porcelain. This residue is called a mineral's streak and the color can often quickly help with mineral identification. A good example of this is hematite, which comes in both metallic and non-metallic varieties that appear drastically different from one another. Its streak, across all varieties however, is consistently reddish brown.

Specific Gravity: This property (SG) is technically the ratio of a mineral's weight to the weight of an equal volume of water. Whether a mineral has uniquely high or low SG can be quickly determined by just holding the mineral specimen in your hand. If it is heavier than you'd expect for its size, then it has a high SG of greater than 4.5 and if it is lighter than you would expect for its size, then it has a low SG of maybe less than 2. A few minerals will stand out by this simple test, such as graphite (SG of 1.75) and galena (SG of 7.5). A note here, though, is that this property cannot be determined for an embedded mineral, but for a single mineral specimen only.

Cleavage: This property is the tendency of a mineral to break along planes of weakness in atomic bonds. Minerals are formed from a highly organized arrangement of atoms and the bonds between these atoms can vary in strength. If certain bonds tend to be weaker with respect to others in the arrangement, then the mineral will tend to break along those planes. A perfect cleavage is one that reflects light well and creates very flat surfaces which are easy to spot, while a poor cleavage is one that doesn't. If no cleavage planes exist, then the breakages are called fractures (discussed below). This property is very diagnostic of many minerals. The number of cleavage planes can vary from one to six, but minerals with four or six cleavage planes are uncommon. It is common to have one, two or three cleavage planes and, for those with one or three, it is diagnostic if these planes are at 90 degrees (perpendicular) to one another or not. For example, halite has three perfect cleavage planes at 90 degrees, forming perfect cubes.

Fracture patterns: This property is breakage patterns that are unrelated to weak chemical bonding planes. Some examples of fracture patterns that may assist in identification include irregular or uneven, conchoidal (like glass) and fibrous (like chrysotile asbestos).

Crystal habit: This property describes the shape a mineral crystal takes as it grows in unrestricted (space wise) environments. Field specimens will rarely show these forms, which are often mistaken for cleavage. Crystal habit forms include acicular or needle like, bladed, globular, columnar, fibrous, platy and prismatic, to name a few.

Other Unique Properties

These unique diagnostic properties are applicable to one or a few minerals only. Having these traits makes the need to define the properties described above less critical.

Taste: While I don't recommend licking rocks or minerals in general, halite, which is regular table salt, is a mineral that can be quickly identified by its taste.

"Feel": This property is a little subjective, but a few minerals are uniquely characterized by how they feel when you touch their surface. For example, talc will feel 'soapy' and graphite will feel 'greasy'.

Streak Odor: This property is applicable to sulfur-bearing minerals, which have the smell of rotten eggs.

Magnetism: This property occurs in several minerals such as chromite and ilmenite which are weakly magnetic but magnetite is easily identified by its strong magnetism.



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Acid Reactivity: Carbonate minerals such as calcite will fizz or react in contact with dilute hydrochloric acid (HCl). Some minerals like dolomite, need to be powdered, which increases surface area, to show an obvious reaction.

Tools for Identification

Mineral identification kits can be purchased online for less than \$15, generally. These kits, which every rock and mineral hound should have in their arsenal, typically include the following: Streak plates (unglazed porcelain in white and black) to determine streak, Acid bottle with dilute HCl (5-10%) to determine reactivity with acid, Your finger nail, a copper penny (pre 1982, a plate of glass and a steel nail to determine range of hardness. A copy of the MOH's scale is handy to have as well, a Magnet to determine magnetism, a Hand Lens to identify cleavage, fracture patterns or other optical properties in small, broken or embedded specimens, a Mineral Flow Chart.

I am often asked by my students how to tell the difference between three colorless minerals that appear to be the same. These crystals, pure quartz, halite and calcite in their pure state are nearly identical. I stress 'pure' because it is the impurities that give them color. The properties of these three minerals are nearly identical and you have to look hard to tell the difference. Through the process of elimination, you may find that the key is determining hardness, cleavage, and reactivity to diluted HCl. Quartz is much harder than both calcite and halite and will scratch or not be scratched by your diagnostic tools. Calcite and halite are similar in hardness. Calcite will scratch your fingernail while halite probably won't, depending on the quality of your specimen. Cleavage is significantly different in these minerals as well. Quartz has no cleavage but its crystal habit can confuse the inexperienced. Halite has three perfect cleavage plains at 90 degrees. But the best way to differentiate between calcite and halite is with dilute HCl. A drop on calcite will fizz while halite shows no reaction at all. Always try to make sure that your specimen is as fresh as you can get.

Remember, having access to a Moh's Scale of hardness and a Mineral Flow Chart in the Field can be extremely helpful in your identification process.

(As I read through Tracy's article, it took me back to my college classes at Mesa Community College and later at Colorado State University as I studied geology. That was a long time ago and I have forgotten a lot of it but much of it came back as I read her article. It brought to mind that as you prospect for gold, there are many specimens of minerals that you will encounter and the more you know, the more you will find. It is just that simple...so have fun and keep your eyes wide open, as there is more than just gold in them thar hills!!! JJ More to come next month on minerals and gem stones.)




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Contact the GPR President

(Layout Design Subject To Additional Cost)



Coming Announcements and Special Events for Jan 2023

(**WMMI** - Western Museum of Mining & Industry, 225 North Gate Blvd. Colorado Springs, CO 80921
(<https://www.wmmi.org/>) (Free to GPR Member with badge)

SUN	MON	TUE	WED	THU	FRI	SAT
1 <u>New Year's Day</u>	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16 <u>Martin Luther King B/D</u>	17	18 <u>GPR Club Meeting</u>	19	20	21
22	23	24	25	26	27	28
29	30	31				