

HELL'S CANYON GEM CLUB
P.O. BOX 365
LEWISTON, IDAHO 83501



**Serving the Valley for
61 YEARS**

PURPOSE OF HELLS CANYON GEM CLUB, INC.

The purpose of this nonprofit, social club is to promote the rock hound hobby by providing opportunities for the collection, working and displaying of gems and minerals, as well as educational programs in the field of geology.

MEETINGS: 2nd Friday of each month Board Meeting 6 pm Regular Meeting 7 pm
VISITORS ARE ALWAYS WELCOME

Dues: Adult [per person] \$15.00; Junior [under 18] Free with a responsible adult membership.

2013 BOARD OF DIRECTORS

President	Steve Rand	208-791-2325	1st Year Trustee	Betty Wilks	208-301-3939
Vice President	Mel Wilks	208-301-3939	1st Year Trustee	Torch Yates	208-743-3358
Secretary	Sally DeBruin	509-758-7580	2nd Year Trustee	Dan Cease	509-254-1720
Treasurer	Marilyn Sharp	509-758-4218	2nd Year Trustee	Lon Sharp	509-758-4218
Past President	Linn Enger	208-746-4957	Federation Director	Jeremy Giard	509-758-2581
			Federation Delegate	Gail Giard	509-758-2581

HELLS CANYON WEBSITE: <http://www.hellscanyongemclub.com>

WEBMASTER: Rick Westerholm: hcgemclub@yahoo.com

HOW TO FIND OUR MEETING PLACE



To get to new meeting location for the Hells Canyon Club, go south on 15th Street in Clarkston. 15th turns into Scenic Way and goes up the hill. Scenic Way turns into Appleside Rd. Continue south on Appleside Rd to where it turns and becomes Reservoir Rd.

The Grange Hall is located at the junction of Reservoir Rd, 6th Avenue and 22nd Street. Additional parking is available in the Church parking lot across 6th Avenue.



PRESIDENT'S MESSAGE

Hello Everyone,

Here it is May already time to do some rock hunting while the weather is getting nicer. We had a couple good field trips with everyone finding themselves a few treasures. I would like to thank Dan for his presentation on minerals he collected in Washington. If you have any idea's for field trips bring your idea's to the meeting and lets get another one set up. Bruce will be back again this month with another talk on mineral identification, So bring in some treasures for show and tell and we will see everyone on the 10th of May.
Steve



One of my treasure's from the field trip

The Club has a Facebook page!!! Checkout our page, look, like or post. Use the link below.
<http://www.facebook.com/pages/Hells-Canyon-Gem-Club/343645205755520?fref=ts>

April 2013 Meeting Minutes

Board meeting April 12, 2013 6:25 pm

Minutes approved as printed in the newsletter. Motion by Torch Yates, 2nd by Dan Cease, motion carried.

Marilyn Sharp presented a new membership form, which has been in review. The new forms will be printed and available for use.

Treasurer report given by Marilyn Sharp. Motion by Dan Cease to authorize payment of bills, 2nd by Torch Yates, motion carried.

Marilyn also reported on auction proceeds. The net affect realized was approximately \$1400 after advertizing costs, cashier startup change, and consignment payments.

Linn Enger reported Bolder Buster distribution is running smoothly and has been working on the membership list. Linn will forward by email the current list to President Steve Rand.

Discussed whether the club should buy grit in bulk to sell to club members. The last purchase made 2 to 3 years ago is running low. The 80lb grit obtained from Bruce is still available to members for purchase. Research on costs will be available next month to see if club should proceed with bulk purchase.

Meeting adjourned at 6:35pm

Regular meeting called to order at 7:05pm

Guests and new members: Marc Yates (Torch's son), Harlan of Moscow, and Ken of Lewiston

Auction was deemed successful and all volunteers involved were thanked by President Steve Rand for their participation.

A summer barbeque instead of an indoor potluck was discussed with the club providing hamburger and members bringing desserts. More information to follow.

Mel Wilks is putting together an Opal Dig field trip, if enough interest is generated. A signup sheet was circulated and Mel will contact individuals when it is scheduled.

Tom Blimka was presented with a plaque from the Club for the 2011 Federation Master Intarsia and Sweepstakes award.

Rose and Orville McArthur are moving to Boise and were presented with a plaque in recognition of their hard work as Federation Delegates, Bulletin Editor, Silent Auction Team Members, and their many years of service to the club. A cake social was held for Rose and Orville before the program.

Linn Enger is working on a membership list, check to make sure your name is on the list, if not, please add it.

Rose and Orville have accumulated rock over the years that will not be traveling to Boise with them. Mel Wilks is going to include their rock in an auction that he is putting together probably in the next couple months. More information to follow.

Show and tell--Joe Schacher brought in a cane he made with a rock inlay handle of 23 different rocks and various cabs he made from jaspers found on a recent trip; Linn Enger made a bolo with shades of a blue jasper found on a recent trip; Jerry Blimka circulated a beautiful opal ring he made; Lonnie Sharp brought in a variety of rocks found from the various field trips to the Evans Rock pit, and another member brought in rocks that resembled petrified potatoes. (If I missed anyone, I apologize)

Drawing for door prizes was held

Program by Dan Cease on information of the Washington State Mineral Council and field trips that are affiliated with the Mineral Council. Dan also displayed various specimens found throughout the years at these field trip locations. Club members can attend these field trips as our club is now a member of the Mineral Council. For more information on when and where to meet for the field trips, go to their website-- www.mineralcouncil.org

Meeting adjourned at 8:25pm (Respectfully submitted by Gail Giard)

FEDERATION REPORT

**Jeremy Giard, Federation Director; Gail Giard, Federation Delegate
April 20, 2013 Mid-Year Federation Meeting-Kennewick WA**

The 2013 NFMS Show is in Butte, Montana August 9-11, 2013. Send in your competition exhibit application to Joe Slover, PO Box 427, Butte MT 59701 by the July 10, 2013 deadline. Set up day is Thursday August 8th at the Convention Center in Butte. Check out the NFMS March 2013 Northwest Newsletter you received for the necessary forms or the website at www.amfed.org/nfms.

The NFMS 2014 Convention will be in Hermiston, OR 8/15-17/2014. They will have 14 inside dealers and hopefully a good number of outside dealers.

The NFMS 2015 is still undecided and they are asking clubs to look at hosting the convention in your town. The 2016 convention will be held in Willamette, OR, no date yet.

Warren Rood, 2nd Vice President reported there is a new website forum-- a chat space setup for NFMS members to use to ask questions, share information, thoughts on shows, field trips, juniors, etc. You need to set up a password and then the Web Master will approve your use of the forum to insure you are a NFMS club member.

Carol Willey reminded all Clubs new directory is available. This directory has many uses such as checking club members credentials and for mailing the Northwest Newsletter. If there are errors please advise her as soon as possible.

Audrey Vogelpohl reported sometimes members are called upon by teachers to make presentations to school classes on earth science. There is a AFMS Presenters Manual for rock club members to use for these presentations and can be found on the website under Kids Corner-Presenter's Manual.

Lamar Tilgner reported that the Northwest Rockhound Retreat still has 5 openings of the allowed 50. See the March 2013 NFMS Northwest Newsletter you received or on the website at www.amfed.org/nfms. The retreat is being held at the Hancock Field Station west of Fossil, Oregon. Lamar also wanted to remind everyone that no collecting is allowed at the retreat area as the campground location is in the middle of a National Monument.

Dee Holland reported the AFMS is offering a Judges and Exhibitors Training Seminar in 2014 at Ogden, Utah. This will be during the annual Golden Spike Gem Show in April. Think about attending and learning. They will have" book

learning" on Friday and part of Saturday. Sunday morning you will help "judge" exhibits. This proved to be a great experience at the Reno Gem Show in 2011 with 30 people attending. More information on this in the NFMS newsletter.

John Spunaugle reported the NFMS Endowment Fund currently has total assets at \$189,700. Judi Allison reminded all present this fund is set up so clubs do not have to raise dues. The last time dues were raised was in the 1950's.

Don Innes supplied a handout of the 2014 budget, which shows that \$10,685 of Unrestricted Endowment Fund money was used to balance the budget. Endowment funds were also used to balance the 2013 & 2012 budgets

Chuck Sonners reported the silent auction proceeds from the Butte Show will go to the NFMS Endowment Fund and encouraged every club to bring 1/2 bucket of rock from their area to have a variety of rock for the silent auction.

Kathy Moedl reported there will be a Resolution Operating Procedure change for voting in August. This change has to do with the operating procedures of the Scholarship Committee. The AFMS Scholarship is a separate corporation from the NFMS. The audit function is no longer performed by NFMS but now audited by professional auditors. Operating changes are needed.

The "Mini Miners Monthly" (MMM) is to be continued for the junior program and can be reprinted for use. This MMM is to be emailed monthly to each Club's President, newsletter editor and junior's program leader. If Clubs are not receiving the MMM or the names have changed, contact by email Darryl Powell at diamonddan@rochester.rr.com.

To avoid clogged kitchen drain pipes, pour a cup of salt and a cup of baking soda down the drain, followed with a pot of boiling water. Sure makes the grease let go.

Coil the ends of your rubber bath mat toward the center, and stand it on end in the tub to drain. If the mat doesn't stay coiled, snap the rolls together with a clothespin. Draining the mat will keep it from mildewing.

Put whole cloves in pockets of woolen coats or in bags with sweaters when storing for the off-season. They prevent moth damage and leave a spicy clean aroma. Also place them in dresser drawers with socks and everyday work clothes.

Do members of your family wear those mud-collecting waffle-looking boots or shoes? Try spraying the soles with Pam, let the mud dry and then hit the soles together. Soles will come clean every time.

To keep your collectors' silver spoons from tarnishing while on display, wax them with two or three coats of liquid floor wax. They won't need polishing for a long time.

I don't buy white shelf paper anymore. Instead, I line my shelves with heavy freezer wrap, with the waxed side up. It can be wiped off with a damp cloth and outwears regular shelf paper.

To separate two glasses that are stuck together, put the bottom glass in warm water and pour cold water in the top glass. The two will pull apart easily without breaking.

I made a little skirt to go around the bottom of my bathroom plunger. Then I stood the plunger in the bathroom and put several rolls of toilet tissue on the handle. Now the plunger---plus extra tissue---is always handy.

I'd often pull the wrong cord as I went to open or close my venetian blinds, so I tied a short piece of colored yard around the cord that closes the blind. Now I know at a glance which one to pull.

As soon as camping season ends, tuck a fabric softener sheet into each sleeping bag before rolling it up. The bag will smell fresh as can be for the first camping trip next season!

Remove sticky price tags from glass or other material by spraying with WD-40. It works well.

Tuck a few pieces of charcoal into your toolbox. It will absorb any moisture that gets in and keep your tools from rusting.

The above taken from "1628 Country Shortcuts" used by permission.

Meeting Program

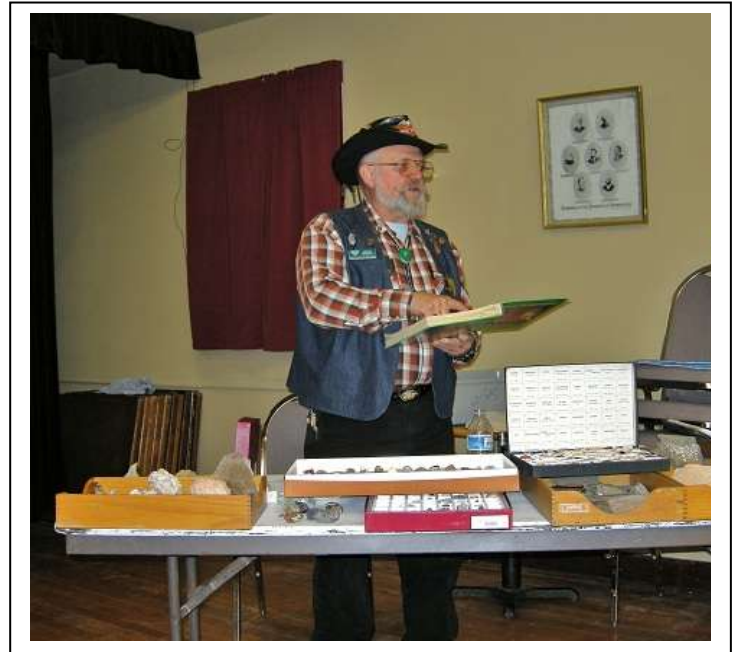
Will be on Minerals, part 3

Presented by Bruce Borgelt

Dan Cease provided the April program on the Washington State Mineral Council and their field trips. Dan displayed various specimens he has found throughout the years at these field trip locations.

Thanks Dan

If you missed part 1 & 2 of Bruce's program, you missed good ones. Be sure to be there for part 3. Please bring a copy of the **SUMMARY TABLE OF ROCK-MINERAL ASSOCIATIONS** to the meeting, Bruce will explain it's use. The table is at the end of the newsletter.



Prospecting for Jade---Sounds like fun and an easy thing to do finding jade. Well it's NOT!! This article is not a bio of me but rather small tips from my experience and little stories that tells more. If you're into collecting rocks and minerals you're prospecting. It is probably the most fascinating adventure.

I like to compare hunting jade like hunting for gold. One just does not go out and expect to find it. I learned you have to do your research. I scoured all types of educational material on gemology, maps, and trade magazines that told about others experiences. Dana's textbook of mineralogy is good but it is too technical for me. I like using myself as the tool to provide identification. I like to use my tongue or water, my eyes and my fingers for the touch. You do not need to worry about smell. Be careful about licking because anything green, red or blue could kill you within minutes if the right chemical is there. Mother Nature is unpredictable and she is not perfect when it comes to chemical and rock mixes. In addition always be prepared to carry a rock hammer, squirt bottle, a G-I-Joe shovel and pick, a backpack, some rope and a gunny sack.

There are two types of jade, Nephrite and Jadeite. Both are tough and both are members of a metamorphosed rock transforming of limestone or sandstone deep below the mantle. You can read more about the differences and background information in reference material on jade. A good source is Rocks and Minerals by Shaffer and The Handbook of Jade by Hemrich.

The exterior shapes of jade can be tumbled (traveled) or situ (in place). Jade has some characteristics. It its weather worn it's waxy to the touch. Jade is very heavy compared to the same sized rock. Color and texture sometimes can be deceiving. Pure jade is white but will show a wide range of colors from purple, pink, brown, white, yellow, black, green and all the mixtures one could imagine. Patterns of color and texture can be different in every piece. Sometimes it will have close parallel fibers that will give a chitounacy. Jade can be disguised by a rind which is usually stained from iron or other minerals in the environment proximity. The exterior can be colored brown, yellow or white. Jade when cut can show rings of different colors, shades of gray, inclusions of pyrite, magnetite, manganese, quartz crystals or even gold.

Nephrite jade is a tough fiber and very dense. When hit with a hammer the sound is like a ring similar to hitting a steel anvil. Centuries ago jade was prized for toughness to make hammers and knives. I could go on talking about jade, there is so much information. I did find a jade slick in a gravel bar on Deer Creek near Oso, Washington. At first I thought it was green glass. It was so transparent and the color was vibrant apple green without any inclusions of black specks.

My prospecting started when I was a little older than five. I traveled to places on the Western Washington side of the Cascades and ventured with my Uncle to parts along Blewett Pass south of Wenatchee looking for gold and platinum. My other Uncle owned two gold mines in Alaska that could only be mined two months out of the year. I never had a chance to go there but saw pictures of them. He had to traverse a glacier to get to them. That old saying; "Gold is where you find it" is also applicable to jade, I thought! I am a fisherman and I always liked gravel bars and water.

I owned a placer mining claim on Money Creek that emptied into the Skykomish River that travels along side of highway 2 between the towns of Gold Bar and Skykomish. I was always fascinated with mining claims, tunnels and rock quarries. I came across a lot of abandoned mines along the East side of the Cascades also. My claim had marble looking jade but it wasn't. Much of that material was mined and became facades to Seattle buildings along 1st avenue.

I was introduced to rock hounding by a neighbor back in 1970 and that started my love for rocks, not just rocks but things like agate, crystals and jade. The weekend fishing trips became prospecting trips that always provided a search for rocks and formations.

The Beckler River system is interesting. It empties into the Skykomish at the town of Skykomish and was always a great place to fish. There are a lot of drainage creeks that run into the Beckler River system. One weekend I was fishing on Frog Mtn. and looked down into a pool of water and noticed a red hue to the sand. I went back to my truck. Got my gold pan and panned the sand and wound up with a lot of garnets, millions of them. They were all over the place. I showed an engineer that I worked with what I found. I thought I struck it rich by finding a whole mountain full of garnets. That was where I got started to look for jade.

The engineer was a mining engineer from Billings Montana and after a couple of days later told me it was worthless because the garnets were coated with lead and could not separate. Darn!! At that point we discussed prospecting for jade. He introduced to me a geology map of the State of Washington. I followed his lead and viewed a fault line that ran from Cle Elm, west of Mt Baker and extended north into Canada west of Kamloops and through Lillooet, BC.

He pointed out Metamorphism, rocks and minerals changing in composition. It occurs in a condition deep down in the magma where heat and pressure changes various types of rock into something else. I was not into all that technical stuff, just show me the jade. I had visions of striking it rich with jade. Boy was I wrong. It took us two years traveling up and down the mountains before we found jade. The west side of the Cascades likes to conceal it with overburden. So we limited our search to river and creek gravel bars and benches that had out cropping's.

We started to find jade all over the place. There were rock hounds/prospectors looking for jade too. We would walk over the same rocks as them but we found jade that they were looking for. Most jade on the west side traveled by the big glaciers from Canada but there was plenty of jade that hadn't traveled. On Deer Creek the jade keeps replenishing itself each winter as the small river washes them out from the blue clay banks and tumbles them onto the various gravel bars.

We found jade all along the line we drew on the map. Around Darrington, Washington every creek has jade in it. Some jade we discovered was the size of a house. Jade that has traveled has a rind of tan or white. Depending if there is iron trace element in the environment. The surface will be stained brown. If white, it's because the fiber ends were smashed. We discovered if you hunt for jade when it's raining your chance to find jade is almost 100%. Just pick up the rock that is white or brown when all other rocks are green. It's hard to pick out the unusual when the white scale appears on all the rocks. We were looking for that fibrous jade called Nephrite. Around the Darrington area we did pick up jadeite, a crystalline silica type. We also found rarities like apple green jade slicks that were very transparent. Nickel was the mineral associated in the jade to create that color.

Don't forget to look up once in a while. The benches used to be creek bottoms and they contain jade. I found a hunk of jade that had not traveled far. It had groves in it like you see at some of the agate digs. It was heavy and it did not look like much until I cut it. The inside was a mottled gray green but when looking at the slice there were specs of yellow. Yes, it was gold in there.

In our prospecting out in the field we found types of associated rocks that are found with jade. Rocks like Serpentine, (Soap stone) Steatite, Tremolite, Nicolite, Actinolite, garnets in schist, thulite and a few others depending on the environment are indicators. Many of these are mistaken for jade. One real good test is to cut it and if the oil turns white its Nephrite jade. Jadeite identification can be made by magnification looking at the crystal structure. Jadeite is usually white, pink, light green and lavender. Locally, Nephrite jade might be found at Riggins. Jadeite might be found in these silica areas also. Sillimanite or fibrolite found here in Idaho could be mistaken for jade because of its waxy touch and toughness.

Any jade that has a prefix in front of it is usually not jade. These are usually pseudo jades (false jades) that kinda get ya excited. Eventually you find out its false, like; Idocrase, grossular garnet, amazonite, aventurine, soapstone, and plasma. Be careful if you're buying jade.

Glossular Garnet, Serpentine, and Steatite are common in the same area where jade is located. A situ jade lens a couple feet long could be there that you are walking on. Just keep looking for the unusual.

I recall my boy and I found a large slick, about a 3 foot slab of Botryoidal jade. I cut it and did not think it was rare. I did not know it at the time and it was left in a flower bed at my old house when I moved from Snohomish. I should go back and get it. My boy and I were on Physhasten Creek a half mile from the car. We used a gunny sack and rope to carry it out. What a job that was.

It's always good to carry a GPS with you. Many times I made discoveries and stashed boulders to pick up later. I could never find them again let alone the same road.

Jade is one of my favorite gems to find. My collection has jade from all over the world and from many parts of the US. I traveled to Wyoming, California, Oregon, Alaska and British Colombia to get some. I would say the best way to know when you see jade out in the field is to look at displays at gem shows or collections at museums.

One Thanksgiving weekend as usual my wife and I would set out to cut a Christmas tree up in the mountains. We traveled to Helena Ridge road South of Darrington. We walked up a logging road to the snow line and were coming back down to the car with our tree.

The logging road wasn't too steep but there was a lot of water on the surface. As we were walking along the sun reflected a green glass spot of color in the road. I went over and kicked it, almost broke my toe. Yes, there was a lens of jade about 12 feet long across the road. It was about 6 inches deep and was situ. We put the tree on top of the car, got out my tools and proceeded to dig up the road. It was the toughest jade I ever cut in my saw. I believe it stopped the saw, had to use a brick to get rid of some fiber. I compared the quality, color and polish with a piece of Burma jade that I cut previously.

I found black jade on beaches along the Strait of Juan D Fuca, Whidbey Island, and Camano Island. Sometimes black jade is actually a very dark green. The best jade I found was on Deer Creek, Sauk River, and the Frazier River in British Columbia.

Jade is an adventure. Good luck in your prospecting.

Dan Cease

TENTATIVE LIST OF WSMC FIELD TRIPS FOR 2013

The WSMC sponsors field trips through various rock clubs in the state. These trips offer the general public as well as the experienced rockhound the opportunity to collect a wide variety of materials from agate and jasper to crystals and fossils. Experienced guides familiar with the sites are on-hand to help find good quality material. Check with the local clubs in your area for further information. **AREAS CURRENTLY CLOSED TO COLLECTING: LUCAS CREEK, ADNA, DIATOM PITS (FRENCHMAN HILLS). No motorized vehicles allowed:** Green Mountain (Kalama) and First Creek.

Check out the latest trip info, and tool listings at: mineralcouncil.org. (Updated: January 17, 2013)

Date	Host	Site	Meet @	Material	Tools
5/18	Everett	Walker Valley	9:00 @Big Lk Store	Geodes	Hard rock tools (lots of energy)
	Contact: Brad Johnson (1st VP WSMC) - cavemanrocks@yahoo.com - ? (206) 403-3073 ?				
6/22	Msvl	Not decided, maybe Mt Higgins or Pilchuck Ck		Rhodonite, Jade, Grossular Garnet	
6/26-30	Pow	Madras	8:00 @ Jefferson Fair, Madras OR	Agate, Jasper, Petrified Wood, T-Eggs Private farms	
07/13-14	Spokane	Lolo Pass	9:00 @ Lolo Pass Resort Parking Lot	Smokey quartz crystals	Shovel, pick
	Contact: Mike Shaw (509)244-8542 (509)251-1574				
7/20	Msvl	Gold Mt	11:00 @ Show (20,21)	Travertine	Lt hard rock
7/27	Msvl	Lake Wenatchee	9:00 @ Coles Corner	Garnets	Shovel, bucket, 1/4" screen, wading
08/3	Spokane	Chewelah mines	9:00 @ Chewelah Safeway	Magnesite	Rock hammer, light digging
	Contact: Mike Shaw (509)244-8542 (509)251-1574				
8/17	NW Opal	Greenwater	9:00 @ Ranger St, Enumclaw	Agate, Jasper	Dig, Lt & hard rock tools
	Contact: Tony Johnson or Ed Lehman				
9/7,8	Pow	Red Top	8:00 @Teaway R Camp	Agate, Jasper, Geodes, Jade	Lt hard rock
9/14	NW Opal	Little Naches	9:00 @ 410 &FR 19	ThunderEggs	Dig & Light hard rock tools
	Contact: Tony Johnson or Ed Lehman				
10/19	Msvl	Money Creek	9:00 @ Camp Ground	Pic Jasper, Ore	Light hard rock tools
11/16	Msvl	Blanchard Hill	9:00 @ I-5 240 exit gas station	Stilpnomelane	Hard rock tools

(* Deposit must be received no later than 30 days before trip date to reserve spot; deposit fully refundable.) Participants must be age 16 or older; no children or pets, please; maximum of 40 participants so get your reservations in early!)

ALWAYS CALL TO CONFIRM TRIP DATES AND DETAILS!!— SEE BELOW

Abbreviation	Host	Contact	E-mail
Evt	Everett Rock & Gem Club	Brad Johnson (206) 403-3073	cavemanrocks@yahoo.com
LkSd	Lakeside Gem & Min Club	Andy Johnson (509) 546-1950	cbagates@hotmail.com
Msvl	Marysville Rock Club	Ed Lehman (425) 334-6282	wsmced@hotmail.com
Msvl-Wasco trip		Stu & Kathy Earnst (360) 856-0588 27871 Minkler Rd, Sedro Woolley, WA 98284	earnstkk@comcast.net
MtBk	Mt Baker Rock Club	Kris Menger (360) 927-0994	kmenger@comcast.net
Nw Op	NW Opal Association	Tony Johnson (253) 863-9238	ynotbandit@earthlink.net
Pow-Wow	All Rockhounds Club	Cliff Matteson (253) 475-8433	cliff.conniematteson@gmail.com
Spkn	Rock Rollers of Spokane	Mike Shaw (509) 251-1574	mikeshawmoose@yahoo.com
WSea	West Seattle Rock & Gem Club	Brian Waters (206) 290-2312	bwaters2011@gmail.com
Yak	Yakima Rock & Min Club	Jerry Wichstrom (509) 653-2787	jewtmew@aol.com

Trips are open to all. Most 2 day trips include Sat potluck, Sun free breakfast, tailgating, swap, and horse shoes. Small fee required for Pow Wow and Madras trips. FOR MORE INFORMATION contact Ed Lehman at wsmced@hotmail.com or (425) 334-6282. Or see mineralcouncil.org

HEADS UP!!!! THE DISCOVER PASS IS HERE!

If you plan to rockhound anywhere near an area that is owned or managed by Washington State's Dept of Fish & Wildlife, Dept of Natural Resources, or a state park, even just using the roads of that particular property to get to another place, be prepared to show your Discover Pass, or get fined \$99.

In an effort to raise funds to maintain recreational roads, etc, the legislature passed a law that took effect July 1, 2011, that requires that every vehicle must have a Discover Pass displayed in its' windshield to access state lands or lands managed by the state. This means that if you are planning on rockhounding on those lands, or driving on those lands, or parking for the day on those lands, or accessing the water from those lands, and so on, you need a pass!

You can purchase a yearly pass for \$35 or single use for \$11.50; one pass is good for two vehicles. The fine for non-compliance is \$99.

For more info see: <http://www.discoverpass.wa.gov/>

MAY BIRTHSTONE IS AN EMERALD

As the birthstone for May, the emerald, a symbol of rebirth, is believed to grant the owner foresight, good fortune, and youth. Emerald, derived from the word *smaragdus*, meaning *green* in Greek, was mined in Egypt as early as 330 B.C. Today, most of the world's emeralds are mined in Colombia, Brazil, Afghanistan, and Zambia. The availability of high-quality emerald is limited; consequently, treatments to improve clarity are performed regularly.

Emerald is a gemstone, and a variety of the mineral beryl ($\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$) colored green by trace amounts of chromium and sometimes vanadium. Beryl has a hardness of 7.5-8 on the 10-point Mohs scale of mineral hardness. Most emeralds are highly included, so their toughness (resistance to breakage) is classified as generally poor.

Properties determining value

A fine emerald must possess not only a pure verdant green hue as described below, but also a high degree of transparency to be considered a top gem.

In the 1960s, the American jewelry industry changed the definition of 'emerald' to include the green vanadium-bearing beryl as emerald. As a result, vanadium emeralds purchased as emeralds in the United States are not recognized as such in the UK and Europe. In America, the distinction between traditional emeralds and the new vanadium kind is often reflected in the use of terms such as 'Colombian Emerald'.

Clarity

Emerald tends to have numerous inclusions and surface breaking fissures. Unlike diamond, where the loupe standard, i.e. 10X magnification, is used to grade clarity, emerald is graded by eye. Thus, if an emerald has no visible inclusions to the eye (assuming normal visual acuity) it is considered flawless. Stones that lack surface breaking fissures are extremely rare and therefore almost all emeralds are treated, "oiled", to enhance the apparent clarity. Eye-clean stones of a vivid primary green hue (as described above) with no more than 15% of any secondary hue or combination (either blue or yellow) of a medium-dark tone command the highest prices. This relative crystal non-uniformity makes emeralds more likely than other gemstones to be cut into cabochons, rather than faceted shapes.

Treatments

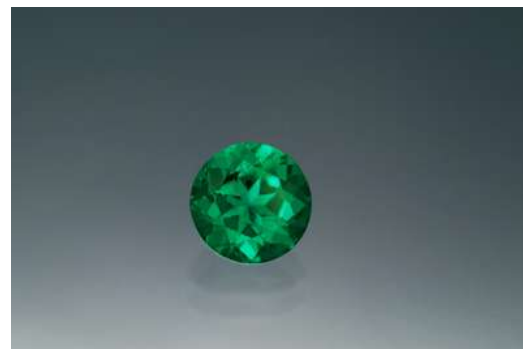
Most emeralds are oiled as part of the post-lapidary process, in order to improve their clarity. Cedar oil, having a similar refractive index, is often used in this generally accepted practice. Other liquids, including synthetic oils and polymers with refractive indexes close to that of emerald such as Opticon are also used. The U.S. Federal Trade Commission requires the disclosure of this treatment when a treated emerald is sold. The use of oil is traditional and largely accepted by the gem trade. Other treatments, for example the use of green-tinted oil, are not acceptable in the trade. The laboratory community has recently standardized the language for grading the clarity of emeralds. Gems are graded on a four step scale; none, minor, moderate and highly enhanced. Note that these categories reflect levels of enhancement, not clarity. A gem graded none on the enhancement scale may still exhibit visible inclusions. Laboratories tend to apply these criteria differently. Some gem labs consider the mere presence of oil or polymers to constitute enhancement. Others may ignore traces of oil if the presence of the material does not materially improve the look of the gemstone.

Given that the vast majority of all emeralds are treated as described above, and the fact that two stones that appear visually similar may actually be quite far apart in treatment level and therefore in value, a consumer considering a purchase of an expensive emerald is well advised to insist upon a treatment report from a reputable gemological laboratory. All other factors being equal, a high quality emerald with moderate enhancement should cost half the price of an identical stone graded none.

Colombia is by far the world's largest producer of emeralds, constituting 50-95% of the world production, with the number depending on the year, source and grade. Emerald production in Colombia has increased drastically in the last decade, increasing by 78% from 2000 to 2010. The three main emerald mining areas in Colombia are Muzo, Coscuez, and Chivor. Rare 'trapiche' emeralds are found in Colombia, distinguished by a six-pointed radial pattern made of ray-like spokes of dark carbon impurities.

Zambia is the world's second biggest producer, with its Kafubu River area deposits (Kagem Mines) about 45 km southwest of Kitwe responsible for 20% of the world's production of gem quality stones in 2004. In the first half of 2011 the Kagem mines produced 3.74 tons of emeralds. Zambian emeralds are of very high quality, being less porous and brittle than Colombian emeralds, with more even color.

Emeralds are found all over the world. In the US, emeralds have been found in Connecticut, Montana, Nevada, North Carolina, and South Carolina. In 1997 emeralds were discovered in the Yukon.



Emerald crystal from Muzo, Colombia

Synthetic emerald

Both hydrothermal and flux-growth synthetics have been produced, and a method has been developed for producing an emerald overgrowth on colorless beryl.

Later, from 1965 to 1970, the Linde Division of Union Carbide produced completely synthetic emeralds by hydrothermal synthesis.

The largest producer of hydrothermal emeralds today is Tairus in Russia, which has succeeded in synthesizing emeralds with chemical composition similar to emeralds in alkaline deposits in Colombia, and whose products are thus known as "Colombian Created Emeralds" or "Tairus Created Emeralds". Luminescence in ultraviolet light is considered a supplementary test when making a natural vs. synthetic determination, as many, but not all, natural emeralds are inert to ultraviolet light. Many synthetics are also UV inert.

Emerald in different cultures, and emerald lore

The Gachala Emerald is one of the largest gem emeralds in the world, at 858 carats (172 g). This stone was found in 1967 at La Vega de San Juan mine in Gachalá, Colombia. It is housed at the National Museum of Natural History of the Smithsonian Institution in Washington, D.C.

One of the quainter anecdotes on emeralds was by the 16th-century historian Brantôme, who referred to the many impressive emeralds the Spanish under Cortez had brought back to Europe from Latin America. On one of Cortez's most notable emeralds he had the text engraved *Inter Natos Mulierum non sur-rexit mayor* ("Among those born of woman there hath not arisen a greater," Matthew 11:11) which referred to John the Baptist. Brantôme considered engraving such a beautiful and simple product of nature sacrilegious and considered this act the cause for Cortez's loss of an extremely precious pearl (to which he dedicated a work, *A beautiful and incomparable pearl*), and even for the death of King Charles IX of France, who died soon after. "The Attenbury Emeralds" is a detective story in which Lord Peter Wimsey must solve several emerald-related mysteries.



HELLS CANYON GEM CLUB HISTORY

Some of the old timers will remember **Floyd Mossler**. Floyd wrote a history of the rock clubs in the Lewis-Clark Valley, from 1937 to about 1978. His son, Michael has granted permission to the newsletter to publish. This will be the fourth of six installments on his story. Enjoy.

On June 1-2, 1956, there was a Gem Show held. Only local people from close by attended. Admission was 25¢ for children, 75¢ for adults. Rock trading was out and no sales just a show. The Club did very well. There were several outside dealers selling.

In 1959 the members were, Don and Edna Axtell, Al, Thelma and Billy Booze, Harry and Bonnie Copeland, Tom and Ruth Duffy, Mr. and Mrs. Edgar Fanning, Barnard and Elaine Greene, Larry and Bonnie Hanson, Bob and Milly Harris, Jean and Hayden Harwood, Maynard and Wilma Kendall, Neal and Marjorie Kingery, Cahncey and Babe Kunkle, Pelchie LaMarche, Mr. and Mrs. C.C. Lame, Arnold and Hazel Lyon, Mr. and Mrs. Howard McElroy, Earl McKenzie, Floyd, Irene and Michael Mossler, Stewart and Dorothy Nelson, Jim and Lucille Parker, Mr. and Mrs. H. O. Phay, Cecil and Nellie Phillips, Joseph and Eugenie Proulx, Alva and Esther Putnam, president. Allen and Rose Richmond, Mr. and Mrs. Fred Rommel, Mr. and Mrs. Robert Roskammer, Mike and Lucille Rudeen, Mrs. Douglas Sinclair, Mr. and Mrs. Carl Smith, Melvin and Alta Stewart, Floyd and Bea Sumner, Mel Thomas, Barry Torgerson, Elmer and Elma Trescott, Lynn Tuttle, Hazel S. Walley, James and Marguerite Wiqqins, Ron and Elsie Wills.

Hansen worked at P.F.I. and was later moved out to another point and later quit and opened up his own lumber yard in Spokane. Where he is now, we don't know.

The Club was incorporated in 1956 while Larry was president. This was done to protect the members from law suits such as the one we had just had. To this date, 1978, one meeting a year has to be held in Lewiston to elect and install the new members, because of it being incorporated here in Idaho.

There are at this time only 3 members still in the Club that were members at the time of Larry Hansen presiding president. At this time there were very few restrictions on getting or collecting rocks, no Forest Service or B.L.M. restrictions. The Club was welcomed by most property owners. Rocks such as Jasper, Common Opal, Petrified wood, fire Opal, and Crystals and Sillimanite and in most areas Asotin Creek and Cloverland and Lower Tammany and the Lewiston Hill, Emerald Creek for garnet, Pierce for Sapphires and crystals and picture rock, were all plentiful. It was a rockhound's paradise. We must not forget the very fine smokey quartz crystals in size up to 6 inches long and 1 inch in diameter, at Bowles Cabin area. There were many more types of rock, all found close to Lewiston. We are talking about the year 1956. After the Big First Show, membership began to get larger fast, and the Club got up to 100 members. Equipment such as typewriters, mimeograph machines and books for a Club library were bought. We had over \$200.00 worth of books that members could check out and read. They have all disappeared, along with some of the equipment. No one knows where. It is a shame, to say the least.

Members came and left, some moved away others just left, some died. Mr. and Mrs. Lyon, Mr. and Mrs. George Volmer, these women were real painters and art people, displaying their paintings at several shows and fairs and art gallerys. They were beautiful. In later years they opened a rock shop. They have since all moved away.

Jess Knepper and wife, have left the Club years ago. He had a very good rock shop and sold equipment also. They have closed it and have retired several years ago, as he is in his 90's and still going, a very dedicated Christian person.

It would be almost impossible to mention the names of each individual member over the past 25 years as some came and joined, paid their dues and were visitors for the evening and never came back again. Others came a few times and moved away, and others joined clubs near them as new clubs were organized such as Flintstone Rock Club of Kendrick. Orofino Club, Grangeville organized a club and Clarkston, and Pomeroy. We had members from each of these places. They dropped out and joined their own town clubs. Some of these clubs have fallen by the wayside. Others are still active.

So I will just mention the more outstanding members such as presidents and some of the officers.

Leroy Weeks, president 1953, was a chiropractor in Clarkston. Joe Blalok, president 1954, quit and formed a new club in Clarkston, called the Jewel Crafters. It fell by the wayside in 2 or 3 years. Several of our members went over there, most of them returned to our club. This happened during the Big Sillimanite craze. Some were paying as much as \$1.00 per ounce for extra nice pieces. This is a stone that is found in no other part of the world as far as I have heard of. The big island and country that Dworschak Dam has flooded was where the best pieces came from, but we no longer can get to it. Still some places to get it, but it has almost faded from the picture at this time. Then came Jean Frich, he was president in 1955, he was a teacher and machinist.

Next was Larry Hansen as the 5th president. He served 2 years 56 and 57. It was under the year he was president, the Club held its first real show and largest Gem Show. Over 3700 people paid admission to the show. Also this was the year, 1956, that the Club was incorporated, this was done to protect the members from damages in case of a law suit.

Neal Kingey was the Clubs 6th president in 1958. No show this year but 3 field trips, and 1 summer picnic was held. Was really a pleasant year for the Club. More members are changing around, some dropping out, new ones coming in. M. Thurston Coons and wife really had a large collection of many different kinds of rocks, always out gathering them from all over. Those who were no longer members sold their collections.

Mrs. Ester Putman became the Clubs 7th president in 1959. Her officers were; Arnold Lyons vice-president, Harry Copeland - secretary, Alva Putman – Treasurer, Past president Neal Kingey was 1 year director. Ron Wills 1 year director, Barney Green 1 year director, Don Axtell 2 year director and Al Richmond 2 year director. I might say the Putmans came from Montana, also a rock hounds paradise. They had been in business there, I believe. She had a candy store here in

Lewiston and would walk home alone across the bridge to Clarkston at night carrying the money from the day's business, a little scary, I would say. One could not do it now with all the purse snatchers of today.

The next president was Arnold Lyons he and his wife had joined the Club a year or so earlier. This was Hazel, his wife, later to become Hazel Bryger, the name that most of the Club will remember her as. She was also the Editor of the news letter and also later the secretary. She has since moved away from the area. Her mother and dad, Mr. and Mrs. George Volmer were members. She and Hazel were both painters and displayed their paintings at several fairs and art shows. George later opened a Rock Shop in the Orchards.

Arnold Lyons was president in 1960, our 8th president. Cecil Powe and his wife joined the Club the year Lyons was president. These two members became two of the most outstanding members of the Club. I forgot to mention the dues at the time of the incorporation of the Club. Each adult member paid \$2.00 per year. Members from 9 to 14 were called junior members. Their dues were 50¢ per year. Over 14 to 18 was \$1.00. Man and wife paid \$3.00 with 20¢ of each member going to the Federation Club. The membership over the years consisted of people from all walks of life from doctors, lawyers, dentists, Police officers, professors, teachers, salesmen, business men, nurses, young people, students and people of all ages from 6 years to over 90 years old. Many of the big mines running today were located by rockhounds. This had a lot to do with the developing and sale of millions of dollars worth of metal detectors of various kinds and has been a big factor in the coin collection business. That has meant thousands and thousands of dollars to the economy throughout the whole world, not to mention the hundreds of Rock and Gem shops that are paying taxes and city license fees, and pouring thousands of dollars into the economy of the entire nation. Many rock and gem shows bring hundreds and hundreds of people in to the communities of all sizes, filling up the motels and restaurants and other businesses. Millions of dollars are spent every year on lapidary equipment and tools to work with in gathering the rock. There isn't a business in the entire nation that has not profited from the rock hounds of the country. Many, many motels have been built to accommodate the traveling rock hound, so the rock hounds have contributed a lot to the economy of this nation in more ways than one.

After 1961 the history is pretty much known to the people of today. The Hells Canyon Gem Club had a show at the shopping center in 1963. I believe Cecil Powe was president at the time and a succesful show was held. Cecil Powe was president of the Club longer than any other president. He served 5 years - a job well done. He and his wife have done more, in my opinion, than any other two members over the years have. He has donated so many door prizes for our shows and polished rock for grab bags and donated slabs and machinery to the Junior Rock Club. He has worked on cases and has helped young and older members alike in the art of starting out on the know how of making and cutting rock. Mrs. Powe is an excellent cook and has prepared the turkey for the Clubs Thanksgiving dinner for years. The officers have met at his Rock Shop for years and Mrs. Powe has always seen to it that there was cake or cookies and coffee for all who attended. This does not in any way cast any reflection on any other members as they have all helped and worked hard to make the shows and Club a success over the past 25 years.

There have been a few arguments and disagreements, but, for the most part, the Club has been a happy, pleasant Club.

Mr. and Mrs. Alvin Putman have been very active in the Club. She has served 2 terms as president. He has served as Treasurer and Vice-President, and helped in many other offices and with the shows. Esther has been the Editor of the news letter and secretary, and they have helped out at the shows, being responsible for the sales of tickets and money. She has been an alternate delegate to the Federation meetings. They are still active at the present time, and hard workers. I will not have room in this little pamphlet to mention all of the members that ranged from 35 to over 100 in a year in the past 25 years.

Other presidents of the Club were Webster Boaks. He and his wife, are a very pleasant couple up in

years over 70, I think, but very active. He was sort of a cowboy, always in cowboy dress. He is in the cattle business back in Missouri, but comes home a couple times a year and are still active members. Max Mallory was president after Boaks, he was good at faceting and other rock work, he lived at Anatone.

Mrs. Max Mallory and Mrs. Boaks are sisters. Another president, maybe the next was Stan Gilson. He was a teacher and carpenter. He and his wife also put out the newsletter for quite a spell. She is still a member and displays her work at our shows. She does very nice rock work and is a willing worker in the Club. She is a registered nurse and is retired. I think she holds some kind of a record. From the time she was married until she moved to her present home she moved 54 times while raising 4 children. He passed away a few years ago. She still lives at their home and does rock work.

CONTINUED NEXT MONTH

MURPHY'S FIRST LAW- IF ANYTHING CAN GO WRONG, IT WILL

Laws of Weather

Lannie's Law – Any week of five consecutive clear and sunny weekdays will have rain, sleet or snow on Saturday AND Sunday.

Pete's Principle – Cloudless days will overcast at the time when you reach the mine access road.

Edward's Extension – The precipitation will begin when you reach the halfway point while walking (uphill) on the access road.

Ervin's Further Extension – The intensity of precipitation will increase in direct proportion to the distance walked on the access road.

Ellie's Observation – All precipitation will cease, and the sun will come out the instant you return to the car.

Laws of Equipment

Charlie's Principle – While visiting the one quarry of the year where hard hats are required, a quick glance in the car trunk will prove that yours is home in the garage.

Ray's Corollary – That same garage will prove to be greater than 200 miles from the quarry.

Dick's Law – A dropped tool will land in a vug where it will do the maximum possible damage to the specimen. (Also known as the Law of Selective Gravitation).

Stewart's Enigma – The laws of chemistry prevent a man-made chisel from being stronger than basalt.

Above material used from <http://mineralhumor.homestead.com/index.html> with permission.

STANDING COMMITTEES	GEMSHOW COMMITTEES
1. Bulletin Editor—Lynn Enger, Ed Shoemaker, Mel Wilks, and Dan Cease	1. Show Chairman---Steve Rand
2. Membership Chairman---Lon & Marilyn Sharp	2. Show Co-Chairman---Linn Enger
3. Juniors Chairman---Mike Horne	3. Show Treasurer---Marilyn Sharp
4. Field Trip Chairman---	4. Dealer Chairman---'Gail Giard
5. Program Chairman ---	5. Advertising Chairman--- Steve Rand
6. Show & Tell Chairman---David & Jacque Dabritz	6. Displays Chairman--- Linn Enger
7. Claims Chairman---Rick Westerholm, Linn Enger and Randy Squires	7. Demonstrations Chairman---Mel Wilks
8. Historian Chairman---	8. Floor Plan Chairman---Rick Westerholm
9. Library Chairman---	9. Silent Auction Chairman---Jerry Northrup
10. Sunshine Chairman---Mel & Betty Wilks	10. Kids Corner---Doug & Sally Debruin
11. ALAA---Linn Enger (American Lands Access Association)	11. Admissions---Lola Collinworth
	12. Security---Randy Squires

NFMS MEMBER CLUBS' SHOW SCHEDULE

(Partial list)

May 11-12 Sat 10-6, Sun 10-4	Bozeman Gem and Mineral Club	Gallatin County Fairgrounds 901 North Black, Bozeman MT 59715	Dan Carter or Jerry Hancock 406 599 6063 Box 11001 Bozeman MT 59719
May 18-19 Sat 10-6, Sun 10-5	Hatrockhound Gem & Mineral Club	Hermiston Community Center 415 South Highway 395, Hermiston OR	Mike Filarski stonemorlin1@netscape.net 541 922 5091 cell 541 571 2593
May 18-19 Sat 10-6, Sun 10-4	Bitterroot Gem & Mineral Society	First Interstate Center, Ravalli County Fairgrounds, 100 Old Corvallis Road, Hamilton MT	Mike McConnell micker1949@yahoo.com 406 777 0536
May 31, June 1-2 Fri 10-5, Sat 10-5 Sun 10-5	Puyallup Valley Gem & Mineral Club	Swiss Park 9205 198th Avenue East Bonney Lake WA	Nancy LeMay 253 987 6751 PVGMC PO Box 134 Puyallup WA 98371, info@puyallupgemclub.org
June 1-2 Sat 9-5, Sun 10-4	North Idaho Mineral Club	Kootenai County Fairgrounds, 4056 North Government Way, Coeur d'Alene, ID	Bev Bockman bockbb@aol.com 208 773 5384
July 27-28 Sat 10-6, Sun 10-5	Northwest Montana Rock Chucks	Flathead County Fairgrounds 265 North Meridian Kalispell MT	Milah Gano or Joe Berg 406 844 3560 PO Box 433 Lakeside MT 59922 mallards_g@hotmail.com

You Might Be a Rockhound If

- The baggage handlers at the airport know you by name and refuse to help with your luggage.
 - The local university's geology department asks permission to hold a field trip - in your back yard.
 - The city sends you a letter informing you a landfill permit is required to put any more rocks in the back yard.
 - UPS has a regular pickup and delivery schedule for your house.
 - You can debate for hours on the differences between spectrolite and labradorite.
 - You shouted "Obsidian!" to a theater full of movie-goers while watching the Shawshank Redemption.
 - Your children have names like Rocky, Jewel, and Beryl.
 - You get excited when you find a hardware store with 16 pound sledge hammers and 5 foot long pry bars.
 - You debate for months on the Internet about whether vibratory or drum tumblers are best.
-

Mineral Puns That Henny Youngman threw out.....

- ✓ A mineral collector fell off of a quarry wall, and suffered serious injuries. He woke up in the hospital and cried "Doctor, doctor, I can't feel my legs!" The Doctor replied "I know, that's because we had to amputate both of your arms."
- ✓ What do you call a fish fossil with no eyes? A fish fossl.
- ✓ A Chlorine atom bumps into an Iron atom on the street and the Chlorine says Are you all Right?.... No, I lost an electron. Are you sure?.....Yes, I'm positive!
- ✓ Did you hear the joke about the prehnite pocket high up the side of the quarry wall? NO? Well, it was over your head, anyway!
- ✓ I was wondering why the falling piece of ledge was getting bigger and bigger. Then it hit me!
- ✓ The rockhound sat down on his chisel and got a little behind in his collecting efforts!
- ✓ Taking your children mineral collecting often puts them on their pest behavior.
- ✓ He was arrested for throwing dynamite down the mine shaft, but when they saw his gold specimens, they dropped the charges.
- ✓ My digging buddy wanted to join me in my hole, so I gave him an inch and he became a ruler!
- ✓ In a recession, the mineral collecting business is always picking up.
- ✓ Old mineral collectors never die....they just slowly petrify!
- ✓ Mineral collecting is a lot like paying taxes...you work hard and end up in the hole!
- ✓ I thought I had found some clear calcite in Alaska, but it turned out to be an optical Aleution!

SUMMARY TABLE OF ROCK-MINERAL ASSOCIATIONS

IGNEOUS GROUP

<i>Rocks</i>	<i>Deposits and Minerals</i>
Rhyolite	Tin ores in fissures: cassiterite (wood tin), topaz, black tourmaline; cavities and fissures: hyalite opal, common opal, precious opal. <i>Examples:</i> in San Luis Potosi, Queretaro and other Mexican States
Trachyte	Fissures: turquoise, kaolinite, minor sulfides; cavities: opal. <i>Examples:</i> in southwest United States; Mexico
Basalt	Amygdaloidal: native copper and silver, quartz, datolite, prehnite, calcite, epidote, chlorite, pumpellyite, adularia, zeolites. <i>Example:</i> Keeweenaw Peninsula, Michigan Pillow basalt: quartz, calcite, prehnite, pectolite, apophyllite, zeolites, chlorite, babingtonite, minor copper and silver, minor sulfides, etc. <i>Examples:</i> basalt sills of Pennsylvania-New Jersey-Connecticut, Oregon, etc.
Diabase	Seams and fissures: silver, copper, cobalt-nickel ores, apophyllite, prehnite, datolite, zeolites. <i>Examples:</i> diabase bodies in Ontario, Canada, and east United States
Granitic	Veins, seams, and altered zones: cassiterite, topaz, scheelite, wolframite, black tourmaline, quartz, fluorite, arsenopyrite, muscovite, molybdenite, bismuth, etc. <i>Examples:</i> Saxony, Germany; Czechoslovakia. Uranium ores in veins: <i>Example:</i> Great Bear Lake, Canada Gas cavities lined with pegmatitic material: feldspar, quartz, topaz, beryl, phenakite, fluorite, siderite, goethite, etc. <i>Examples:</i> Pikes Peak granite region, Colorado; Conway red granite region, New Hampshire
Granitic Pegmatites	Often emplaced in metamorphic rocks as small to large bodies, usually of vein-like shape: feldspar, quartz, mica, tourmaline, beryl, garnet, columbite, tantalite, amblygonite, pollucite, spodumene, topaz, and many others. <i>Examples:</i> pegmatite regions of southern California, Maine, Brazil, Madagascar
Syenite	Veins: quartz, gold, sulfides. <i>Example:</i> Ontario
Nepheline Syenite	Distinct crystals (phenocrysts): corundum, zircon; masses: sodalite, cancrinite. <i>Examples:</i> bodies of nepheline syenite rock in Ontario, Maine, Arkansas
Granodiorite Monzonite	Disseminated: "porphyry" copper ores. <i>Examples:</i> in numerous places in southwest United States. Molybdenite. <i>Example:</i> Climax, Colorado Altered zones: scheelite. <i>Example:</i> Bishop, California
Diorite Gabbro	Veins containing native metals and sulfides in numerous localities. Large masses: magnetite, ilmenite, pyroxenes, copper, nickel, and iron sulfides. <i>Example:</i> Lake Superior region
Anorthosite	Large coarsely crystalline masses: labradorite, magnetite, ilmenite. <i>Examples:</i> New York; Iron Mountain, Wyoming; Labrador
Peridotite	Masses: chromite, nickel ores with olivine, pyroxene, spinel, platinum, magnetite, pyrrhotite, etc. <i>Examples:</i> New Caledonia; eastern Pennsylvania; Siskiyou County, California. Single crystals: diamond, pyrope garnet, enstatite, etc. <i>Examples:</i> Murfreesboro, Arkansas; numerous localities in Africa

SEDIMENTARY GROUP

Conglomerate	Copper, silver. <i>Examples:</i> Keeweenaw Peninsula, Michigan; Ontario. Diamond. <i>Example:</i> Brazil. Gold. <i>Example:</i> Witwatersrand, Union of South Africa
Sandstone	Disseminated: uranium-vanadium ores. <i>Example:</i> Colorado plateau. Cavities: quartz crystals. <i>Example:</i> Hot Springs region, Arkansas. Seams, veins, and disseminated: cinnabar, galena, sphalerite, barite, celestite, strontianite, calcite, gypsum, anhydrite, etc. <i>Examples:</i> numerous localities. Fossil replacements: uranium-vanadium ores, as above; quartz after wood, etc. <i>Example:</i> Colorado plateau
Shale	Seams and cavities: boron minerals, sulfates and carbonates in playa deposits. <i>Example:</i> Searles Lake, California. Strata and seams: anhydrite, gypsum. Concretions and replacements: pyrite, marcasite, goethite; fossils: jet, amber. <i>Examples:</i> numerous localities
Limestone	Sulfide veins and disseminated deposits: sulfides of lead, copper, zinc principally. <i>Examples:</i> Cananea, Sonora; Mapimi, Durango, Mexico; many others. Seams and geode-like openings: barite, celestite, strontianite, fluorite, quartz, minor sulfides. <i>Example:</i> Clay Center, Ohio
Chert	Breccia openings, seams, veins: lead, zinc, and iron sulfides, minor quartz; calcite. <i>Example:</i> tri-state district of Oklahoma, Kansas, Missouri
Saline Rocks	Strata: halite, gypsum, anhydrite, sylvite, carnallite, etc. <i>Examples:</i> Carlsbad, New Mexico, deposits in New York, Michigan, California, Germany, etc.

METAMORPHIC GROUP

Gneiss	Disseminated pods, single crystals, lenses, stringers: almandite, graphite, cordierite, corundum, mica, andalusite, kyanite, staurolite, ilmenite, etc. <i>Examples:</i> Gore Mt., New York; Swiss Alps
Schist	Disseminated pods, single crystals, lenses, stringers: garnet, graphite, talc, pyrophyllite, serpentine, chlorite, magnetite, tremolite, actinolite, epidote, brucite, mica, etc. <i>Examples:</i> Wrangell, southeastern Alaska; numerous localities in California, Alpine regions, Appalachian Mountains, etc. Often intruded by pegmatites
Serpentine	Disseminated and vein-like bodies: garnierite, pyrrhotite, chromite, chrysotile asbestos, magnesite, brucite, actinolite, jadeite, cinnabar, etc. <i>Examples:</i> southern counties of Oregon and northern counties of California; "barrens" of Maryland, etc.
Quartzite	Cavities: quartz. <i>Examples:</i> numerous localities
Slate	Cavities: quartz. veins: quartz with gold and sulfides. Scattered crystals: pyrite. <i>Examples:</i> numerous localities
Phyllite	Scattered crystals and pods: staurolite, andalusite, kyanite
Marble	Scattered crystals, pods, lenses: sulfides, phlogopite mica, graphite, corundum, spinel, chondrodite, grossularite garnet, scapolite, pyroxenes, and amphiboles, etc. <i>Examples:</i> northern New Jersey, southern New York marble belt
Marble Skarn	Scattered crystals, pods, lenses: magnetite, spinel, corundum, graphite, andradite and grossularite garnet, wollastonite, scheelite, pyroxenes and amphiboles, scapolite, sulfides, zincite, willemite, many other species. <i>Examples:</i> scheelite ore bodies in California; Franklin, New Jersey; Brewster, New York; Riverside County deposits, California, etc.