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NOVEMBER 2010

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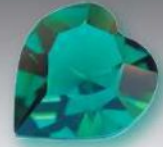


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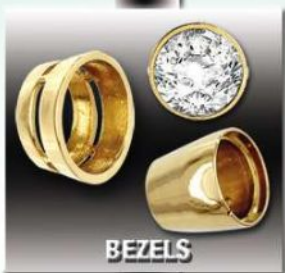
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Rock & Gem

Volume 40, Number 11

November 2010

ON THE COVER

Controversy swirls around the question of how agates formed like the eyes in this Wave Hill agate from the Northern Territory of Australia. (Tom Shearer photo)

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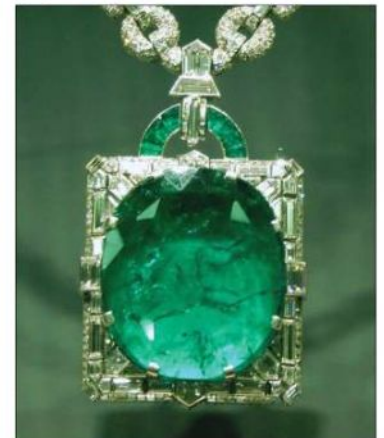
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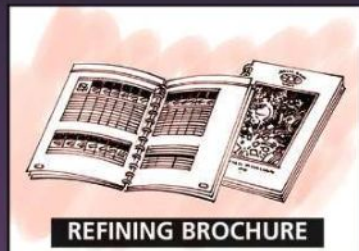
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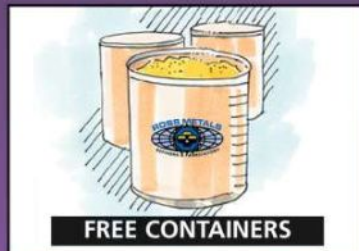
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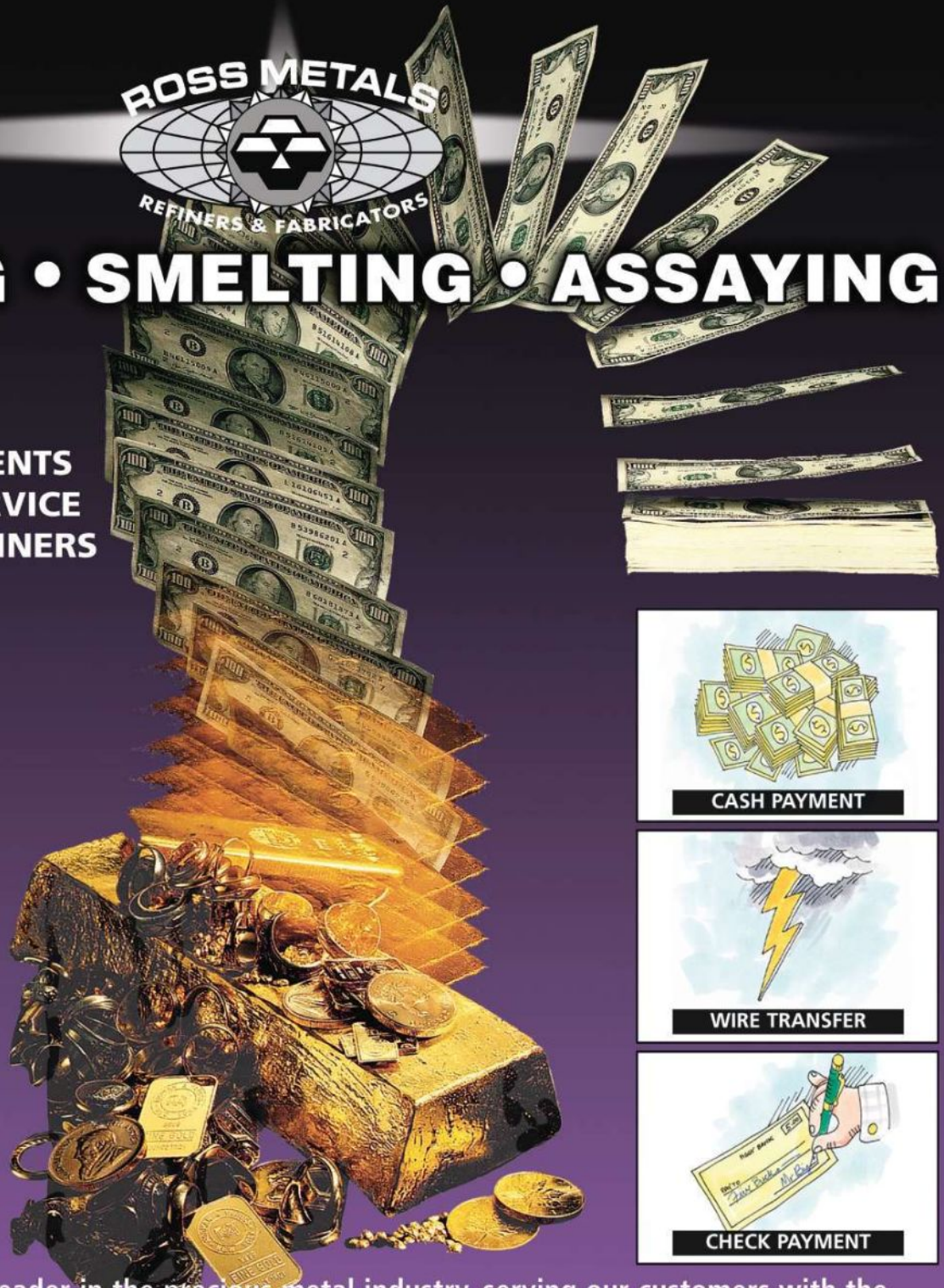
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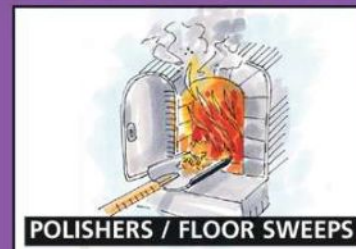
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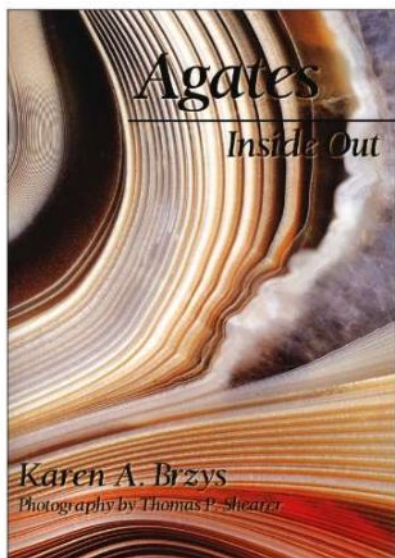
New Releases

Bob Jones has been a major contributor to *Rock & Gem* magazine—some would even say its heart and soul—since the magazine began in 1971. A prolific writer with a wealth of knowledge about the hobby and science of minerals, he delights in helping collectors increase their understanding of specimens and their sources. Readers who enjoyed Bob's Frugal Collector series of articles, which was published in *Rock & Gem* between August 2003 and July 2007, will be interested to know that these works will form the basis of a two-volume set of books, the first of which is scheduled to be released in early 2011.

The Frugal Collector series described individual minerals, their classic sources, the appearance of their typical specimens, and the history of how they came to the market. The way Bob sees it, knowledge is power to the mineral collector. If you know what constitutes a classic specimen, you're in a better position to recognize and possibly purchase one, even if you don't have a lot of money to spend. These articles have been revised and expanded and illustrated with eye-popping photos in a hardcover format that's a collectible itself. In trademark fashion, Bob intersperses factual information with anecdotes in this enjoyable-to-read text. To pre-order your copy of *The Frugal Collector*, Volume I, see the ad on page 42.



LYNN VARON PHOTO/KRISTALLE SPECIMEN



Another recently released title, *Agates: Inside Out*, explores the mystery of agate formation (see the review in the September 2010 Picks & Pans column). It was written by Karen Brzys, the owner of the Gitche Gumee Agate and History Museum (www.agatelady.com), in Grand Marais, Michigan. This hamlet on the shore of Lake Superior has been a mecca for agate pickers for generations.

Rockhounds who enjoy the bands, eyes, and other patterns in these silica gems know that there is great debate about how they formed in nature. In this issue, Karen shares a possible explanation in her article "How Did Agates Form?" (p. 12). Moreover, she does it in a straightforward, nontechnical style that the casual reader can easily understand. While science is still working on a definitive answer, collectors are enjoying a lively debate.

Read about other great rockhounding titles you can add to your bookshelf in our Picks & Pans column each month. They'll make a nice complement to your back issues of *Rock & Gem*!



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Since I was a small child, I have enjoyed making things with my hands," writes November Craftsman of the Month Marlene Amira Hoffman, of North Hollywood, California. "In high school, I can remember taking, and thoroughly enjoying, a jewelry class in which I learned how to solder and make a bezel for a ring. Recently, when I found myself out of work and not very successful at finding a new secretarial job, I decided to think back to what I was really passionate about. Obviously, secretarial work was not the first thing to enter my mind, but jewelry making was!

"I enrolled myself in a pearl-knotting class at the local community college, and from there have started making my own line of jewelry. I now design and handcraft all my own jewelry and sell it at local farmers' markets. My jewelry-making skills have evolved from pearl knotting to wire wrapping. Each piece is made with semiprecious stones, beautiful crystals, and lots of love!

"When my husband was visiting a high school buddy of his who lives in Mussel Shoals, California, he found a beautiful piece of



blue sea glass on the beach. Knowing that I love to make jewelry, his friend's wife told him to bring it home to me. I'd never wire wrapped a stone before, so I thought, Why not try something new and different? Copper is being used in jewelry today, so I decided copper wire would make a beautiful bail for the glass piece and began wrapping.

"Letting my creative juices flow, I just wrapped until I was happy with the look and ended off with a coil to hold the glass in place. I wanted to give the wire a bit of a patina, so I dipped the wrapped pendant into a solution to give it a more 'rustic' appearance. Again keeping in the natural/rustic theme, I thought, What would look better than a piece of leather cord for the necklace? I finished the wire wrapping on the ends, added a rustic copper toggle, and *viola!* a necklace was created.

"My husband went back to visit his friend and I gave him the necklace to give to his friend's wife as my gift. With a few simple materials, a beautiful piece of jewelry was created and will hopefully be enjoyed for a lifetime."💎



Would you like to be named Craftsman of the Month?

To enter the contest:

- Write a 500-word step-by-step description of how you crafted your lapidary project from start to finish. Submit an electronic copy of the story, along with your printed manuscript, if you are able.
- Take least one sharp, close-up, color photo of the finished project. Submit a photographic print or a high-resolution (300 dpi at 4 inches by 5 inches) digital photo as a .tif or .jpg file on a CD. (Contact the editor with questions.)
- Send your materials, along with your name and street address

(required for delivery), to Craftsman of the Month, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003. Submissions will not be returned, so do not send originals. Only winners will be notified.

Craftsman of the Month winners receive a two-speed Dremel Model 200 N/40 MultiPro kit and a wall plaque in recognition of their creativity and craftsmanship. Winning projects are also posted on our Web site, www.rockngem.com.



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★ **MAY 13 - 15, 2011**

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★ **AUGUST 12 - 14, 2011**

EAST COAST GEM, MINERAL & FOSSIL SHOW

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★ **AUGUST 19 - 21, 2011**

SOUTHEAST GEM, MINERAL & FOSSIL SHOW

Holiday Inn - **CARTERSVILLE, GA**

★ **SEPTEMBER 14 - 18, 2011**

COLORADO MINERAL & FOSSIL SHOW

Holiday Inn - Denver Central, **DENVER, CO**

★ **SEPTEMBER 16 - 18, 2011**

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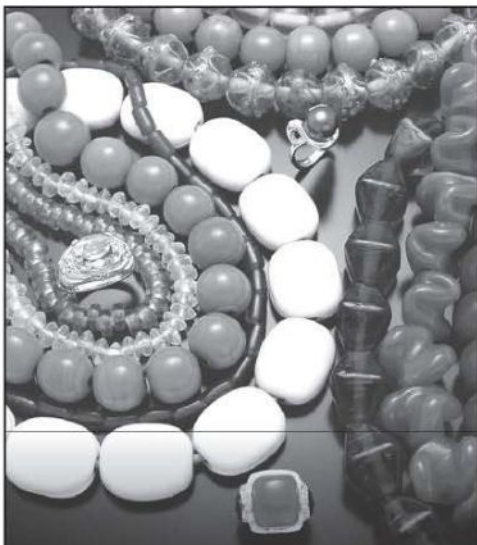
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 NOV. 26, 27, 28 LYNDEN, WA
 NOV. 27 & 28 MONTEREY, CA
 DEC. 3, 4, 5 SANTA BARBARA, CA
 DEC. 10, 11, 12 COSTA MESA, CA
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NOVEMBER 2010

2—SAN DIEGO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Mission Valley Resort Hotel, 875 Hotel Circle S.; Tue. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

3—BUENA PARK, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Knott's Berry Farm Resort Hotel, 7675 Crescent Ave.; Wed. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

5-7—ANCHORAGE, ALASKA: 9th annual show; Chugach Gem & Mineral Society, Alaska Miners Association; Sheraton Anchorage Hotel, 2nd Floor, 401 E. 6th Ave.; Fri. 5-9, Sat. 10-5, Sun. 11-4; free admission; displays, demonstrations, vendors, rocks, minerals, jewelry, books, kids' activities; contact Anita Williams, (907) 345-2541; e-mail: awilliam@alaska.net

5-7—BLACK CANYON CITY, ARIZONA: Annual show, "Rock-A-Rama"; Braggin' Rock Club; High Desert Park, Jacie St.; free admission; minerals, lapidary supplies, displays, fossils, rough slabs, crystals, beads, tailgaters welcome; contact Phyllis, (623) 374-5451

5-7—EUGENE, OREGON: Show, "Gem Faire"; Gem Faire Inc.; Lane County Events Center/Exhibit Hall, 796 W. 13th Ave.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

5-7—EUREKA, CALIFORNIA: 56th annual show; Humboldt Gem & Mineral Society; Redwood Acres Fairgrounds, 3750 Harris St.; Fri. 9-6, Sat. 10-6, Sun. 10-5; dealers, gems, minerals, fossils, kids' games, live demonstrations (lapidary, jewelry making, lampwork beads, flint knapping); contact Steven V. Johnson, (707) 476-8393; e-mail: humboldtcave man@att.net

5-7—GOLDEN, COLORADO: Annual show; Denver Area Mineral Dealers; Exhibition Hall, Jefferson County Fairgrounds, 15200 W. 6th Ave.; Fri. 10-6, Sat. 10-6, Sun. 11-4; free admission; minerals, fossils, gemstones, jewelry, beads, carvings; Pat Tucci, GEOdyssey LLC, P.O. Box 16339, Golden, CO 80402, (303) 279-5504; e-mail: ptucci@sprint mail.com; Web site: www.geodyssey-rocks.com

6—TUCSON, ARIZONA: 9th annual silent auction; Old Pueblo Lapidary Club; 3118 N. Dale; Sat. 9-2; free admission; contact Danny V. Harmsen, (520) 323-9154

6-7—AMARILLO, TEXAS: Show; Golden Spread Gem & Mineral Society; Amarillo Civic Center, 401 S. Buchanan St., Regency Room; Sat. 10-6, Sun. 10-5; adults \$2 (good for both days), children under 12 free; silversmithing, wire wrapping, Wheel of Fortune, silent auction, dealers, jewelry, fossils, gemstones, beads, prospecting equipment, flint knapping, demonstrations, hourly drawings, grand prize; contact Roy or Wanda Finley, 9170 FM 1151, Claude, TX 79019, (806) 944-5464; e-mail: finfran@midplains.coop

6-7—ANAHEIM, CALIFORNIA: 43rd annual show; American Opal Society; White House/West Wing Event Center, Hobby City, 1238 S. Beach Blvd.; Sat. 10-6, Sun. 10-5; adults \$3, children under 15 free; opal and gem dealers from the USA and Australia, rough and cut opals, gemstones, jewelry, supplies, raffle, free seminars, free gem cutting and jewelry making demonstrations; contact Pete Goetz, (714) 530-3530, e-mail: mpg1022@aol.com; Web site: <http://opalsociety.org>

6-7—BREWER, MAINE: Show; Penobscot Mineral & Lapidary Club; Brewer Auditorium, Wilson St.; Sat. 10-5, Sun. 10-4; adults \$1, children free; silent auctions, door prizes, demonstrations, children's activities; contact Lance Shope,

38 Sunset Strip, Brewer, ME 04412, (207) 989-3342; e-mail: lshope67@yahoo.com

6-7—EDMONDS, WASHINGTON: Annual fall show; Maplewood Rock & Gem Club; Maplewood Clubhouse, 8802 196th St. SW; Sat. 9-5, Sun. 9-4; free admission; raffles, displays, demonstrators, sales; contact Bev Ryder, 4625 Strumme Rd., Bothell, WA 98012, (425) 338-4184; e-mail: famryd@aol.com; Web site: www.maplewoodrockclub.com

6-7—EXTON, PENNSYLVANIA: 41st annual show, "Gemarama 2010"; Tuscarora Lapidary Society; CFS, The School at Church Farm, 1001 E. Lincoln Hwy.; Sat. 10-6, Sun. 10-5; adults \$6, children under 12 \$1; demonstrations, exhibits, dealers, children's activities; contact James Johnston, 1309 Cedar Rd., Ambler, PA 19002, (215) 542-7753; e-mail: j19b43jy@msn.com; Web site: www.lapidary.org

6-7—GREENWICH, CONNECTICUT: Annual show; Stamford Mineralogical Society; Eastern Greenwich Civic Center, 90 Harding Rd.; Sat. 9:30-5, Sun. 10-4:30; gems, minerals, jewelry, fossils; contact Howard Heitner, (914) 779-2041; Web site: www.stamfordmineralsociety.org

6-7—MIDLAND, MICHIGAN: Show and sale; Mid Michigan Gemcraft & Mineral Society; Midland Resort Hotel Convention Center, 1500 W. Wackerly St.; Sat. 10-6, Sun. 10-4; free admission; rocks, gems, minerals, fossils, jewelry, beads, Scout patches, photo op. with T. rex skull, demonstrations, presentations; contact Deb Acord, 55 Star Rd., Sanford, MI 48657, (989) 430-4471; e-mail: jackdanred1@aol.com; Web site: <http://midlandrockclub.com/>

6-7—MIDLAND, TEXAS: 48th annual show; Midland Gem & Mineral Society; Midland Center, 105 N. Main St., corner of Wall and Main; Sat. 9-6, Sun. 10-5; adults \$4, students (6-18) \$1, children 5 and under free; dealers, demonstrations, exhibits, silent auction, kids' corner, geode cutting, fluorescent mineral room; contact Craig Tellinghuisen, (432) 697-7668; e-mail: mgmstx@gmail.com

6-7—SAN DIEGO, CALIFORNIA: Show, "The GemDiego Show"; San Diego Mineral & Gem Society; The Al Bahr Shrine, 5440 Kearny Mesa Rd.; Sat. 10-5, Sun. 10-4; free admission; dealers, gems, minerals, beads, jewelry, lapidary equipment and supplies, demonstrations, wire wrapping, faceting, lost wax casting, silver chainmaking, intarsia, spheremaking, gemstone identification, Junior Booth, Club Booth; contact Bob Hancock, (619) 889-6886; e-mail: rhbob hancock@cs.com

6—SAN MATEO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things, San Mateo Co. Event Center (Event Center Meeting Pavilion), 2495 S. Delaware St.; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

6-7—CONCORD, CALIFORNIA: 51st anniversary show; Contra Costa Mineral & Gem Society; Centre Concord, Clayton Fair Shopping Center, 5298 Clayton Rd. (near Ygnacio Valley Rd.); Sat. 10-5, Sun. 10-5; adults \$5, 20 percent discount at Web site, under 16 and Scouts in uniform free with adult; fluorescent room displays, 21 vendors, minerals, fossils, gems, crystals, jewelry, books, tools, equipment, lapidary supplies, 60 exhibitors, 12 demonstrators, beading, wire-wrapping, faceting, stone carving, youth activities, silent auction, prizes, raffle, woolly mammoth skull, giant jade, giant cave bear, giant auction; contact Harry Nichandros, P.O. Box 4667, Walnut Creek, CA 94596, (925) 289-0454; e-mail: bob@ccmgs.org; Web site: <http://ccmgs.org>

6-7—EXTON, PENNSYLVANIA: Show, "Gemarama 2010"; Tuscarora Lapidary Society; School at Church Farm, Bus. Rte. 30 and Rte. 202; Sat. 10-6, Sun. 10-5; adults and students \$6, seniors \$5, children \$1, see Web site for discount; dealers, finished jewelry, cut and uncut stones, fossils, beads, tools, lapidary supplies, demonstrations of jewelry and lapidary arts, exhibits, children's activities, door prizes,

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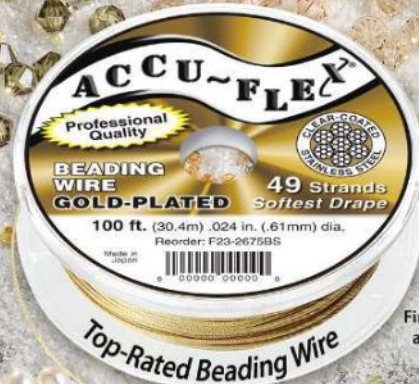
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How Did AGATES Form?

Explaining the Mystery of Their Genesis

Story by Karen Brzys



TOM SHEARER PHOTO

Despite almost 250 years of study and research, the agate formation process is still not completely understood.

One of the keys to successful agate hunting is to learn to “think like an agate”. In order to think like an agate, it is important to understand how they formed. This article describes a new theory about agate development. It merges concepts from various published theories and communicates the information in a nontechnical manner.

Agate is a semiprecious variety of quartz. Quartz is the second most abundant mineral in the earth’s crust, after feldspar. It is made up of a continuous framework of silicon dioxide molecules (silica). Silica comes in many forms. It can be suspended in water, precipitated out of solution to form noncrystalline gels or solids (such as opals), or grown into crystalline quartz.

The crystalline varieties of quartz can be subdivided into two groups. Macrocrystalline includes quartz with crystals that you can see with the unaided eye. When most people think of quartz, they envision six-sided crystals with six-sided pyramids at their ends. Microcrystalline quartz has crystals that require a powerful microscope to be seen. The microcrystalline quartz varieties are further subdivided into two groups, “granular” and “fibrous” varieties that are distinguished by the size and shape of the microcrystals.

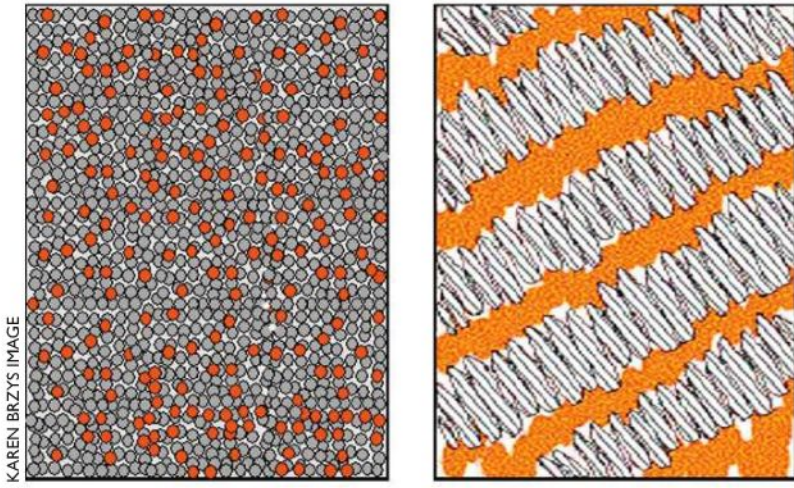
Examples of granular microcrystalline quartz include chert, flint and jasper. These varieties have small, spherical microcrystals that pack together like BB pellets in a jar. Because the crystals pack together so tightly, granular microcrystalline quartz is usually opaque. Agate is a type of fibrous microcrystalline quartz that is a variegated form of chalcedony (pronounced kal-sed’-nee). The crystals are long and fibrous, which allows agate to be translucent in most cases.

Agates naturally developed when empty pockets or veins inside host rock filled in molecule by molecule and layer by layer with chalcedony microcrystals, which self-organized to form concentric bands or other patterns. Agates developed in igneous, sedimentary and metamorphic rocks and have been discovered on every continent. They have been studied for almost 250 years, but despite considerable research, most people agree that the agate formation process is still not completely understood. This is because no one has

TOP: Chert, flint, and jasper (left) have granular microcrystals, whereas chalcedony agate (right) has fibrous microcrystals. In both diagrams, orange represents iron oxide impurities and gray represents the silica microcrystals.

CENTER: This closeup of an agate amygdaloid from Michipicoten Island in Lake Superior clearly shows the capillary fractures in the host rock that “fed” the agate pocket with silica solution.

BOTTOM: This diagram illustrates the direct diffusion method of delivering silica-rich water into the vesicle pocket and extruding the silica-poor water back into the inter-granular pores of the host rock (inflow must equal outflow).



documented agate formation in real time, nor have agates been successfully replicated in the laboratory. It is amazing that we cannot make agate, but we can manufacture diamonds, rubies, sapphires and emeralds.

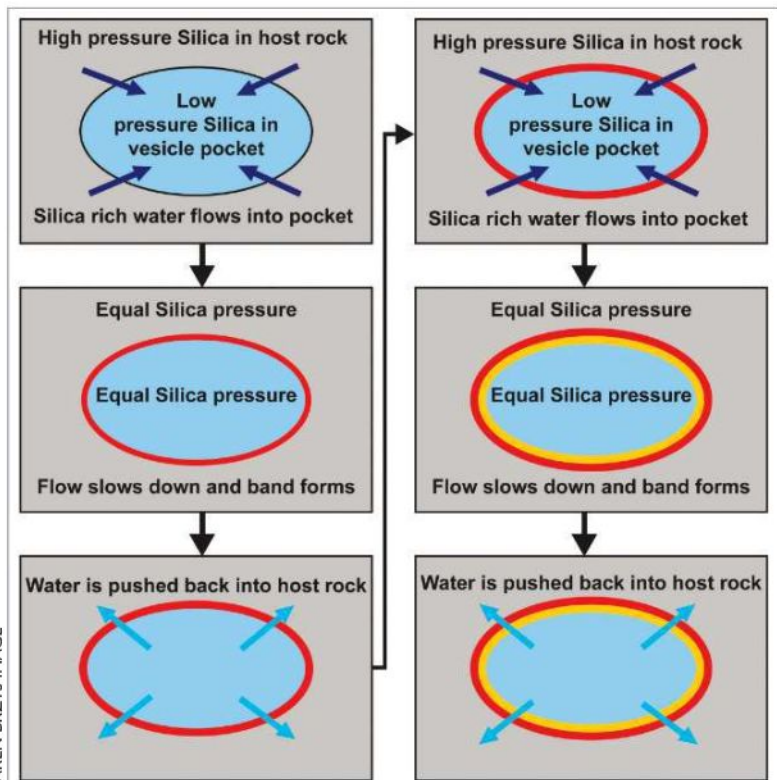
There are two main agate genesis theories. One suggests that agates formed from the inflow of mineral-rich solutions into empty vesicle pockets. The second is the silica gel theory, which suggests that agates formed from silica gel clumps in molten lava or gelatinous oozes that seeped through the pores of host rock and accumulated in pockets. This article suggests a new hybrid theory that has in part been influenced by the article “The Formation of Agate Structures: Models for Silica Transport, Agate Layer Accretion, and for Flow Patterns and Flow Regimes in Infiltration Channels”, published in *Neues Jahrbuch Für Mineralogie Abhandlungen*, which described a theory originated by German geologist Eckhart Walger (August 2009, p. 113). This new theory suggests that there is a cyclical process during agate formation that involves the inflow of silica-rich fluids into the vesicle pocket from surrounding host rock, the development of a temporary gelatinous membrane when silica molecules attach, the outflow of silica-depleted water back into the host rock, and the hardening of the gelatinous layer into chalcedony microcrystals.



SOURCE OF SILICA

A large percentage of the world’s agates formed in vesicle pockets inside volcanic basalt or andesite rock. These igneous rocks were usually poor in silica, so there had to be another source of the mineral in order for agates to develop. There may have been many different sources of silica, depending on the geologic environment and conditions. Some of the possible sources included silica-rich rocks such as volcanic ash, bentonite, rhyolitic tuff, and sandstone, organic remains, mineral-rich groundwater, and hydrothermal fluids. If the silica source was rock, a chemical weathering (devitrification) process took place when carbon dioxide mixed with water to form carbonic acid, which then chemically decomposed the source rock to free up silica and other minerals.

Once silica was leached from its source, it usually took the form of silicic acid, which is comprised of silicon, hydrogen and oxygen. Fluids within the host rock pores became supersaturated with silicic acid. But since this form of silica is inherently unstable, it rapidly condensed and eliminated water to form silica polymer colloids. These, at first, were small particles floating in fluid within the pores of the host rock. Over time, the colloids joined together. This occurred because silica molecules love their friends. You can think of the polymerizing process as lots of silica molecules “holding hands” to form longer chains of silica molecules. This is an important step for agate genesis because it appears that, under normal agate-forming conditions, quartz does not crystallize directly from single molecules of sili-



con dioxide suspended in solution ("Precipitation of Amorphous Silica from High-Temperature Hypersaline Geothermal Brines", by L.B. Owen, Lawrence Livermore Laboratory, University of California, June 1975, p. 6).

SILICA TRANSPORT

Once the pores in the host rock became supersaturated with silica colloids, the next step in the agate formation process was for silica to be transported through the host rock to the vesicle pockets. When the host lava first began to cool and solidify into rock, contraction took place throughout the matrix, producing a network of cracks called "fractures." At the top of the lava flow, there tended to be more cooling-induced fractures, as well as more vesicle pockets, since the gas bubbles that originally formed the pockets rose to the top. Over time, these fractures served as conduits and facilitated the movement of fluids throughout the host rock.

Even though all the pores and vesicle pockets in the host rock filled with water, the silica concentrations varied. The silica saturation in the smaller pores of the host rock attained a higher concentration, while that in the larger vesicle pockets was significantly lower. Consequently, a difference in concentration level (gradient) developed between the inter-granular pore solutions and the fluids within the vesicle pockets (Walger, p. 126). This gradient was the driving force that caused the higher-saturation solution in the pores to move into the vesicle pockets either through capillary fractures or directly through the pores of the outer husk and chalcedony bands of the vesicle. Proof of this "porosity" is demonstrated by the fact that agates can be artificially colored by injecting dyes through the semipermeable agate layers. In both cases, the driving force of this fluid movement was the need to equalize the silica concentration levels.

INFILTRATION CHANNELS

The tube-shaped connective channels that are often seen in agate slabs are central to understanding agate formation. Those who believe that these connective structures are "exit channels" suggest that on occasion agates had to relieve pressure via an expulsion release. We can understand why a lot of researchers have labeled these as "tubes of escape" since the bands next to the tubelike channel grow thinner toward the outside of the agate. It appears that this thinning is in response to the material in the center of the agate pushing out.

A closer examination of these connective channels, however, indicates that they may instead be "inflow" channels. If the connective tubes were formed by a high-pressure release, as has been suggested by silica-gel enthusiasts, then it would be expected that the microscopic silica fibers forming the individual agate bands lining the channel would have been deformed as a result of the pressure release toward the outside of the channel. Walger discovered in his research that this is not the case. He used scanning electron microscope photos to show that the silica fibers in the connective channels maintain the normal perpendicular orientation relative to the agate band direction (Walger, p. 125).

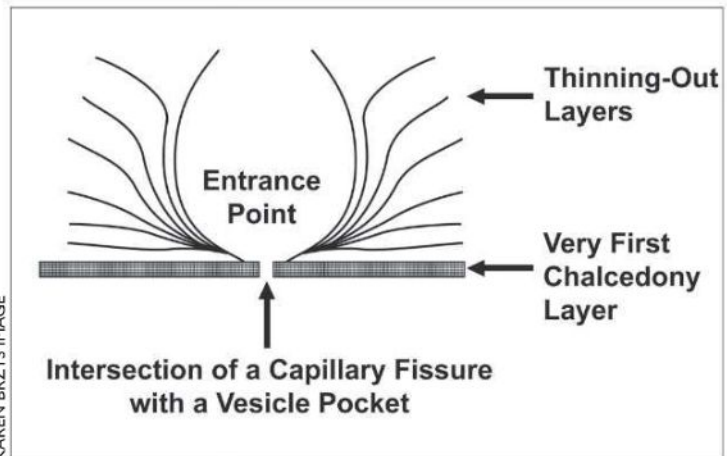
Although the geometrical shapes of connective channels can vary, in many cases the inflow channels are narrow at the front end, thicken, then narrow again, resembling the shape of a green onion. The reason for this shape, and why the entrances into agate pockets stayed open, is the power of the inflowing fluid, or what is technically called a laminar plane free jet. Let's just say that a "jet stream" formed when fluid was forced through the small opening at the entrance point of each connective channel. These jet streams prevented minerals from attaching near the entrance points.

There are a few analogies that explain how the channels stayed open to continuously provide agate pockets with silica-rich solutions. The dynamics of the channels can be compared to keeping a faucet dripping during the winter so that water pipes don't freeze. Another analogy can be found in the cardiovascular system: As long as there is a positive blood pressure, blood particles are kept from attaching to the walls of blood vessels. A third analogy is borrowed from



KAREN BRZY'S PHOTO

The connective channel with thinning bands connects the exterior of the agate to the interior in this Lake Superior agate from Copper Harbor, Michigan.



KAREN BRZY'S IMAGE

This diagram shows the different components of an infiltration channel. These channels served as conduits to feed mineral-rich fluids from host rock into agate pockets.



KAREN BRZY'S PHOTO

The infiltration channel in this Mexican Laguna agate shows aggregates of mineral impurity (probably calcite) that grew in the channel. The stalks of the aggregate appear to point inward and are not deformed, which would have occurred if the channel formed as outflow from pressure release.

sedimentation flow dynamics involving the impact of flowing water. Picture a river entering a lake. The flow of water keeps the junction point open. This is the concept of "scour", which is the hole left behind when sediment is washed away and kept from accumulating on the bottom of a river due to the motion of the river's water.

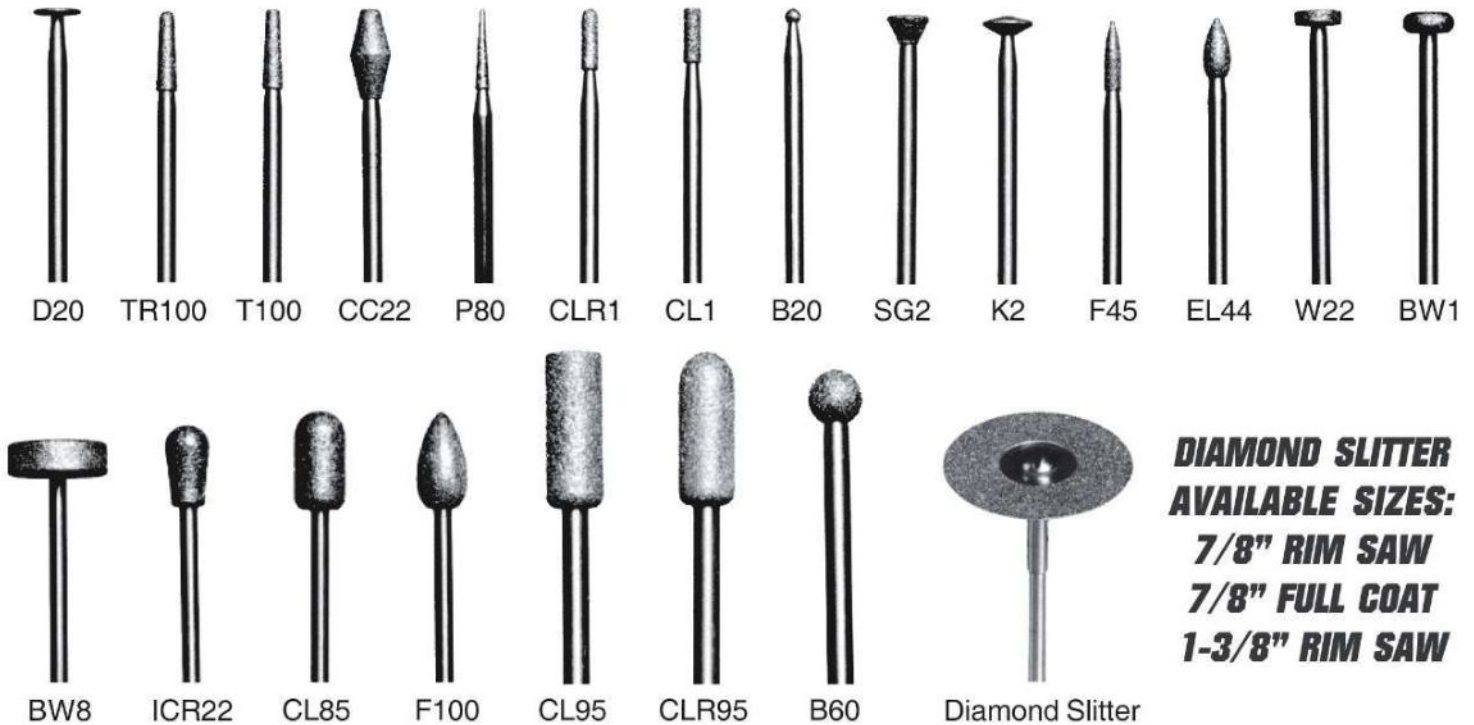
More support for the premise that the channels are for inflow can be seen in agates that have crystals growing within the channel. If this were an outflow channel caused by a pressure



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AGATES from page 14

release powerful enough to burst through the outer husk wall, there would not be random crystals without deformities that grew lazily in the middle of the channel. Instead, aggregate growths can sometimes be seen within the channel that grew in toward the center of the pocket. Thus, the mineral aggregate was effective as an obstacle, disturbing the inflow current, and accordingly, it modified the spatial distribution of the bands that formed near the channel opening.

As the colloidal silica particles entered the infiltration channel, they were carried away by the faint inflow current. That is why, after the start of the convection, the first agate bands thinned out at a sharp angle toward the entrance point of the channel. With increasing distance away from the entrance point, the flow dissipated, allowing the silica colloids to precipitate out and attach. As these thinning layers started to accumulate, the actual entrance point moved increasingly deeper into the vesicle pocket. This caused the thinning-out bands to become more and more inclined toward the entrance point. Eventually, the infiltration channel finished forming and developed a narrow slot that stayed open and continued to feed the pocket.

BAND DEVELOPMENT

Although it is true that no two agates are alike, there are control mechanisms that are universal in the formation of all agate banding. Researchers who have studied agates from all over the world have discovered similarities in texture, microstructure, and rhythmic zoning. The agate bands developed as fingers of fibrous silica microcrystals progressively grew from the outside of the cavity toward the inside. The first step was the formation of a semiporous silica membrane surrounding the cavity. As the amount and size of the polymer chains floating in solution inside the agate pocket increased, the colloids started to adhere to the inside wall of the cavity. When the colloids attached and "found their friends", they formed a thin, gelatinous membrane.

As the gel layer increased in thickness, the concentration of "free" silica colloids in the pocket's fluid decreased, and the rate of attachment to the vesicle wall slowed down, finally coming to a temporary halt. Because the process stopped, there was never complete closure of the silicified texture in the membrane layer and a residual porosity remained. The gel layer took up space, causing some of the silica-poor fluid to then be diffused back out of the pocket through the pores. The amount of outflow of silica-poor fluid equaled the amount of inflow of silica-rich fluid. This is called the "continuity condition". Basically, this means that there had to be an outflow to equal the amount of



KAREN BRZYS PHOTO

Sometimes, iron oxide formed individual polka dot spheroids throughout the agate, rather than forming distinct iron oxide bands.



KAREN BRZYS PHOTO

This photo shows red bands with iron oxide impurities that precipitated between layers of chalcedony. Note that the iron oxide bands decreased toward the center of the agate (top of photo).

inflow, since water cannot be compressed. Not long after each membrane developed, the gel in the membrane formed chalcedony microcrystals to harden the layer (Walger, p. 127). The driving force exerted by the concentration gradient was maintained as long as chemical weathering in the surrounding rock continued to supply silica.

Although scientists cannot make agate banding happen in the laboratory, they can measure the intimate details and chemical components of agate bands. It appears that silica colloids were not alone; researchers have determined that other minerals contributed to the formation of bands. In some cases, the mineral impurities, such as iron, simply tried to get in the way. If these impurities had the same electrical charge as silica colloids, they were incompatible and were pushed to the inside and away from the leading edge of gel membrane formation, settling in the troughs and at the tips of the silica crystal fibers as the gel membrane solidified. Over time, these impurities built up and somewhat blocked silica colloids from getting to the active membrane surface. When enough of the impurities had built up, they formed their own bands or spheroid deposits. After the impurity's concentration was reduced because the free impurity molecules precipitated and attached, silica growth recommenced.

I liken this rhythmic process to a crystal-making party. First, the silica colloids decid-

ed that they wanted to have a crystal-making party. One thing about silica molecules is that they are very discriminatory; they didn't let impurities with the same electrical charge come to their party and kicked them to the inside of the pocket. But the impurities were jealous, so they built up a barrier layer until they had enough to have their own crystal-making party. They parted themselves out as they laid down their band, and then the silica started again.

Other trace elements that entered into the agate pocket actually helped the silica to form chalcedony bands. These ions, which had an opposite electrical charge, seemed to stimulate coagulation of the silica colloids and help to facilitate band formation (*Fundamentals of Interface and Colloid Science*, Vol. IV, by J. Lyklema, Elsevier Inc., 2005, p. xvi). When the bands were developing, these trace element ions were "befriended" by the silica and allowed to enter into the lattice structure of the individual microcrystals of quartz. The trace element molecules were larger than the silica molecules, so they took up more space. The silica fibers tried to maintain their structural continuity while simultaneously making room for the larger ions, which resulted in the fibers growing in a twisted orientation. This in turn twisted the lattice structure within the entire band. It is thought that aluminum was usually the catalyst, but potassium, sodium, zinc, barium and calcium ions may have also been responsible. All these ions were capable chemically of forcing this twisting, plus they naturally occurred in the host rock that surrounded agate pockets.

These catalysts apparently helped to link the negatively charged silica particles. As the silica crystallized, aluminum accumulated at the front of the active gelatinous membrane. An internal cycle was created in which diffusion or infiltration of mineral rich fluids into the agate pocket, development of a temporary silica gel membrane that hardened into an individual agate band, and outflow of mineral-poor fluids from the pocket repeat. The repetition of these stages resulted in the pocket filling from the outside inward to form the agate. Although the role of aluminum was proposed by silica gel enthusiasts, this hybrid theory suggests that, since temporary silica gel membranes formed during the osmotically driven inflow process, the chemical influence of aluminum may have also played a role during the inflow process.

Perhaps we will never completely solve the mystery of agate formation. More than 3,000 named varieties of agate developed over 3 billion years of earth's history in all types of geologic environments. Perhaps all genesis theories explain how at least some of the agates that we now find were formed. It makes sense to examine all the facts and combine aspects of the different theories to explain the mystery of agate genesis. 💎

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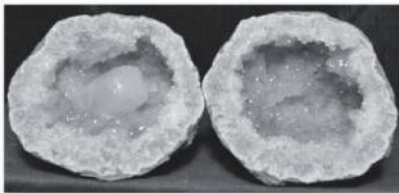
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SHOP TALK

by William A. Kappale

Cabochon Findings

After all the work you have put into slabbing, cutting, trimming, grinding, sanding and polishing, you sure don't want to just toss your cabochon onto a pile of its cousins, put it in a display case, or set it on the mantel. Fortunately, you don't have to. There are all kinds of commercially made mountings for your cabs. Of course, if you really want to dive into the hobby, you can craft your own wearable pieces of jewelry to display your craftsmanship. Here are some of your options.



PENDANTS AND BROOCHES

I lumped these two together, since I feel that a brooch is just a pendant with a pin back instead of a loop and bail. Mountings for these come in a wide variety of styles, sizes and materials. The simplest ones consist of a thin channel of metal with a loop and bail at the top. The stone is held in place by crimping the top with pliers. The metal has virtually no springback, so the stone will not move or fall out. The "belt and suspenders" crowd can use a drop or two of cyanoacrylate glue just in case.

In many other styles, a bezel ring or cup in the shape of the stone is used to hold it. The stone is placed in the bezel, the edge of which is pressed over the edge of the stone with a commercial bezel pusher, a small piece of dowel, or a plastic toothbrush handle—in short, anything that will not mar the bezel.

The area around the bezel is where creativity of design comes in. Inexpensive mounts are often just stamped sheet metal with a plating to make them shine. They have been around for eons and seem to sell well, but if you have worked hard and come up with a really nice stone, in my opinion, you need to find it a better home. Better mounts are fabricated from base metals, like copper, brass and bronze, right up through silver, gold and platinum. I have found some mounts made of the base metals that are really nice. Sometimes, they are just buffed and coated with lacquer or polyurethane, and other times they are plated with silver, gold or platinum. The best fabricated mounts are made of these three precious metals, but they get awfully pricey.

Beautiful mounts can also be made using the lost wax casting process. Although the best findings are made of the precious metals, there are casting alloys of base metal, mostly brass and bronze, that make great mountings. For most of us, these may be the best bet.

BELT BUCKLES

Belt buckles are very popular places to put our cabochons. They come in a wide variety of sizes and styles, starting with a very simple cast bezel on a hidden backing that contains the loop for the belt and the pin for the belt hole. The cab is placed inside the bezel, and the bezel is screwed to the backing with a couple of hidden screws. Only the bezel rim and the cab show from the front. Larger and more elaborate buckles come in rectangles, squares, circles, ovals, and various freeform shapes. Most have the same screwed-on bezel, which works very well and simplifies the installation. There are round, rectangular, square and oval cast brass buckles with depressions that can be filled with polished slabs, very large cabochons, or even mosaics made from small scraps.

MISCELLANEOUS

There are many more ways to display your lapidary work. Bola ties are still popular, as are hat pins, stick pins, bookmarks, rings, earrings, keychain dangles, bracelets, and other items. The list is long, but most of them use the same method of mounting the stones as pendants, brooches and buckles. Some of the smaller projects, like bookmarks, may just use glue to mount the stone. A little searching will usually find just the right mount in which to display the fruits of your labor. ♦

Please feel free to send your questions and comments about any of my columns to Shop Talk, 25231 Pericia Dr., Mission Viejo, CA 92691 or quappelle@cox.net.



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Collecting FLUORESCENT MINERALS



Many major and local mineral shows feature a display of fluorescing minerals like Greg Anderson's booth at the Tucson Gem & Mineral Show.

The Phenomenon Is No Longer Just a Novelty

Story and Photos by Bob Jones

I first became interested in fluorescent minerals in the 1930s, when the property of fluorescence was considered more of a novelty than a legitimate collecting focus. Granted, ultraviolet (UV) lights were being used at Franklin and Sterling Hill, New Jersey,

to separate the red-fluorescing gangue mineral calcite from the pay ore of fluorescent willemite and its companion non-fluorescing ores zincite and franklinite. Back in those early days, the use of UV lamps was mainly restricted to scientists and miners.

Some of the more progressive museums had small, fascinating exhibits of drab-looking minerals, mostly from Franklin, and some chunks of calcite that came to life when you turned on an ultraviolet light source. Such a display at the Yale Peabody Museum in New Haven, Connecticut, is what started me on my collecting career in 1935!

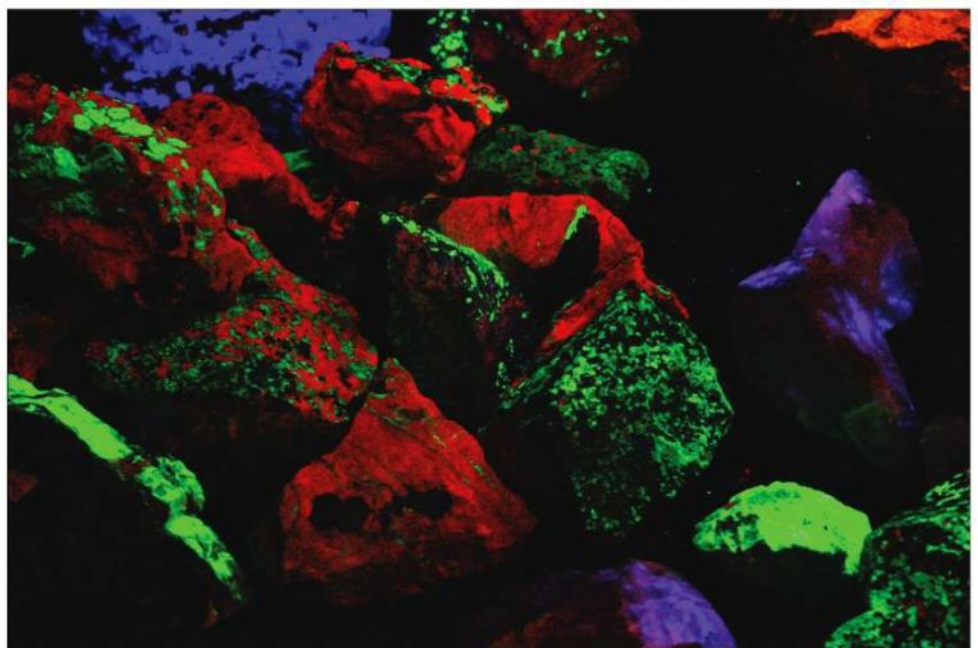
At that time, few collectors spent their nights in the field in search of fluorescing minerals. One reason was the lack of affordable and portable lamps and battery packs. In the 1920s, the main source of ultraviolet excitation for mineral study was a machine called an "iron spark". This cumbersome machine was not unlike a welding torch in some ways. It had to be plugged into a source of high energy. It gave off lots of UV light, but it also gave off visible light, which made it difficult to accurately judge the color response from a subject rock. Unless the response was really bright, it was partially masked by excess visible light.

The revolution in collecting fluorescent minerals came when Ultra Violet Products, a company in California, developed a portable filtered shortwave UV lamp. The crowning touch was a portable battery to go with this handheld lamp.

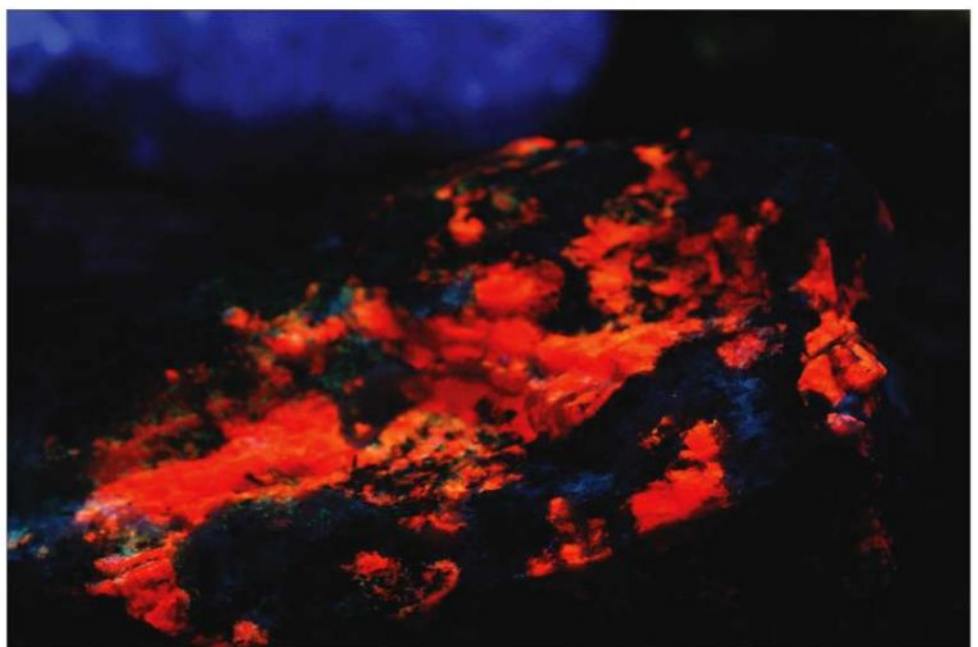
The Yale exhibit I saw in 1935 had both shortwave and longwave lamps. The curtained display of rainbow rocks exhibited a dramatic color change that thrilled and mystified a young kid like I was at the time. The control switch got a really good workout that fateful day.

When World War II started, tungsten became a strategically important metal, as it was used in all sorts of alloying operations to toughen steel. The most important sources of tungsten are the minerals powellite and scheelite. It so happens that both these minerals, to a greater or lesser degree, respond brightly under shortwave UV excitation. Prospectors soon discovered that the discarded waste rock on the dumps of many California gold mines was rich in these two tungsten minerals. It didn't take a genius to figure out that, with a portable UV lamp, one could scan these dumps and find a new pay ore: tungsten-bearing scheelite. The beauty of this was the ore had already been mined and broken up and was ready to be hauled off to a crusher and smelter!

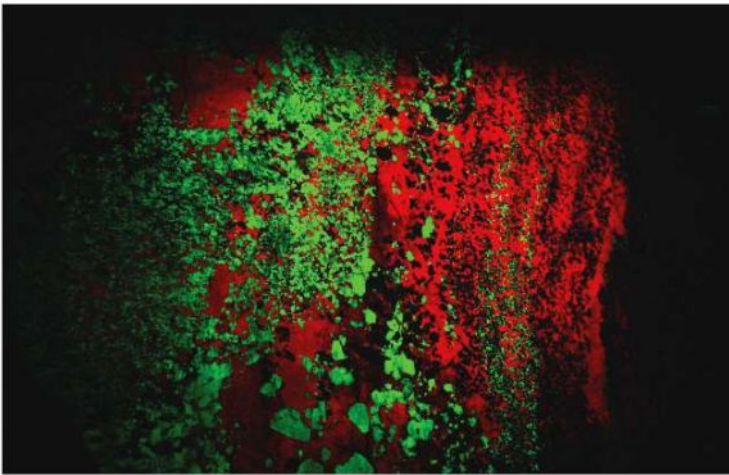
After the war, other lamp manufacturers began to produce UV equipment that was useful for mineral collectors. Some of these lamps were inexpensive kits for the amateur collector, which helped get more and more people involved in collecting fluores-



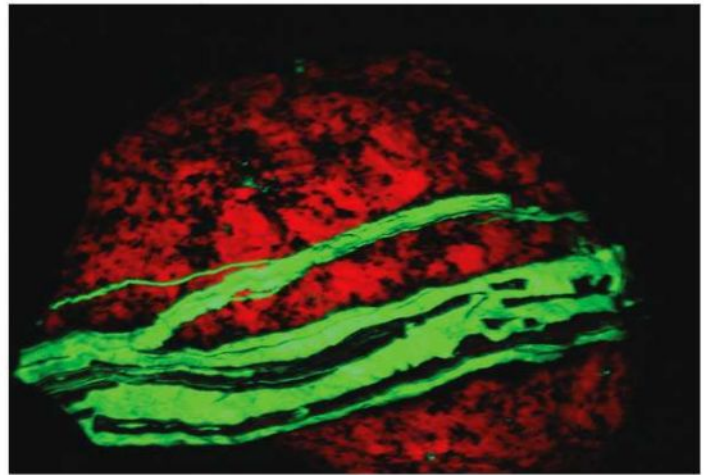
Drab-looking minerals (top) come to life when you turn on an ultraviolet light source (above). These specimens are from the famous zinc mines at Franklin and Sterling Hill, New Jersey.



Tugtupite from Russia looks like it is on fire under the ultraviolet lamp.



A typical specimen from the Franklin, New Jersey, ore dump shows red-fluorescing calcite and green-fluorescing willemite.



A rare form of veined green-fluorescing willemite in red-fluorescing calcite comes from Franklin, New Jersey.

cent minerals. My first lamp was a \$20 kit I assembled myself! It produced both shortwave and longwave UV light. I even used that little lamp when I researched some 70 localities for fluorescent minerals, which I recorded in my master's thesis, "Luminescent Minerals of Connecticut", and when I wrote *Fluorescent Minerals of Franklin, New Jersey* (Fluorescent House, 1961). That was well over 50 years ago!

UV equipment for collectors made a quantum leap in the latter part of the 20th century. Now there are lamps that give off extremely powerful shortwave or longwave energy or both! To add to the fun, some new lamps give off "midwave" UV energy, wavelengths that fall between the short and long extremes. All these new lamps are brighter, excite a much greater range of fluorescent minerals, and last longer.



The sphalerite ore from Bisbee, Arizona, responds nicely under a longwave ultraviolet lamp.

The problem with earlier UV shortwave lamps was that the special filter needed to pass UV energy while blocking ordinary light eventually lost its effectiveness. Gentle heating might restore the filter for a short time, but those old lamps, as useful as they were, had a fairly short field life. The new lamps of today are sturdier and last much longer, which is a plus for cost-conscious hobbyists. In addition, some minerals that respond very poorly or not at all under the two standard shortwave and longwave UV sources respond quite nicely under the newer midwave UV source.

All of today's UV lamps today cost a lot more than my original lamp, but today's collector enjoys a greater number of identified fluorescent species and brighter responses from their specimens! Prices for a lamp today range from around \$100 for a single-wavelength lamp to over \$400 for a powerful lamp that emits several UV wavelengths.

The current increase in interest in fluorescent minerals is exciting! Back in 1960, I started a monthly column in *Rocks & Minerals* magazine titled "Collecting Fluorescent Minerals". It was the first column exclusively devoted to minerals that respond to UV light. I like to think it had some positive effects on the growth of this type of collecting.

That growth has had delightfully colorful results! Dozens of mineral species that were not recognized as fluorescent in the mid-20th century are now eagerly sought and collected using the new equipment. The best known and most easily recognized classic fluorescent minerals are those from Franklin and Sterling Hill. The zinc ores from these deposits are dominated by brilliant red-fluorescing calcite, a gangue mineral, and green-fluorescing willemite, a rich zinc silicate ore. The other important ores, zincite and franklinite do not respond to any UV light wave.

What made these two old zinc mines special in the early days of fluorescent mineral collecting was the dozens of fluorescent minerals they produced. I spent many

a day under a blanket on the dumps of the Franklin and Parker shafts seeking fluorescent minerals like hardystonite, calcium larsenite (now called esperite), and others. We collectors only knew of a couple dozen fluorescent minerals in those days. Now, nearly 100 different species and varieties are known to respond under one or more UV wavelength at Franklin and Sterling Hill. That accounts, in part, for the great number of collectors who visit the Franklin and Sterling Hill show, the two museums on site, and the old dumps, which are accessible for a small fee.

My favorite place for collecting fluorescent minerals is the Sterling Hill Mining Museum because of the fee-digging dump. This dump was created when the mine was converted to a museum and a tunnel was extended for an underground tour. That dump is regularly refreshed with ore

For More Information

Fluorescent Mineral Society

The Fluorescent Mineral Society is an international organization of professional mineralogists, gemologists, amateur collectors, and others who study and collect fluorescent minerals. Check the Bibliography page for recommended reading on fluorescent minerals.

<http://uvminerals.org/fms/spectrum>

World of Fluorescent Minerals

by Stuart Schneider
Schiffer Publishing, 2006

Collecting Fluorescent Minerals

by Stuart L. Schneider
Schiffer Publishing, 2004

Other informative out-of-print or hard-to-find titles on this topic may be available for purchase through www.amazon.com or www.alibris.com.

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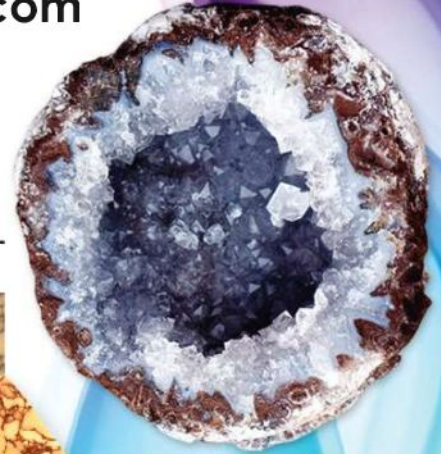
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- 1.) TEP, Tucson Electric Park, 2500 East Ajo Way Tucson, AZ 85703, Space T12 (outside Tent #12), Jan 29 - Feb 13, 2011
- 2.) Tucson Gem & Mineral Society, 260 S. Church Street, Tucson AZ Convention Center, Space 16W, February 10-13, 2011

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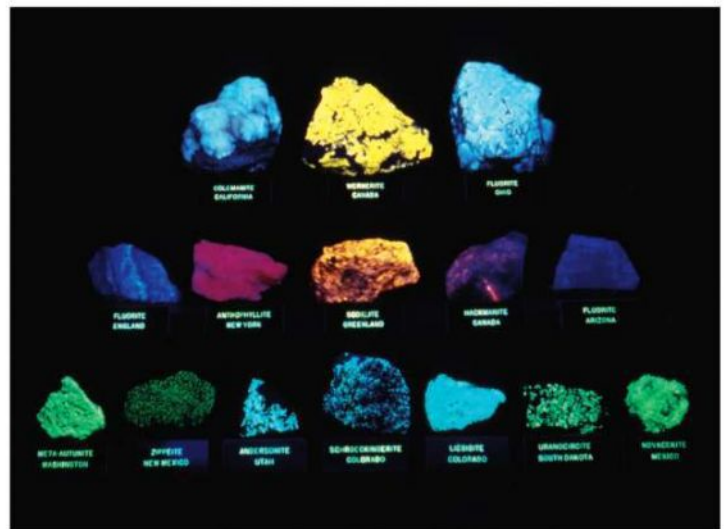
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Hackmanite (a form of sodalite) from Dungannon Township, Ontario, responds beautifully under ultraviolet excitation.



The Sterling Hill Mining Museum in New Jersey features impressive fluorescent mineral displays in its Tom Warren Fluorescent Mineral Room.

hauled from underground for folks who pay a fee to enjoy collecting!

Both the Franklin Museum and the Sterling Hill Museum boast impressive fluorescent mineral displays. Again, my nod goes to Sterling Hill, with its special Tom Warren Fluorescent Mineral Room. Tom was the guy who designed and built those early UV lamps that were used during World War II. Those of you who have seen your white shirt glow blue on some Disneyland rides might be interested to know that Tom's company, UV Products, supplied those first lamps when the Anaheim, California, theme park opened!

A number of mineral localities are now recognized as special for the variety of fluorescent minerals they hold. One such locality, because of the variety of rare and uncommon species it yields, is Mont-Saint-Hilaire near Montreal, Quebec. This odd geological deposit produces an entirely different variety of fluorescent minerals than the New Jersey deposits. Mont-Saint-Hilaire produced minerals such as terskite, catapleite, franconite, and about 50 other exciting fluorescent minerals. The quarry is no longer accessible to collectors.

Oddly, the mineral that gave its name to the UV phenomenon, fluorite, is quite uncommon both in New Jersey and at Mont-Saint-Hilaire. The classic sources for fluorescent fluorite are the mines of Cumberland, England. These mines shut down 100 years ago, but quantities of blue-fluorescing fluorite still appear in the marketplace, thanks in part to the huge quantities of specimens once produced in England. Today, these older specimens are added to by one English mine, the Rogerley, which was re-opened a few years ago and is currently yielding choice green crystals that respond with the classic blue color under longwave UV excitation.

The Rogerley mine is located near Frost-erley (Durham County) in the extreme northern part of England. The mine was

opened for specimen collecting by the American dealership Graeber and Himes, of Fallbrook, California. Cal Graeber and Leonard Himes, both friends of mine, can be found at most major mineral shows in the United States and Europe. Though they deal in a full range of choice mineral species, they highlight the lovely green cubes they mine from the Rogerley. Some of these cubes are an inch on an edge. Most specimens are completely covered with cubes that come to life as bright blue crystals when excited by longwave UV light!

The Rogerley mine specimens have not been investigated for the cause of their UV response, but plenty of work has been done on many other English sources whose fluorite gives a blue response under longwave energy. In almost every case, these fluorites have a trace of one or more rare earth elements like yttrium, europium and cesium. It would not be unreasonable to suggest these trace elements are also found in the Rogerley crystals.

The trace elements that are the root cause of most of the fluorescent responses you see are called "activators". The majority of activators are the transition metal elements. Manganese is one such element and is the chief activator in the calcites from Franklin and Sterling Hill. Lead can be an activator, as in the halides from the Salton Sea in California. Uranium is a very strong activator, but not all uranium minerals respond under the UV lamp. Those that do, including autunite, meta-autunite and schoepite, are bright green under the shortwave lamp. Minerals in which uranium is a trace element can also fluoresce. Chalcidony, common in many desert areas, contains a trace of uranium salts, which cause it to fluoresce green. Everyone's favorite zinc arsenate, adamite from the Ojuela mine in Mapimi (Durango), Mexico, can fluoresce a brilliant green, thanks to a trace of uranium. Adamite that does not fluoresce or responds poorly is inhibited from doing so because of

a "quencher", either iron or copper. Trace amounts of these two metals in a mineral can inhibit any fluorescent response.

Mercury is an unusual, but delightful, activator. The calcite from the mercury mines at Terlingua, Texas, and a couple of lesser-known mines in Mexico has trace mercury in its structure and responds magnificently under both long- and shortwave UV. Under a longwave lamp, the Texas calcite is a bright pink, while under shortwave UV it is a vibrant blue. The pink-fluorescing calcite will also phosphoresce a superb blue when the longwave UV lamp is shut off.

With the increased participation of foreign mineral dealers in American shows, a greater variety of fluorescent minerals has come into the United States from foreign deposits. Knowledge of the variety and number of minerals that are known to fluoresce increases among collectors every year because the hobby itself is growing dramatically. It is not unusual to see a collector walking around a mineral show, UV lamp in hand, scanning the minerals on a dealer's table for a response. In doing so, they have unearthed hitherto unrecognized fluorescent species.

A few of the minerals from other lands that are now commonly collected are talc from Pakistan, which fluoresces white under shortwave UV light; zircon from Australia, which fluoresces yellow under shortwave UV; blue-fluorescing scheelite and white-fluorescing powellite from China; and hydroboracite from Turkey, which gives a blue response under shortwave excitation. Dozens of common to rare fluorescent species from foreign countries that were unheard of 50 years ago are now commonly collected.

It is very exciting that fluorescent minerals have moved from a novelty only seen in museums to an integral part of the collecting hobby. Major shows and many local shows feature fluorescent mineral displays on the show floor. Fluorescence is definitely here to stay!💎

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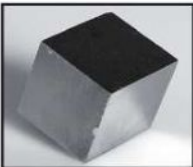
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Show Dates from page 10

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silent auction; contact Jim Johnston, (215) 542-7753; e-mail: information@lapidary.org; Web site: www.lapidary.org

6-7—LANCASTER, CALIFORNIA: Show, "Rock 'N' Gem Roundup"; Palmdale Gem & Mineral Club; Antelope Valley Fairgrounds, 2551 W. Ave. H; Sat. 9-5, Sun. 9-5; free admission; petrified wood seminars by Walt Wright, dinosaur programs by Richard Wade; children's area with interactive games, silent auction, Country Store, more than 25 vendors, more than 30 lapidary displays; contact Susan Chaisson-Walblom, 42122 52nd St. W, Quartz Hill, CA 93536, (661) 406-0143; e-mail: slchaisson@yahoo.com; Web site: www.palmdalegemandmineral.com

6-7—MELBOURNE, FLORIDA: Show, "Parade of Gems"; Canaveral Mineral & Gem Society; Melbourne Auditorium, 625 E. Hibiscus Ave.; Sat. 10-5, Sun. 10-5; adults \$4; contact Don McLamb, (321) 723-2592; email: fdjmc@aol.com; Web site: www.canaveral-mgs.com

6-7—RIDGECREST, CALIFORNIA: 55th annual show; Indian Wells Gem & Mineral Society; Desert Empire Fairgrounds, 520 S. Richmond Rd.; Sat. 9-5, Sun. 9-5; free admission; contact John DeRosa, (760) 375-7905

7—EVANSTON, ILLINOIS: Show, "Ayla's Wonderful World of Beads"; Ayla's Originals; Hilton Garden Inn, 1818 Maple Ave.; Sun. 10-4; adults \$3 (\$2 with Web site coupon); vendors, freshwater pearls, gemstones, art glass, sterling silver, seed beads, findings, beading supplies; contact Ayla Pizzo, 1511 Sherman Ave., Evanston, IL 60201, (847) 328-4040; e-mail: info@aylasoriginals.com; Web site: www.aylasoriginals.com

7—McCLELLAN (SACRAMENTO) CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Garden Pavilion, 5640 Dudley Blvd.; Sun. 11-3; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

12-14—EDISON, NEW JERSEY: Show; MalicJewels Jewelry & Gift Show; New Jersey Convention & Expo Center at Raritan Center, Hall D, 97 Sunfield Ave.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

12-14—HAMBURG, NEW YORK: Show and sale; GemStreet USA; The Erie County Fairgrounds, The Grange Bldg., 5600 McKinley Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strieter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

12-14—HUMBLE, TEXAS: 57th annual show; Houston Gem & Mineral Society; Humble Civic Center, 8233 Will Clayton Pkwy.; Fri. 9-6, Sat. 9-6, Sun. 10-6; adults \$7, seniors and students \$6, children under 12 free; displays, working exhibits, demonstrations, fluorescent mineral exhibit, swap area, more than 40 dealers, minerals, fossils, jewelry, spheres, meteorites; contact Rick Rexroad, HGMS Clubhouse, 10805 Brooklet, Houston, TX 77099, (281) 530-0942; e-mail: rlrroad@sbcglobal.net; Web site: www.hgms.org

12-14—KINGSPORT, TENNESSEE: 1st annual fall show; Prehistoric Exhibits; 321 Broad St.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$3, children under 12 free; special fossil exhibits, full-scale T. rex skeleton, geology, fossil and archaeology lectures, door prizes, mineral and gem identification; contact Jerry Jacene, (423) 765-9633; e-mail: jjacene@hotmail.com

12-14—LOUISVILLE, KENTUCKY: Show; KYANA Geological Society; Resurrection Lutheran Church gym, 4205 Gardiner View Ave.; Fri. 10-7, Sat. 10-7, Sun. 12-6; free admission; local and national dealers, minerals, fossils, hand-crafted jewelry, slabs, geodes, polished gemstones, lapidary supplies, door prizes, kids' starter collections, demonstrations and activities; contact Mike Whitehouse, (502) 905-4988; e-mail: kyanashowchair@gmail.com; Web site: www.kyanageo.org

12-14—MORGANTON, NORTH CAROLINA: Show; Morganton Parks and Recreation; Collett Street Recreation Center, 300 Collett St.; Fri. 10-6, Sat. 10-6, Sun. 12-5; adults \$3, students \$2; door prizes, interactive gem mining booth; contact Gary Leonhardt, 300 Collett St., P.O. Box 3448, Morganton, NC 28680; (828) 439-1866; e-mail: gleonhardt@ci.morganton.nc.us; Web site: www.ci.morganton.nc.us

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12-14—POMONA, CALIFORNIA: Show, "West Coast Gem, Mineral & Fossil Show"; Martin Zinn Expositions; the Fairplex in Pomona, 1101 W. McKinley Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-5; admission \$5, parking \$9; exhibits, guest lecturers, 100 wholesale and retail dealers; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax: (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

12-14—PUYALLUP, WASHINGTON: 6th annual show, "South Sound Gem, Opal & Mineral Show"; Boeing Employee Mineralogical Society, Northwest Opal Association; Washington State Fairgrounds, Meridian St. S and 9th Ave. SW; Fri. 10-5, Sat. 10-5, Sun. 10-4; contact Lyle Jorgensen, (425) 483-0557; e-mail: mechanix@comcast.net

12-14—SACRAMENTO, CALIFORNIA: Show, "Golden Harvest Of Gems, Mineral, and Jewelry Show"; Sacramento Mineral Society; Scottish Rite Center, 6151 H St.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$5, children (6-12) \$1; dealers, rock slabs, beads, findings, fossils, gold and silver jewelry, mineral specimens, rock carvings, gemstones, jade, indian, meteorites, tools, wire wrapping, kids' activities; contact Sacramento Mineral Society, P.O. Box 160544, Sacramento, CA 95816, or Tarance Beguhl; e-mail: tarance@sacramentomineralsociety.org; Web site: www.sacramentomineralsociety.org

12-14—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Trail (Hwy. 41); Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

12-14—TACOMA, WASHINGTON: Show, "Gem Faire"; Tacoma Dome/Exhibition Hall, 2727 E. "D" St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

13—RICHMOND, VIRGINIA: 19th annual fall rock swap; Richmond Gem & Mineral Society; Ridge Baptist Church Meeting Hall, 1515 East Ridge Rd.; Sat. 9-3; free admission; swap and purchase mineral specimens, fossils, shells, gems, lapidary specimens; contact Carl Miller, (804) 310-8762; e-mail: kobold1@erols.com

13—VALLEJO, CALIFORNIA: Show, "Christmas Gift show and sale"; Vallejo Gem & Mineral Society; Vallejo Veterans Memorial Bldg., 420 Admiral Callaghan Ln.; Sat. 9-5; admission \$1; beads, jewelry, minerals, jade, crystals, gems, door prizes, club member sales, lapidary crafts, silver casting work, beading; contact Dan Wolke, P.O. Box 706, Vallejo, CA 94590, (707) 334-2950; e-mail: dncwolke@sbcglobal.net; Web site: www.iwired.org

13-14—FREEPORT, ILLINOIS: Show, "Holiday Jewelry, Gem & Mineral Show 2010"; North West Illinois Rock Club; Highland Community College Student/Conference Center, 2998 W. Pearl City Rd.; Sat. 9-5, Sun. 10-4; free admission; five speakers, demonstrators, kids' games, club displays; contact Brian Green, P.O. Box 396, Warren, IL 61087; e-mail: bgreen57@hotmail.com

13-14—LAKE HAVASU CITY, ARIZONA: 41st annual show; Lake Havasu Gem & Mineral Society; Aquatic Center, 100 Park Ave.; free admission; Sat. 9-5, Sun. 9-4; more than 30 display cases, handcrafted jewelry, mineral and fossil collections, educational displays, hands-on activities, kids' games and prizes, demonstrations, cutting and polishing gemstones, silversmithing, dealers, tools, findings, rock slabs, finished jewelry, door prizes, raffle prizes; contact C.J. Stone, (928) 505-2865; Web site: http://lakehavasugms.org

13-14—NEW YORK, NEW YORK: Show and sale; New York Mineralogical Club; Holiday Inn - Midtown, 440 W. 57th St.; adults \$6, children under 12 free with adult; minerals, gemstones, unique jewelry, fossils, meteorites, lectures, displays, free children's minerals; contact Tony Nikischer, (914) 739-1134

13-14—SEDRO WOOLLEY, WASHINGTON: Show, "Treasures of the Earth"; Skagit Rock & Gem Club; Sedro Woolley Community Center, 720 State St.; Sat. 9-5, Sun. 10-5; free admission; hourly door prizes, dealers, demonstrations, children's activities; contact Vi Jones, (360) 424-8340; e-mail: rocks1x1vi.george@verizon.net

13-14—YUBA CITY, CALIFORNIA: 19th annual show, "Festival of Gems and Minerals"; Sutter Buttes Gem & Mineral Society; Franklin Hall, Yuba-Sutter Fairgrounds, 442 Franklin Ave.; contact Inez Berg; e-mail: inez_brg@yahoo.com; or Eric Anspaugh, (916) 567-9750

continued on page 42

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ROCK SCIENCE

by Steve Voynick

Notes on Native Copper

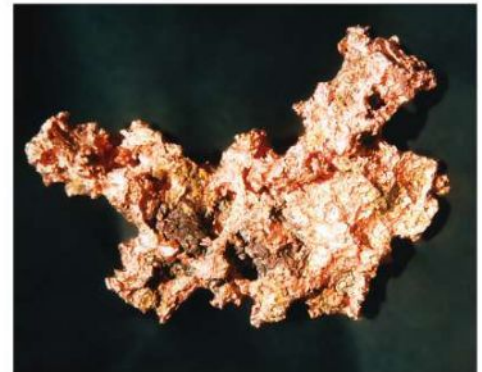
Of the approximately 4,400 recognized mineral species, only 21 occur as native elements. Thirteen of these are metals that have sufficiently low levels of chemical reactivity to be stable in the elemental state. Although gold and silver are the first native elements that come to the minds of most collectors, native copper specimens are far more widely collected for reasons of abundance, availability and affordability. And the history of native copper is just as fascinating as that of the precious metals.

As mankind's first utilitarian metal, copper has had a monumental impact on history. By 10,000 BCE, early metalworkers were hammering bits of native copper into the simple tools that eventually lifted mankind from the Stone Age into the Copper Age. Copper has since remained vital to every subsequent level of our technological advancement.

Although native copper was the primary source of the metal for thousands of years, it is now collected only as specimens. It occurs as irregular masses, scales, plates, wires, branching aggregates, and crystals that are usually dodecahedral, but occasionally cubic and octahedral. Native copper is never pure, but always contains varying quantities of arsenic, antimony, bismuth, lead, iron or silver. In crustal abundance, copper ranks 25th among the elements, making it much more abundant than silver (66th), but far less common than iron (4th).

The natural, weathered surface of native copper sports a green to greenish-black tarnish. Reaction with hydrogen sulfide gas creates the black tarnish of chalcocite (copper sulfide), while carbonic acid produced by atmospheric carbon dioxide reacting with water creates the green tarnish coating of malachite (basic copper carbonate). Freshly exposed surfaces or acid-cleaned specimens, however, are a distinctive copper red to pinkish red with a bright metallic luster.

Like gold and silver, copper crystallizes in the cubic system with a closely packed structure that imparts a relatively high density (specific gravity 8.9). In this close atomic packing, copper's outer electrons are not bound to individual atoms, but move freely throughout the crystal lattice. This pool of free-moving electrons is the basis of metallic bonding and explains copper's high electrical conductivity. Under mechanical stress, metallic bonding enables lattice sections to slip along their atomic planes and deform rather than fracture, a property that accounts for copper's malleability, ductility, and relative softness (Mohs 2.5-3).



Thanks to affordability, distinctive color, bright metallic luster, and interesting forms, native copper is the most widely collected native metal.

Copper has a great chemical affinity for the common element sulfur, the presence or absence of which determines the nature of the metal's occurrence. Most copper in the earth's crust is combined with sulfur in such familiar sulfide minerals as chalcocite, bornite (iron copper sulfide), and chalcopyrite (copper iron sulfide). Although native copper is relatively abundant, significant deposits are quite rare and form only in sulfur-deficient mineralogical environments. Native copper usually forms as fracture fillings in basaltic volcanic rocks and is deposited when circulating, copper-bearing solutions react with the iron in the basalt. In the absence of sulfur, the more chemically reactive iron displaces the copper from solution, causing it to precipitate in metallic form.

The Keweenaw district of Upper Michigan hosts the world's largest known native-copper deposits. When its basalt country rock was emplaced, extensive degassing (emitting of sulfurous gases) during eruption and solidification removed almost all the sulfur. Much later, when copper-rich, hydrothermal solutions circulated through the basalt, this absence of sulfur enabled great quantities of copper to precipitate in native form.

With their distinctive reddish color, bright metallic luster, variety of interesting forms, and unusual origin in sulfur-deficient mineralogical environments, native-copper specimens are no less interesting than samples of the precious metals. ♦

Steve Voynick is a science writer, mineral collector, former hardrock miner, and the author of books like *Colorado Rockhounding* and *New Mexico Rockhounding*.



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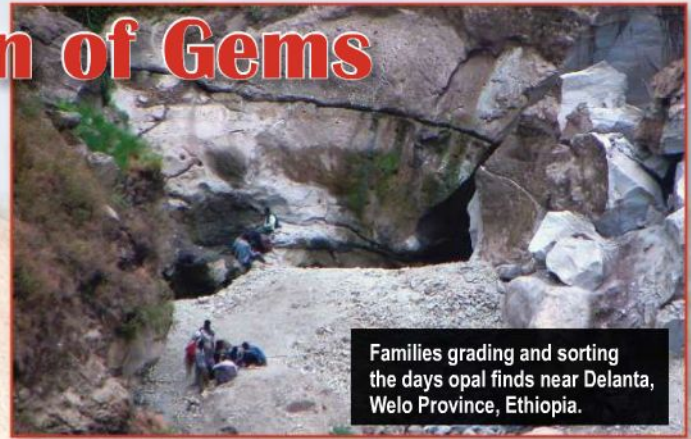
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Story and Photos by Lyle Koerper



Lunchtime at the White Elephant mine was an ideal time to begin high grading our finds of rose quartz, black tourmaline, and angel wing mica.



Tegan and Grandma found a natural resting place at Dinosaur Ridge where a large nodule had been removed.

Children like rocks. Watch what happens when a child sees a banded agate, the inside of a geode, a glitzy pyrite cube, or a sparkling crystal cluster. Our modern world creates seemingly unlimited stimulation for children; yet, nature's wonders, millions of years old, still capture the rapt attention of both young and old.

June, my wife of 55 years, and I became rockhounds after we had retired. While we were raising our three children, we seemed to be busy in other ways. The result was that our children were not exposed to this hobby, which we have found stimulating and challenging.

Now, however, we have a new generation to influence: our grandchildren. We are finding a new satisfaction by sharing our rockhounding hobby with two of our grandkids, Colin and Tegan, who live in Denver, Colorado, and are in 8th and 4th grade, respectively.

Through the years, our daughter, Kimberly, and her husband, Alan, have graciously accepted our gifts of "yard" rocks, including petrified wood from North Dakota, rose quartz from South Dakota, granite from Colorado, and chrysocolla from Arizona. Colin and Tegan always seemed pleased to receive modest specimens such as quartz crystals from Arkansas, copper trace minerals from Arizona, small nodules and geodes, and miscellaneous tumbled polished stones. Of course, we also provided books featuring fossils, dinosaurs, geology, rocks and minerals.

Our children approved of their parents' somewhat late-in-life hobby and our purchase of a high-clearance, four-wheel-drive vehicle. When our rockhounding took us from agate hunting on the Oregon coast to silversmithing and wire wrapping classes at the William Holland School of Lapidary Arts in Young Harris, Georgia, they marveled at our finds and our photos. Our daughter-in-law, who is an accomplished jewelry designer, seemed to envy us for attending the world famous Quartzsite and Tucson, Arizona, gem and mineral shows.



The material Tegan and her grandparents found at the White Elephant mine includes rose quartz, mica, feldspar, and black tourmaline.



The Rainbow mine is in the pegmatite region around Custer, South Dakota. The pegmatite here had bright pink feldspar with mica, quartz, and black tourmaline.



While collecting is not permitted, the Dinosaur Ridge walkway and exhibits are designed to permit close inspection of the attraction, even touching and feeling.

June and I are active members of the Wichita (Kansas) Gem & Mineral Society, of which I have been president and show chairman. Our membership of about 150 represents several states. We emphasize activities for children at our show, held in April. The Wichita show opens on Friday with Education Day. As many as 1,500 schoolchildren get a lesson on rock and mineral identification. We offer grab bags with labeled specimens, a junior rock pile, a gem wheel, and a gem hunt. Among children, the fluorescence room is the most popular exhibit.

Our club has had limited success with an ongoing program for juniors. There are, however, several member families with children. Children, especially during field trips, seem to give everyone extra enthusiasm and energy.

When Tegan was 8 years old, she went on her first rockhounding trip with Grandma and Grandpa. After spending a night at her home in Denver, we "borrowed" her for a couple of days and headed into the mountains for Dillon, Colorado. Following Interstate 70 west from Denver, we stopped to visit some old mine sites near Idaho

Springs, Colorado. From a clear mountain sky above, the sun sparkled off the pyrite in the mine dumps. June and I were surprised to hear Tegan exclaim, "Whoa!" Growing up in rural South Dakota, I thought "whoa" was the way you told a team of horses to stop; but, for Tegan "whoa," accompanied by a wide-eyed expression, had replaced the perhaps overused "wow" expression we of a more senior generation are accustomed to. We realized that day that we had found a new convert to rock hunting, along with new terminology to describe our hobby.

From Dillon, we made the short trip to Leadville, Colorado. From Leadville, we took East 5th Street toward Mosquito Pass, through the many mining areas. We told Tegan we might find calcite, galena, quartz, and even silver or gold.

Again, there was bright sunlight. We found galena, quartz and calcite, but Tegan's favorite find was pyrite. The only equipment she needed was a collecting bag and gloves. The mine dumps provided a wonder wherever she looked. The views were also spectacular. Nature courted Tegan in a

big way. Of course, Grandma and Grandpa had even more fun sharing the experiences of this new and truly energized rock pup.

In taking our grandchildren rockhounding, June and I wanted the complete support of the children's parents. We are always concerned for our personal safety, so safety for all involved was of utmost importance. We generally are "surface" collectors and didn't want our outings to seem like work. We selected locations that we knew would provide good collecting. We also knew the children would be cooperative.

June and I spent the 4th of July holiday with our Denver family. We had heard about the unique exhibits at Dinosaur Ridge just 10 miles west of Denver. We asked our daughter about taking the children there on a field trip. She agreed, and joined us. Alan had work responsibilities.

We drove about 45 minutes to Dinosaur Ridge to explore what is known as the Adventure Trail. This trail is on a hard-surfaced roadway along a mile-long ridge. You see dinosaur bones in a historic "quarry," more than 300 well-defined dinosaur tracks, trace fossils, ancient ocean ripple marks, mangrove swamp evidence, volcanic ash, and several geological formations. When the roadway was constructed, several concretions 3 feet to 4 feet in diameter were exposed in the resulting cliffs. Some of these nodules are still in evidence, along with cavities from others that have been dislodged.

As often happens with good collecting sites, since we visited it, the White Elephant mine has passed into private ownership and is now off limits to rockhounds. The status of mines in the Custer area can be checked at the Custer District Office, Black Hills National Forest, 330 Mount Rushmore Rd., Custer, SD 57730, (605) 673-4853.

Hiking the trail by the ridge is free. We, however, paid \$3 each to ride a bus to the top of the trail so that we could leisurely walk down to the museum and store at the bottom of the ridge. A series of interpretative signs describes the fossils and other features along the trail.

The indoor museum exhibits take the viewer through five time periods in the age of dinosaurs, providing information and a visual representation of the environment of each period. The gift store has rock, fossil and mineral specimens, along with a wide range of resource materials.

Dinosaur Ridge is along North Rooney Road. From state Route 470 north of Morrison, Colorado, take the Red Rocks Park Road west to North Rooney Road; or from Interstate 70 west of Denver, take Exit 259 south to Red Rocks Park Road and turn east onto North Rooney Road. The outdoor ridge exhibits, museum and store are supported by the nonprofit Friends of Dinosaur Ridge, 16831 W. Alameda Parkway, Morrison, CO 80465. Contributions are encouraged.

In Morrison, located along state Route 8, is the Morrison Natural History Museum. Nearby are two hiking trails that reveal the natural wonders of the area: the Hogback Geological Trail and the Triceratops Trail. Of course there is no field collecting at Dinosaur Ridge or along the other trails.

Later last summer, we were scheduled to attend a family reunion in Rapid City, South Dakota, gateway to the Black Hills. June grew up in Custer, South Dakota, in the heart of the Black Hills. We return to the area annually and have rockhounded there extensively.

Colin, Tegan, and their parents would be attending the South Dakota reunion. We asked Tegan, who had obviously enjoyed her first field trip experience, if she wanted to go rockhounding again on mine dumps in the Black Hills. This meant staying several extra days in Custer with Grandpa and Grandma before returning to Denver. We also checked with Colin.

Colin was willing, but his schedule was tight. He had to return to Denver with his parents. Tegan said maybe she would stay. We realized then that she had never been to a mine in South Dakota. They are quite different from those in Leadville.

One of the advantages of rockhounding in the Black Hills is that you have the choice of several locations, some only minutes away, because of the many mines throughout the extensive pegmatite region surrounding Custer. It was early evening when Colin, Tegan and I decided to take a quick "prospecting" trip to the Rainbow mine, only 10 minutes away.

A thunderstorm was threatening, but as long as there was no heavy rain or light-



Tegan enjoys comparing her collected specimens to the illustrations in her reference manuals.



Reaching the Ingersoll mine requires a challenging two-mile walk that is uphill all the way.



The pegmatite with pink feldspar, quartz and mica we collected at the Rainbow mine brought wide-eyed expressions to the faces of our grandchildren, Colin and Tegan.

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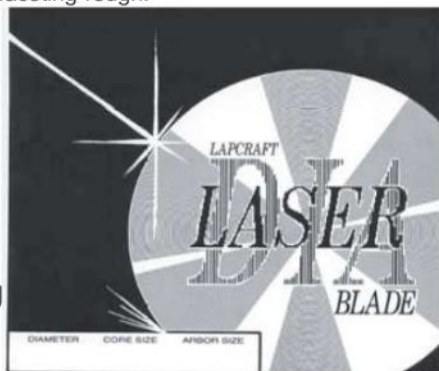
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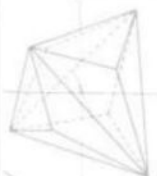
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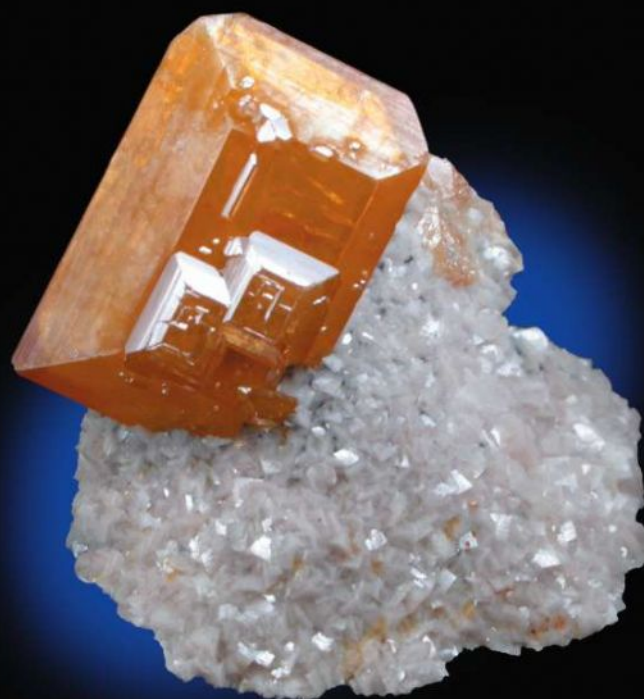
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Black tourmaline crystals from the Rainbow mine, west of Custer, South Dakota, were a favorite find for Tegan.



Allen Scott, fourth-generation owner of Scott's Rock Shop in Custer, South Dakota, answered Tegan's questions and cut geodes for her.

ning, we decided to try to squeeze in a little collecting. The Rainbow mine has colorful pegmatite with pink feldspar, mica, quartz, and black tourmaline. The storm threat did chase us away, but not before the children marveled at all the minerals found in the pegmatite. Reluctantly, we climbed into the van with "not enough" specimens.

To reach the Rainbow mine, take U.S. Highway 16 west of Custer just over five miles, then turn south on Forest Service Road 409. Go through the gate. The mine is about a quarter mile down the road, on the left, through the trees.

During our visits to the Black Hills to visit June's brother and sister, we have never been disappointed in our collecting efforts. We have some quite nice rose quartz. Days in the grasslands near the Badlands have produced a number of agates and some petrified wood. We have looked faithfully for the elusive Fairburn agates, but have only been somewhat successful. We have dug—really dug—for Tepee Canyon agate and have some we are glad to show to others, explaining that rockhounding can truly provide good exercise.

To make Tegan's rock hunting experience a fun time that she'd want to repeat, we decided to go to three mines: the White Elephant, the Ingersoll, and the Rainbow. We would not dig, but do largely surface collecting. Tegan would have ample opportunity to find some "whoa" specimens. Our approach was the same each day. We laid out the schedule, with Tegan involved in the planning. We explained to Tegan where we were going and how long the trip would take. Tegan understood why she needed to wear real shoes. We gave her a collecting bag, gloves, and a rock pick. We used sunscreen and mosquito spray. We packed a good lunch and allowed enough time to get ice cream at Flintstones Bedrock City in Custer, wondering all day what exotic flavor of sherbet they would be offering that day.

The White Elephant, just north of Pringle, South Dakota, is one of many mines in

the pegmatite region, most of them open pits. This mine was worked extensively for feldspar as well as beryl, quartz, and mica. At one time as much as 500 tons of feldspar was mined monthly. We were looking for the "whoa" stuff, especially rose quartz, angel wing mica, and black tourmaline crystals. We did a little digging in spoil piles, but generally explored the extensive workings. Tegan found the best tourmaline crystals, several angel wing mica specimens, and blush pink rose quartz. Our picnic lunch provided a good break and a time to high grade our first finds.

Our second hunting location was the Ingersoll mine, located in the area behind Mount Rushmore National Memorial. Reaching the Ingersoll mine was a physical challenge, but well worth it. This area is reached by a two-mile hike that is uphill all the way.

Take the Old Hill City Road from Keystone, South Dakota, along the railroad tracks of the 1880 Train toward Hill City. About two miles from Keystone, just past Kemp's Kamp, there is a small parking area on the right. Follow the old roadway trail up to the mine. It took us 40 minutes to walk up to the mine. The walk back to the van required much less time, even with heavy specimen bags.

When you arrive at the Ingersoll mine, you must continue uphill to the tailings, of which there is a large amount. Lepidolite, beryl, columbite-tantalite, amblygonite, mica, feldspar and cassiterite were all found during mining here. Single beryl crystals weighed up to 30 tons. The only place I have found beryl in the Black Hills, however, is at the Rainbow mine.

We just hunted on a small area of the spoil piles. The climb had taken a lot of energy and we had left our lunch in the van. Purple lepidolite and books of mica glistened in the sunlight, but green and blue tourmaline created the most excitement. Tegan agreed that we had to do some serious high grading before we started the hike downhill to the van.

Our final rockhounding trip was a return visit to the Rainbow mine, where Colin, Tegan and I had previously prospected before threat of a storm chased us away. The Rainbow is special to me because it is the only place in the Black Hills where I have found beryl.

Tegan, Grandma and I returned to the Rainbow mine while the sun was shining off the quartz, mica and feldspar. The host material is primarily pink feldspar with quartz, mica and beryl. We did not find any beryl, but we collected pink feldspar that contrasts sharply with the quite uninteresting feldspar found in other places. The "whoa" find here was yellow lepidolite. Again, the bright sunlight meant that Mother Nature was doing her best to please both old and young.

Any rockhounding trip to South Dakota's Black Hills must include visiting one or more of the rock shops in the area. Most of the businesses also have a "museum" featuring a collection of prize specimens.

While she lived in Custer, June's family lived across the street from the Scott family and Scott's Rock Shop. Both are still there. Allen Scott represents the fourth generation operating the wholesale-retail operation. His parents, Sam and Rose Marie, are still nearby to help out and Allen's college-age daughters represent the fifth generation involved in the rock shop.

The free museum at Scott's Rock Shop includes specimens of Black Hills minerals, some Fairburn agates, fossils from the nearby Badlands, and samples of fine lapidary work.

Some caution is always warranted in taking children into stores like rock shops. Tegan already had a heavy bag of specimens. We thought we were safe. Allen and his daughter Bethany answered our questions as we looked at all the glittery stuff you find in a good rock shop. There was one thing that made Tegan curious. You are correct if you guessed geodes.

She found a display and started to lift and shake. "I wonder if this is hollow, and



We found purple lepidolite, blue tourmaline, mica, and black tourmaline schist at the Ingersoll mine.

what's inside?" she asked. Allen had the answer. We went into the cutting room, and soon the wonders of the inside of the hollow geode were revealed. It was nice. Tegan looked at the two halves and a thoughtful look covered her face. She suggested, "Maybe we should get another one for Colin?" Finally, we had four: geodes for mom and dad, as well as Colin.

Tegan can identify her self-collected specimens by name. She points out the quartz, mica, tourmaline and feldspar in chunks of pegmatite. Rose quartz and the individual mica books and angle wings are now favorite South Dakota Black Hills finds. She enjoys comparing the real thing to the illustration in reference manuals. I must also confess that Grandma was more of a teacher in this experience than Grandpa. June learned a great deal about rocks, minerals and gems from the Scotts.

June and I will certainly continue rock-hounding as we are able. We hope that Tegan and perhaps Colin will go with us again. We have a number of places in mind where the children could find more "whoa" stuff. In any event, we think that our lives and the lives of both Tegan and Colin are different because Grandma and Grandpa shared their enthusiasm for discovering nature's wonders. 💎

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Mineral Buyers Witness Pakistan Floods

On the way to Peshawar, Pakistan, to make our usual gem and mineral purchase trip for our fall season, we stopped in London for a few days to visit with family. During our visit, we caught a glimpse of a TV report about floods in Pakistan. Since this is the monsoon season and flooding is not unusual every year, we didn't pay much attention to the news reports, but carried on with our visit as planned.

On arrival in Peshawar on the 1st of August, everything seemed normal at the airport and on our way to one of our homes in the city. However, at the break of dawn, when our aircraft was circling over the terrain in the Peshawar valley before landing, we had noticed large patches of water scattered over a vast area, but even then we didn't make the connection.

That evening, after awaking from a much needed rest, we turned on the TV and we were absolutely horrified at the scenes that were being telecast, many of them being broadcast live. We saw massive destruction of village after village and towns one after another crumbling like houses made out of cards or matchsticks and being swallowed by the raging torrents of water that continued to quickly turn everything into a sea of mud and debris.

Arif and I were in tears and could hardly believe what we were witnessing. Apparently, the rain started high up in the mountains of the beautiful Swat Valley, well known worldwide for its exquisite emeralds and nationally for its succulent fruits. The torrent of the Swat River was so furious that it had overflowed its banks and flooded entire villages, [torn] down massive forests, and [moved] huge boulders and soil, which gushed south into the Munda Dam.

This dam is about 10 miles northwest of Arif's ancestral village, Sherpao, where his family has been settled for over 400 years. The fury of the Swat River caused the Munda Dam to break, flooding the entire area for miles and miles, creating a pseudo ocean. This caused crops almost ready for harvest to be washed away, along with thousands of livestock, homes, and belongings and more than a thousand people.

Very fortunately, Sherpao in Charsadda, which is Arif's ancestral village, was spared because it is situated on top of a plateau.

Needless to say, all our thoughts about acquisition of minerals were the least of our concerns. From Gilgit and Skardu in the north, where some of the world's most beautiful and pristine aquamarine and scores of other fine minerals are found, to Azad Kashmir, famous for its ruby deposits, a huge portion of northwest Pakistan was underwater. Several bridges and roads were washed away as though they never existed; we realized that thousands of survivors would be stranded without food, water and shelter. Now once again, we faced a new challenge on our arrival in Peshawar and we could not afford to hesitate for a moment to put a plan into action to get aid to the affected families as soon as possible.

Immediate finances for the flood affected were available from funds remaining from your generous contributions for the December 2007 horrific suicide bomb blast during a prayer service in Sherpao, Arif's village. We were there when this happened and brought this sad incident to your attention, which took the lives of over 60 heads of households and left many maimed or blinded. The generosity and outpouring of support, love and concern from your side created Project Regeneration. Your kindness touched our hearts and the hearts of every survivor, up to this day. Thank you.

Due to your generosity, consistent support was provided for almost three years for the survivors. Today, each one of them has been reintegrated back into society and their lives have been regenerated. We had opened schools for them to teach them a trade and to educate them, all of the students being female, because their menfolk had been killed.



ARIF JAN PHOTO

A survivor stands amid the scattered remains of his home.



ARIF JAN PHOTO

Volunteers prepare emergency relief packages.

Therefore, the remaining funds from Project Regeneration were redirected toward a Flood Relief Emergency Survival Package. This was only possible because of your generosity in 2007. Thank you, again. Along with contributions from Arif's family members, my daughter in the USA, and ourselves, we were able to put together a survival package of 26 items for 700 families (3,500 people) within five days, which would sustain them for at least 10 days until government help arrived. This was a massive project for both Arif and me and a group of 15 volunteers, out of which 10 of them were less than 18 years old. Without delay, these packages were distributed to 700 families in nine different villages. These people had lost everything they owned and most had been cut off from the rest of society because of the flood waters. They were in dire need of these supplies for their survival.

We also got to witness immediate help and acts of kindness for their countrymen who were affected from thousands of people in the area who had not been affected by this disaster. They are still continuing to help by providing food and the shelter of their own homes to strangers who have lost everything in this catastrophe.

An interesting footnote: Some in the USA feel that since Pakistan was the stronghold of the Taliban, help should not be offered nor given. For those who are unaware of the fact, it is the people of Pakistan who suffered at the hands of the Taliban the most. The Sherpao Bombing was only one of more than 500 attacks that destroyed thousands of lives because Pakistan supported our "War on Terror".

I, for one, sincerely appreciate the United States' prompt action by providing several helicopters to aid in rescue operations, which were flown in from Afghanistan. Besides this action, aid in funds and material has also been announced.

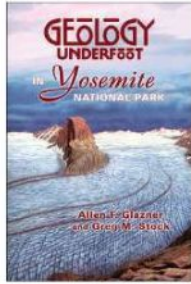
—Aisha & Arif Jan Peshawar
Rocksaholics, LLC

BOOK REVIEW:

Geology Underfoot in Yosemite National Park

by Allen F. Glazner and Greg M. Stock

For visitors to Yosemite National Park, a raft of questions often come to mind: How did it form? What of the odd shape. What created the waterfalls, the granite domes, and the like?



Geology Underfoot in Yosemite National Park

(Mountain Press Publishing Co., 2010) is a wonderful paperback text that answers those questions and many, many more. It has been expertly written by geologists with a feel for the earth's beauty. Glazner and Stock do a superb job of revealing the park's grandeur and geological history so that the visitor will feel, hear and understand the forces that raged in this area over eons of time.

Within its 25 chapters is information for those intrepid people who accept the challenge of climbing Yosemite's ramparts. The writers take you through the millions of years of Yosemite's history, using 150 color photos and 51 color illustrations and maps to highlight the resulting features and vistas. The writers even delve into the history of mining that took place near this vast granitic area, making the text interesting to rockhounds and nature lovers alike.

Anyone who has visited Yosemite will find this 308-page text the answer to the many questions that still linger after the visit. For those planning a visit, reading this excellent work will provide you with the grounding needed to better appreciate and understand the forces of nature as she shaped this stunningly beautiful region. *Geology Underfoot in Yosemite National Park* retails for \$24.

—Bob Jones

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ROCK & GEM Kids

Smithsonite

ZnCO₃

The mineral smithsonite can be white, but it also comes in hues of greenish-blue (from copper traces), yellow (from cadmium), reddish-brown (from iron), and lavender-pink (from cobalt). Smithsonite rarely forms crystals, but when it does, they're usually small rhombohedrals with curved faces. More commonly, the mineral forms botryoidal (bumpy, like a cluster of grapes) crusts that are translucent to opaque and have a waxy or pearly luster.

Smithsonite is a secondary mineral, formed by the alteration of previously deposited minerals. It's found in the oxidation zones of lead-zinc deposits. An oxidation zone is where metal deposits weather in the presence of oxygen and water, typically near the earth's surface. Smithsonite forms when zinc minerals like sphalerite (ZnS) weather in or near limestone. Sphalerite provides the zinc (Zn) and limestone provides the carbonate (CO₃) that combine to form crusts of smithsonite.

JIM BRACE-THOMPSON PHOTO



Pink smithsonite (left) comes from the Tsumeb mine (Namibia), while aqua-blue botryoidal smithsonite is from the Kelly mine (New Mexico).

Smithsonite has been mined around the world. The Kelly mine in Magdalena, New Mexico, is famous for blue-green botryoidal smithsonite clumps, and Tsumeb, Namibia, produces fine, crystalized specimens.

Until the late 1800s, when sphalerite largely supplanted it, smithsonite was the primary ore of zinc. Zinc is used for rust-resistant coatings, as in galvanized steel. It's also used as an alloy

metal. For instance, it has been combined with copper to produce brass since the 10th century BCE. Smithsonite is still found in lead and zinc slag heaps at Lavrio (Laurium), Greece, where silver was mined by the ancient city-state of Athens.

The word "smithsonite" should have a familiar ring. It was named after Englishman James Smithson, who left his mineral collection—and his fortune—to start our nation's Smithsonian Institution!

—Jim Brace-Thompson

South Dakota's State Rockhound Symbols

In 1966, South Dakota named two state rockhound symbols: rose quartz as state mineral and Fairburn agate as state gemstone. Rose quartz, which was discovered near Custer in the 1880s, is mined in the Black Hills for jewelry, carvings, and mineral specimens. Pure quartz (silica dioxide) is colorless; the pink in rose quartz comes from titanium impurities.

Named for the town of Fairburn, South Dakota, Fairburn agates are beautiful and hard to find, a combination that fetches high prices. In the late 1800s, they were first noticed by gold prospectors within alluvial deposits (gravel from ancient streams) caused by uplift of the Black Hills. This uplift exposed beds of 330 million- to 248 million-year-old limestone in which the agates had formed and from which they eroded over time. The agates show banded patterns in a range of colors, including vividly contrasting blue and orange. As marine sedimentary agates, Fairburns lack features that indicate volcanic origin (inclusions, pseudomorphs, etc.), but their bold colors more than make up for that.

In 1988, the state named two more symbols: Black Hills gold as state jewelry and Triceratops as state fossil. During the Wild West days of the Black Hills gold rush (1874-77), South Dakota was notorious for gun slingers, especially around Deadwood. The search for gold also created friction that led to Indian wars (including Custer's Last Stand), since the Black Hills had been recognized as the sacred land of the Sioux Indians. Black Hills gold jewelry incorporates three colors of gold—green, rose and yellow—that have been crafted into grape leaf patterns.

JIM BRACE-THOMPSON PHOTO

Triceratops is the beloved three-horned, plant-eating dinosaur of the Cretaceous Period that is famously portrayed in paintings and cartoons squaring off against Tyrannosaurus rex. Both dinosaurs are found in South Dakota's Hell Creek Formation and date from the end of the Age of Dinosaurs, 68 million to 65 million years ago. Triceratops replaced the cycad (a palmlike plant that left petrified trunks similar to pineapples in shape) as state fossil.

—Jim Brace-Thompson



South Dakota's rockhound symbols are (left to right) rose quartz, the dinosaur Triceratops, Black Hills gold (on the belt buckle), and the Fairburn agate.

Safety Tips for Mineral Collectors

One word must be in every mineral and fossil collector's mind when he or she goes out to dig for specimens: safety.

You must always do everything you can to be sure that you and everyone else in your dig party are safe. Did you know that many mineral clubs actually have a "safety chairperson" who teaches safety rules to all the club members and enforces them on all club field trips?

How can you be safe when you go on a dig? Here are some ideas to guide you. Let's say you see the world's best fluorite crystal on a piece of limestone at the top of a pile in a quarry. Before you go after it, ask yourself, "If I try to get that specimen in this way, could I hurt myself or others?" If the answer is "yes", you must find a safe way to get the fluorite. If you can't, you must leave it where it is!

Safety also means wearing and using the right equipment. As a matter of fact, many mines and quarries will not allow anyone to dig unless everyone has and wears the following basic safety equipment:

- A hard hat to protect the head from falling rocks.
- Safety glasses, goggles, or a face shield to protect the eyes from flying rock chips.
- Heavy boots, such as work boots or hiking boots, which support the ankles and have steel-reinforced toes, in case a rock falls on your foot. Sneakers, loafers or sandals do not provide support for your ankles or protection for your feet. A large rock can easily break your foot bones and may even cause damage that will be with you the rest of your life.
- Heavy cloth or leather work gloves to protect your hands from cuts, scrapes, and other injuries.
- Long pants to protect your legs. Never wear shorts.
- A long-sleeved shirt to protect your arms.
- A first-aid kit to take care of cuts and injuries. If you are allergic to bee stings, bring an EpiPen in case you get stung.
- A cell phone so you can call for help if you have an accident and need medical assistance.

Never, never, never dig alone. Always have at least one other person with you. That way, if something serious happens to one of you, the other can go and get help.

Bring plenty of water and drink it often. If you get too hot and dehydrated, you can become very sick. It's also a good idea to have some food along.

Do your research. Study what kinds of animals, critters and bugs you may encounter on your dig. For example, some areas have rattle snakes. You don't want to accidentally meet a rattler!

When digging, keep a good amount of space between yourself and other collectors. Swinging hammers and flying chips of rock can cause serious injuries.

—Darryl Powell



LYNN VARON PHOTO
Wear gloves to protect your hands from sharp rocks and sturdy boots to protect your feet from injury.



LYNN VARON PHOTO
Always have at least one other person with you in the field to go for help in an emergency.

Take the Quiz, Win a Prize!

The Quiz is open to U.S. residents 17 and younger. All the questions can be answered by carefully reading *Rock & Gem Kids*. Mail your answers to **November Quiz, Rock & Gem magazine, P.O. Box 6925, Ventura, CA 93006-9899**. Five winners will be drawn from the valid entries received by **Nov. 30, 2010**. Valid entries must include the correct answers, the entrant's name, age and address, and the signature of a parent or guardian. This month's prize is a rockhound emblem ball cap, generously donated by Amateur Geologist (www.amateurgeologist.com; see ad on page 41.)

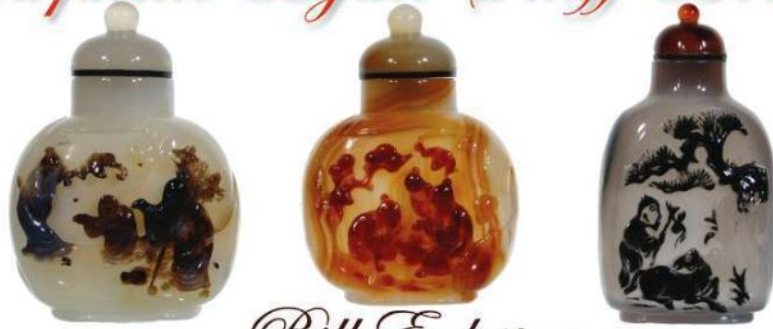


1. Trace amounts of _____ cause smithsonite to be colored yellow.
2. _____ provides the zinc and _____ provides the carbonate needed to form crusts of smithsonite.
3. The pink color of rose quartz comes from _____ impurities.
4. _____ deposits consist of gravel from ancient streams.
5. The three colors of Black Hills gold are _____, _____ and _____.

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November 19 - 21, Seattle, WA; Seattle Center Exhibition Hall; Mercer St., at 3rd Ave. N., Seattle, WA 98109

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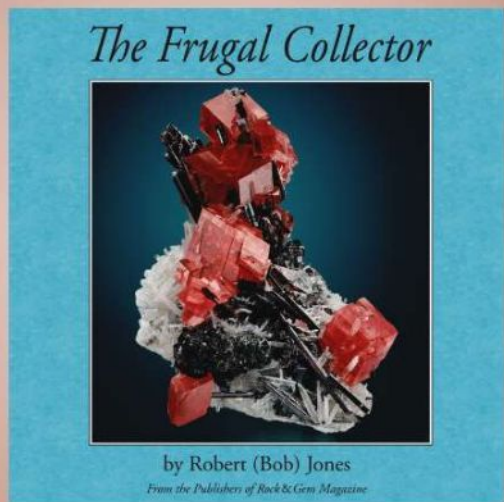
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Show Dates from page 27

NOVEMBER 2010

19-21—MARIETTA, GEORGIA: 25th annual show; Cobb County Gem & Mineral Society; Cobb County Civic Center, 548 S. Marietta Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; rocks, gemstones, crystals, fossils, beads, jewelry, jewelry supplies, door prizes; contact Mary Ingram, (770) 427-1108; e-mail: mandmingram@gmail.com; Web site: www.cobbcountymineral.org

19-21—PORTLAND, OREGON: Show, "Gem Faire"; Oregon Convention Center/Exhibit Hall E, 777 NE MLK Jr. Blvd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

20—CLACKAMAS, OREGON: 37th annual auction; Columbia-Willamette Faceters' Guild; Monarch Hotel, 12566 SE 93rd Ave.; preview 5:30, auction 7-10; contact Gail Lough, (971) 678-2862; e-mail: glough7@gmail.com

20-21—BREMERTON, WASHINGTON: Show, "2010 Fall Festival of Gems"; Kitsap Mineral & Gem Society; The President's Hall, Kitsap County Fairgrounds, 1200 N.W. Fairgrounds Rd.; Sat. 10-5, Sun. 10-5; free admission; club displays, junior events, silent auction, raffle prizes, dealers, demonstrations; contact Jim McClure, (253) 265-3011; e-mail: pogy2@centurytel.net

20-21—FAIRFAX, VIRGINIA: 19th annual show; Northern Virginia Mineral Club; George Mason University, Student Union Bldg. II, Rte. 123 and Braddock Rd.; Sat. 10-6, Sun. 10-4; adults \$5, seniors \$3, teens (13-17) \$3, children (12 and under) and Scouts in uniform free, GMU students with valid ID free; more than 20 dealers, minerals, fossils, crystals, gems, jewelry, carvings, meteorites, demonstrations, exhibits, door prizes, kids' mini-mines and fossil dig, silent auction Sun.; contact Tom Taaffe, (703) 281-3767; e-mail: rockclctr@aol.com; Web site: www.novamineralclub.org/

20-21—LEBANON, PENNSYLVANIA: Show and sale, "Gem Miner's Holiday Festival"; Lebanon Expo Center, Rte. 72 and Rocherty Rd.; Sat. 10-5, Sun. 11-4; adults \$5, children under 12 free; gems, jewelry, minerals, fossils, beads; contact MAGMA, (301) 565-0487; Web site: www.gem-show.com

20-21—MADISON, WISCONSIN: Show, "Rockin' Madison 50 Years"; Madison Gem & Mineral Club; Alliant Energy Center, 1919 Alliant Energy Center Way; Sat. 9:30-5, Sun. 10-5; adults \$3, children free; flintknapping and rock carving demonstrations, panning for gold and sapphires; contact Nevin Franke, Burnie's Rock Shop, 901 E. Johnson St., Madison, WI 53703, (608) 251-2601; e-mail: burniesrockshop@gmail.com; Web site: www.madisonrockclub.org

20-21—WEST PALM BEACH, FLORIDA: 43rd annual show; Gem & Mineral Society of the Palm Beaches; South Florida Fairgrounds, 9067 Southern Blvd.; Sat. 9-6, Sun. 10-5; adults \$7, children free; gem mining, fossil dig, exhibits, demonstration area, hourly door prizes, scholarship fundraiser; contact Barbara Ringhiser, (561) 588-5458; e-mail: bar5678@aol.com

26-28—CALGARY, ALBERTA, CANADA: Show; Alex Kuznetsov; Calgary Chinese Cultural Centre, 197 1st St. SW; Fri. 4-9, Sat. 9-7, Sun. 9-5; adults \$7, seniors and students \$5, children free; lectures, demonstrations, door prizes; contact Alex Kuznetsov, (403) 202-1971; e-mail: calgarygemshow@gmail.com; Web site: www.calgarygemshow.com

26-28—COLUMBIA, SOUTH CAROLINA: 43rd annual show; Columbia Gem & Mineral Society; South Carolina State Fairgrounds, 1200 Rosewood Dr.; Fri. 10-6, Sat. 10-6, Sun. 12-5; adults \$4, children 12 and under free, military and dependants free Sun.; 24 retail vendors, jewelry, beads, loose stones, fossils, minerals, gold, silver, tools, geode cutting, club member collection exhibits, lapidary demonstrations; contact Susan Shrader, P.O. Box 633, Columbia, SC 29060, (803) 736-9317; e-mail: ashrader@mindspring.com; Web site: www.cgams.org

26-28—LYNDEN, WASHINGTON: Show, "Gem Faire"; Gem Faire Inc.; NW Washington Fair & Events Center, 1775 Front St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

26-28—MOBILE, ALABAMA: Annual show; Mobile Rock & Gem Society; Greater Gulf State Fairgrounds, Cody Rd. and Zeigler Blvd.; Fri. 2-7, Sat. 9-6, Sun. 10-5; adults \$3, children under 12 free; contact Jerry Shirey, 2911 Pretty Branch Dr. W, Mobile, AL 36618, (251) 786-4777; e-mail: Rockhoundjs@aol.com; Web site: www.mobilerockandgem@yahoo.com



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26-28—SALEM, VIRGINIA: 31st annual show; Roanoke Valley Mineral & Gem Society; Salem Civic Center, 1001 Roanoke Blvd.; Fri. 2-7, Sat. 10-6, Sun. 12-5; adults \$3 (3-day ticket), children under 16 free; door prizes, grand prize; contact Jeff McFalls, 1031 Broadhill Dr., Vinton, VA 24179; e-mail: rocky@rvmgms.com; Web site: www.rvmgms.com

26-28—ST. PETERSBURG, FLORIDA: Show; Frank Cox Productions; The Coliseum, 535 4th Ave. N; Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

27-28—MONTEREY, CALIFORNIA: Show, "Gem Faire"; Monterey County Fairgrounds, 2004 Fairground Rd.; Sat. 10-6, Sun. 10-5; free admission; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

27-28—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; Fort Mason Center, 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

27-28—WICKENBURG, ARIZONA: Show, "Wickenburg Gem & Mineral Show"; Wickenburg Gem & Mineral Society; Community Center, 160 N. Valentine St.; Sat. 9-5, Sun. 9-5; free admission; more than 40 vendors, gems, minerals, jewelry, door prizes, grab bags, spinning wheel, raffle; contact Beth Myerson, P.O. Box 20375, Wickenburg, AZ 85358, (928) 684-0380; e-mail: myerbd@gmail.com

DECEMBER 2010

3-5—EL PASO, TEXAS: El Paso Mineral & Gem Society; El Maida Auditorium, 6331 Alabama; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$3, seniors \$2, under 12 free; gems, minerals, fossils, beads, jewelry, tools, books, equipment, geode cutting, silent auction, demonstrations; contact Jeannette Carrillo, 4100 Alameda Ave., El Paso, TX 79905, (877) 533-7153; e-mail: gemcenter@aol.com

3-5—HUACHUCA CITY, ARIZONA: 2nd annual show, "Miner's Mania Gem Show"; Tombstone Gem Show; Tombstone Territories RV Resort, 2111 E. Hwy. 82; Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; Arizona lapidary artists, miners and collectors, many local minerals, Arizona mining history displays, prizes, special raffle; contact Betty Krug, P.O. Box 414, Tombstone, AZ 85638, (520) 457-9505; e-mail: rockwranglers@gmail.com; Web site: www.tombstonegemshow.info

3-5—INDIANAPOLIS, INDIANA: Show and sale; GemStreet USA; The Indiana State Fairgrounds, The Pioneer, Our Land Bldg., 1202 E. 38th St.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strieter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

3-5—SANTA BARBARA, CALIFORNIA: Show, "Gem Faire"; Earl Warren Showgrounds/Exhibit Hall, 3400 Calle Real; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

3-5—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Trail (Hwy. 41); Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

3-5—SPRING HILL, FLORIDA: 36th annual show; Withlacoochee Rockhounds; Slovene American Club, 13383 County Line Rd.; Fri. 9-5, Sat. 9-5, Sun. 9-5; adults \$3, students \$1, children 12 and under free; minerals, gemstones, fossils demonstrations, handcrafted jewelry, lapidary equipment, gem and mineral auction, Aaron's Breastplate and Famous Diamonds of the World replicas; contact Ralph Barber, (352) 200-6852; e-mail: barbersbloomers@hotmail.com

10-12—COSTA MESA, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; OC Fair & Event Center/Bldg. 10, 88 Fair Dr.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

10-12—NORCROSS, GEORGIA: Show, "North Atlanta Gem Mineral, Fossil & Jewelry Show"; Mammoth Rock

continued on page 56



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GEMSTONES of the ZODIAC

Astrology Aligns Stones and Stars

Story and Photos by Bob Jones

Just when the signs of the zodiac were created has been lost in antiquity. We do know that, thousands of years ago, people living in the Near East called the Sumerians and the Babylonians developed great skills in astronomy and recognized the visible planets, major constellations, and stars. It is a reason-



able assumption that the constellations that we recognize today as the 12 zodiac clusters were known and studied at that time. Thanks to the earth's rotation and its revolution around the sun, these constellations appear to rise and as the seasons change, giving them added significance.

Through thousands of years of observation, the desert peoples of the Near East became astute astronomers, gathering great amounts of astronomical information, which they used both scientifically and mystically. They believed that heavenly events were the will of their gods and influenced their lives. Studying the stars helped them foretell disaster as well as good fortune, on a personal and universal level. The belief that the stars influenced their everyday lives undoubtedly gave rise to zodiacal studies.

Keep in mind that the constellations lie roughly within the earth's plane of orbit, also called the plane of the elliptic. As the earth moves along its course of orbit and the seasons progress, the constellations appear to rise and set.

Since the sun and moon have a strong physical effect on earth, it seemed logical to these early peoples that they also had a strong spiritual effect on earth. It also seemed logical to extend these powers to the 12 constellations of the zodiac.

Out of these beliefs, the pseudoscience of astrology evolved about 5,000 years ago. Unfortunately, believers in the pseudoscience would not accept the facts discovered by the research of true scientists. This inhibited the acceptance of the facts.

Just when the signs of the zodiac actually emerged from all these observations and beliefs cannot be dated. Some form of zodiacal use preceded the Babylonians,

though it was the Sumerians and Babylonians who developed the first comprehensive zodiacal system.

The regular movement of the zodiacal constellations is linked to the movement of the earth. Each constellation, in turn, becomes dominant at a particular time, or season, of the year. In the early days, people explained earthly events as having been caused by particular signs of the zodiac. They created legends and myths to explain how each of the signs reached its heavenly position, assigning meanings and events to their appearance and position of dominance.

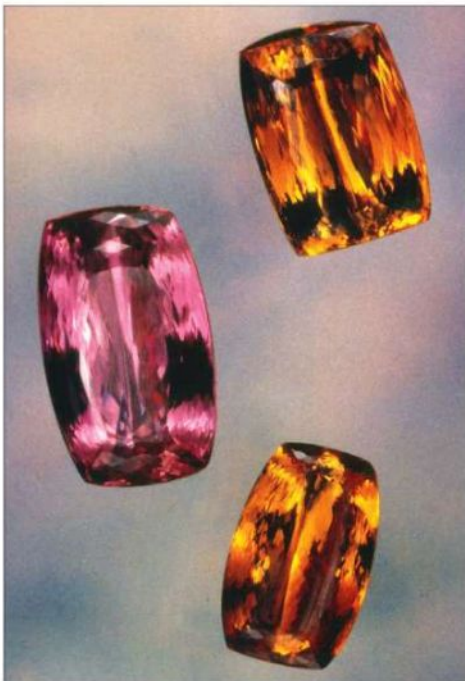
One interesting early legend comes from ancient Babylon. It seems one Marduk, as representative of the gods, placed the signs

in the heavens as likenesses of the great gods. Thus, the zodiacal signs functioned in lieu of certain gods to influence life in earth.

An early Persian tablet, which now resides in the British Museum in London, gives us our modern zodiac signs. The tablet, as translated, lists the zodiacal, or constellation, signs: the ram, bull, twins, crab, lion, virgin, scales, scorpion, bow, capricorn, water bearer, and fishes. Today, we give these same signs more personal names: Aries (the ram), Taurus (the bull), Gemini (the twins), Cancer (the crab), Leo (the lion), Virgo (the virgin), Libra (the scales), Scorpio (the scorpion), Sagittarius (the archer), Capricorn (the goat), Aquarius (the water-bearer), and Pisces (the fishes).

MONTH	BIRTHSTONE	ZODIAC SIGN	ZODIAC STONE
January	garnet	Aquarius	garnet
February	amethyst	Pisces	amethyst
March	aquamarine	Aries	bloodstone
April	diamond	Taurus	sapphire
May	emerald	Gemini	agate
June	moonstone	Cancer	emerald
July	ruby	Leo	onyx
August	peridot	Virgo	carnelian
September	sapphire	Libra	chrysolite
October	opal	Scorpio	aquamarine
November	topaz	Sagittarius	topaz
December	turquoise	Capricorn	ruby

Source: *The Gem Kingdom*, by Paul Desautels (Random House, 1971)



The precious and colorful gem topaz is the zodiacal stone for Sagittarius and November's birthstone.



If you were born in March, you should wear the gemstone aquamarine. It is also the zodiacal gem for the constellation Scorpio, ascendant during October and November.

The zodiacal signs established by the Babylonians persisted through history, passed down by the Greeks and the Egyptians into modern times. The next obvious step in this evolving belief was to assign certain gems to each sign.

The assignment of gems to all sorts of things, even women's names, was a common practice in antiquity. Gems were treated with great respect because of their rarity and their properties—colors, hardness, luster and clarity—which were far superior to those of non-gem mineral crystals. Early people, lacking mineralogical knowledge, began to believe these exceptional properties were due to the gems' associations with certain gods and possession of certain planetary affinities. It became a common to assign a gem to a particular zodiac sign. Its virtues remained in effect while that constellation was visible in the night sky. Thus, people came to believe each gem had a special relationship with any person born under that dominant zodiacal sign. They believed the

signs of the zodiac had a strong influence over a person's life. Wearing the gemstone of that zodiacal sign could strengthen the influence of their zodiac sign.

It's pretty obvious that birthstones were a natural outgrowth of this belief, but they did not formally appear until just a couple centuries ago, long after the zodiac gemstones came into use. The appearance of birthstones may have had a commercial influence, as well as a spiritual one.

One special characteristic of gemstones was their hardness, which devotees interpreted as evidence that they retained "planetary virtues", positive human characteristics such as honesty, good fortune, strength, and truthfulness. Common and non-gem minerals like selenite, calcite and aragonite and most others are quite soft when compared to the extreme hardness of gem crystals. Early folks believed that gem crystals possessed much stronger virtues and held them longer, since they were thoroughly impregnated with those virtues. Since they lacked scientific knowledge of crystal structure and

hardness, those ancients considered this a logical explanation for a gem's hardness.

Carving or engraving a gem in the image of its zodiacal sign would enhance the stone's influence, assuring its wearer that certain qualities and virtues would always be present with him.

If you compare the early birthstone lists, of which there are several dozen, to the list of zodiac gems, similarities are obvious. George Frederick Kunz (1856–1932), in the final printing of his book *The Curious Lore of Precious Stones* (Halcyon House, 1938), wrote, "The influence exerted by precious stones was assumed in Medieval times without question" (p. 1).

During the Renaissance, the scientific method evolved. It required factual proof to establish the validity to theories and assumptions. The scientific method was the enemy of the pseudosciences, since no proof can be offered to support their teachings. According to Kunz, however, science was unable to quash astrological beliefs simply by demanding that proponents find "some plausible



May's birthstone, emerald, also serves as the zodiacal gemstone of those born under the sign of Gemini, ascendant in late May and early June.



The red corundum gemstone ruby is July's birthstone and the zodiacal gemstone for Capricorn.

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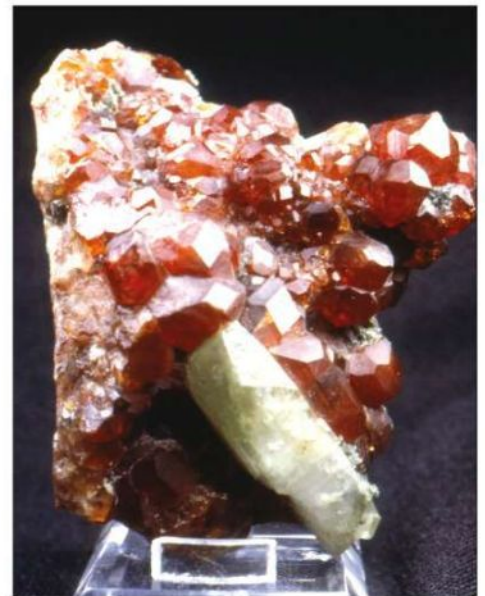
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IN BUSINESS SINCE 1986



April's Taurus has endowed sapphire with certain powers, but it is September's birthstone.



With its many varieties, garnet is an excellent birthstone for January and zodiacal stone for Aquarius.

explanation as to how precious stones became endowed with their strange and mystic virtues, and how these virtues acted in modifying the character, health or fortunes of the wearer" (p. 2). Despite his research into the subject, Kunz, a leading American gemologists in his day, admitted he never found a connection between gems and their supposed virtues. Still, many people continued to cling to a belief in the power of birthstones and zodiacal stones.

There are some differences in the zodiacal (sometimes called "astral") and birthstone lists. For one thing, the sections of the calendar governed by the signs of the zodiac start around the middle of one month and run into the next month. The lists of birthstones and zodiacal stones found on page 20 of Paul Desautels' book *The Gem Kingdom* (Random House, 1971) show several differences in gem species (see sidebar). The zodiacal list more closely reflects the earlier-assigned stones, while the birthstone list has been adjusted in recent times, perhaps for commercial reasons.

People who have strong beliefs in both birthstones and zodiac stones must wear their birthstone for that entire calendar month and two zodiacal stones, one for the first half of their birth month, for the zodiac sign in the descendance with the start of the birth month, followed by a second zodiac gem for the sign that is ascending mid-month.

For example, someone born in September would wear a sapphire throughout the month. But they would also have to wear a carnelian for Virgo for the first three weeks of September, switching to chrysolite or peridot for Libra on Sept. 22.

In *The Curious Lore of Precious Stones*, Kunz also offers some quite pleasing short poems for each of the zodiacal gems. For September, he wrote, "Success will bless whate'er you do, through Virgo's sign, if

only you place on your hand her own true gem, carnelian" (p. 330).

Of course, not all the virtues of a gem are positive. Even today, there are people who believe that some gems emit a form of evil. For example, some believe that precious opal can cause harm to the wearer and that pearl causes disease and death. Both these ideas are associated with the observation of loss of luster in the gems. It is important to note that both fine opal and lustrous pearls can lose color and luster, but the loss is due to some mechanical effect and has nothing to do with evil spirits or emanations.

Each of the zodiacal stones carries its own set of virtues, as put forth by Kunz in *Curious Lore*. Rather than describing the zodiacal signs in the order of the months of the year, most references start with the sign of spring, the ram. This is logical, as spring is when the earth emerges from the cold, dark winter and things come alive again—in the Northern Hemisphere, that is! Some signs have alternate stones.

Aries, the Ram (Mar. 21-Apr. 19), is represented by amethyst, which rules the emotions, and energies. It gives the wearer swift perception, vital power, a quick temper, generosity and an affectionate disposition.

Taurus, the Bull (Apr. 20-May 20), has been assigned the agate. It protects crops, grants a cheerful, amiable and reserved disposition and ensures a long and quiet life.

Gemini, the Twins (May 21-June 20), endows aquamarine beryl with the ability to control one's emotions and affections and gives a spirit of adventure, as well as knowledge and strength.

Cancer, the Crab (June 22-July 23), speaks through the emerald, which can be arrogant and presumptuous and precise in manner, with a sense of humor. In later life, the wearer will enjoy good fortune.

Leo, the Lion (July 23-Aug. 22), has endowed onyx or ruby with boldness, cour-

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Long called "chrysolite", peridot is the zodiacal gem associated with Libra.

age, generosity and faithfulness. Born under this sign, the wearer of onyx will be ambitious, quick-tempered and opinionated.

Virgo, the Virgin (Aug. 23-Sep. 21), is credited with endowing carnelian or jasper with a series of virtues. A person born under this sign will be sympathetic, tactful and intuitive, and will enjoy the arts.

Libra, the Scales (Sept. 22-Oct. 21), is assigned the gem chrysolite or emerald. There is some discussion in the early literature as to what "chrysolite" really is. The general consensus is that it is peridot, which may also be the true identity of the gem described as emerald in Aaron's Breastplate. The wearer of this gem has a just and equitable disposition, but lacks boldness and aggressiveness, so takes few risks.

Scorpio, the Scorpion (Oct. 22-Nov. 20), has as its gem aquamarine or topaz, which make the wearer bold and persistent in actions, but inclined to be quarrelsome and jealous, often getting into fights.

Sagittarius, the Archer (Nov. 21-Dec. 20), is associated with turquoise, one of the most historically important gems. It grants great energy and a love of the arts and sciences. Wisdom, honor, humility, and cheerfulness are common traits in anyone born under this sign.

Capricorn, the Goat (Dec. 21-Jan. 19), is represented by the gem ruby or onyx. Those born under this sign tend to be delicate and prone to illness. They can be inconsistent and tend to develop poor health.

Aquarius, the Water Bearer (Jan. 20-Feb. 18), infused garnet and sapphire with its powers, including mysticism and fidelity with strong and enduring passions. Aquarians are hard workers with great patience.

Pisces, the Fish (Feb. 19-Mar. 20), is usually associated with amethyst, but those born under this sign have the choice of using peridot. The characteristics of the Pisces gem are not very nice. In fact, Amulets and



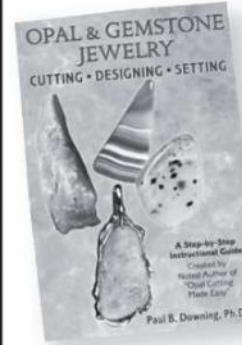
Amethyst is the zodiacal gem for Pisces and the birthstone for February.

Talismans, by E. A. Wallis Budge (University Books, 1968), refers to Pisces as "the hell of the zodiac" because it seems to be more malignant than beneficial (p. 420). Yet, it is credited with granting positions of trust and importance and associated with powerful friends.

In my old files, I came across an advertisement I had saved from the 1970s. It offers "zodiac minerals" based on ancient astrological beliefs. I had saved the ad because this was something I had never heard of before, and have heard little or nothing more since. For the curious, the ad lists the following minerals with the signs of the zodiac: amethyst (Aquarius), rock crystal (Pisces), realgar/orpiment (Aries), malachite (Taurus), geode (Gemini), chalcopyrite (Cancer), sulfur (Leo), fluorite (Virgo), pyrite (Libra), vanadinite (Scorpio), chrysocolla (Sagittarius), and dogtooth calcite (Capricorn). Unfortunately, the advertisement carried no explanation of how these minerals came to be associated with the signs of the zodiac, though it's pretty obvious to me that it was an advertising ploy.

In today's world, the traits and powers vested in the signs of the zodiac and their gemstones often go unnoticed. Still, great numbers of people know their birthstones and the zodiac sign under which they were born. If some of the traits proscribed to the gems of the zodiac are evident in a person, is it coincidence or astrological inevitability? So, we check the horoscopes and astrological charts that are published in most daily newspapers. We wear our birthstone and maybe even our zodiacal stones. If you agree with your birthdate's zodiac prediction, you know it is right! If you disagree with what your sign tells you, then it is all just fantasy, anyway! Still, right or wrong, true or not, we enjoy our birthstones and, perhaps, our zodiac stones. Both are great sources of conversation, personal security, and joy. 💎

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FF THE DOP

by Jim Perkins

Planning for Good Recovery

Recovery from gem rough is often not an issue when you're cutting low-priced natural or synthetic gems. If some material is lost, it's not that much of a concern. When you cut higher priced rough or if you're simply a prudent faceter, however, you take extra care to maximize your yield. This was the case for me when I recently purchased an opal from Welo, Ethiopia, to cut for competition. Welo opal is a crystal opal that was discovered in 2008 or 2010, depending on the source you read. At the present time, the material isn't that expensive in comparison to other gem materials, but I feel that, as this material gains in popularity, its price will rise.

The stone I picked from a parcel weighed 6.3 grams or 31.5 carats. It measured approximately 13 millimeters wide by 22 millimeters long by 17 millimeters deep. It was just flaming with color play, so I could have placed the table on any side and cut a gorgeous stone. However, I could also orient it in one direction, cut it into two pieces on my trim saw, and have enough depth to cut two matching stones. This would require some careful measuring and cutting, but it would really be worth the effort.

I didn't want to waste any more rough when faceting my stone than necessary, so I measured and determined that a 10 millimeter by 16 millimeter oval was the best size to cut from my stone. There would be enough material to grind the stone to size without wasting a lot of material. I didn't find any off-the-shelf settings for this size, but a stone this special deserves a custom setting or may even end up as a collector stone and never be set. It didn't matter to me, as a 1.6 L/W ratio will produce a large stone and is very close to what is called a "golden ratio", which is a very pleasing length-to-width ratio from a design standpoint.

I used an oval design I had created in GemCad about a year or so previously and stretched it to 1.6 L/W, then adjusted the facet angles so they all came out to 1/10-degree resolution. Then I looked at the pavilion ratio factor and calculated the factor I needed for a suitable crown height. Knowing the desired C/W ratio, I adjusted the crown angles accordingly using the tangent ratio function in GemCad. Then I also adjusted the crown angles to 1/10-degree resolution, making sure all the meet points were in their proper positions.

The next steps were to grind a flat spot, which would become the table, on the face



of the stone and grind away any matrix skin, leaving good opal exposed so I could check the fire and make sure this stone would give me good play of color. Then I measured again and cut the stone into two pieces, each with enough depth to allow me to cut two beautiful stones.

I calculated the depth I needed by adding the P/W and C/W factor, then multiplying the sum by the width. My GemCad diagram told me I needed 6.61 millimeters for the depth, so I rounded up to 7 millimeters. Since my rough was approximately 17 millimeters deep, I had enough to do this fairly easily, allowing for waste from the thickness of the trim saw blade. Had I oriented the opal in any other direction, however, I would not have been able to do this. If your stone doesn't have such good depth, you can often cut it so that you can facet a smaller stone with less depth.

Planning is an important part of preparing a piece of rough for faceting, especially if it is expensive material or otherwise precious to you. Opal is known as the "queen of gems", and since this piece of rough is so fantastic and the yield will be so good, I named my design "Ethiopian Queen". Even with careful planning, I will only achieve 27 percent return out of the rough. Without planning, however, I probably would only have recovered 13.5 percent, so I've doubled my return. The cost of my rough was \$171.50, including shipping, and a reasonable price for cut stones of this size would be about \$525 to \$690 each, so I'll more than double my money, which is a very attractive proposition. ♦

Send your comments and questions about any of my columns to Off the Dop, P.O. Box 1041, Medina, OH 44258, or e-mail me at jimperkins@zoominternet.net.



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Helen Serras-Herman

Her Sculptures and Jewelry Reflect a Passion for Gems

Story by Andrew Herman

Helen Serras-Herman has a passion for gems—colorful, natural, unique and vibrant gems. Her love is reflected in sculptures and in jewelry that features carved gems as centerpieces. Her gregarious personality is often mirrored in her large and showy, yet elegant, jewelry pieces. Other times, she holds

back and creates modest-size pendants and pins that are interchangeable on precious bead necklaces. Her contemporary organic compositions, choices of unusual gem materials, workmanship quality, and ability to blend together the mineral and art worlds are what attract clients to her artwork.

I met Helen, who happens to be my wife, when she gave a presentation of her work to the Gemological Institute of America (GIA) Alumni meeting in Baltimore, Maryland, in May 1990. A graduate gemologist myself, I listened to her presentation and viewed some of her work with admiration. At that time, Helen had returned to the United States after living and working in Europe for most of her life. She was born in New York City to Greek immigrant parents. The family returned to Athens, Greece, where Helen grew up and took classes on drawing and painting. She attended the University of



ANDREW HERMAN PHOTO

Helen Serras-Herman was born in New York City, raised in Greece, and educated in Europe.



HELEN SERRAS-HERMAN PHOTO

The face of this mythical nymph encloses a rare Brazilian Sugarcane emerald, the same material as in the detachable strand, set with a black Australian opal and a Mexican fire opal.

M.J. COLELLA PHOTO



For her Silver Faces Collection, inspired by a trip to Singapore, Helen hand carves one-of-a-kind sculptural scenes in wax, then casts them in sterling silver.

M.J. COLELLA PHOTO



The 6-inch-tall sculpture Visionary is carved in black and white Brazilian agate and slides in a Silver Faces cradle.

Fine Arts in West Berlin, Germany, where she studied sculpture (1976-83). Upon her return to Greece, and while engaged in her large sculptural work, Helen took a course on gem carving (glyptography or glyptic arts) at the Glyptography Center in Athens, the school created by the late English master Nik Kielty Lambrinides. Helen's artistic future would change with the discovery of the world of carved gemstones. She completed a five-year apprenticeship and earned her degree in gemology through the Gemological Association of Great Britain (Gem-A).

After the unexpected death of her father, Helen decided in 1988 to move to Maryland and establish her studio, the Glyptography Center, now known as the Gem Art Center. From that point on, she completely devoted her work to the art of gem sculpture. That is when we met and our story began.

Helen's abstract background in figurative sculpture is visible in her small-scale sculptures and jewelry art. An unusual combination of solemn faces and tree roots identifies her work. Her current inspiration is often drawn from subjects that have interested her since the days of her life-size sculptural exploration. "During a trip to Singapore," Helen recalls, "a brief encounter with the gigantic, age-old, eternal mangrove trees left me with strong impressions and provided the inspiration for a series of sculptures. The twisted and swirling branches are the perfect backdrop for my distorted and exaggerated Faces." The materials are different; her large sculptures were done in

M.J. COLELLA PHOTO



The color palette of desert scenes, bright cactus flowers, and vivid Arizona sunsets is the inspiration revealed in this Mediterranean coral and silver necklace and earring set.

mixed media or cast in bronze, while her current medium is gem materials. The interwoven sculptural roots shelter various interpretations of dominant faces, decorating the bases for her gem sculptures or taking center stage in her Silver Faces Collection of jewelry, which features one-of-a-kind sculptural scenes, which she carves by hand in wax and then casts in sterling silver.

She often scores her carvings with lines or grooves that frequently run from the face to the back of the stone. She calls

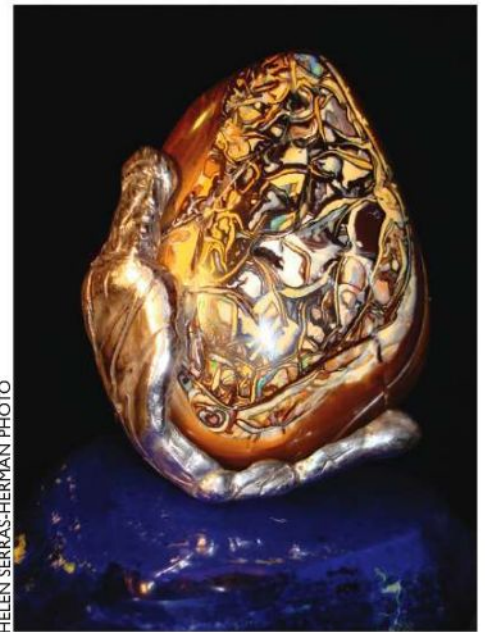
them "construction lines, lines that connect the volumes and the continuous movement, lines that are engraved pursuing the light and that are set off by the light, giving dimension and organic feeling to the sculpture". She has used this technique on many drusy materials, probably achieving the best contrast result on drusy rainbow pyrite from Russia.

Drawings are a significant and integral part of Helen's creative process. Some may be simple sketches to help her plan



M.J. COLELLA PHOTO

Helen's stone carvings are often scored by lines or grooves, as in this drusy rainbow pyrite pendant.



HELEN SERRAS-HERMAN PHOTO

This gem sculpture features a carved Koroit matrix opal from Australia, held in a sterling silver cradle on a carved lapis lazuli base.



M.J. COLELLA PHOTO

The realistic, yet abstract head of Helen's Portrait of Leonardo DaVinci gem sculpture utilized an entire smoky quartz crystal.

The complex art of gem sculpture attracts Helen, as it combines knowledge and skills in sculpture, lapidary, drawing, gemology and jewelry



HELEN SERRAS-HERMAN PHOTO

Helen is drawn to unusual gem materials like Larimar. This detachable 18k yellow gold slide and pin reflects the shape of a marine ray.

her pieces, while others become a form of art expression.

During her lectures, Helen often shares sources of her inspiration and acknowledges the many people who have influenced her. She says that "inspiration may be found in nature, in books, in other art forms such as movies or dance, in ancient stories, or current news. They may be close to home or seen at far away places on our travels. Somehow, all these stimulants

mount up inside us and, when channeled through our creativity, they emerge victorious in unique artworks." She often points out the significance of life experiences and how they inspire her.

Helen is also an advocate of taking classes whenever possible. She believes that the hands-on guidance of a teacher is invaluable. She recently took some beading classes and is thrilled with the results! Her advice to beginners is to take as many different classes

as possible from various sources. These may include classes in lapidary cabbing and faceting through local gem clubs; drawing, painting, and art history at art schools and community colleges; gemology through gemological associations; simple beading or wire-wrapping from local societies and retail bead stores; and jewelry-making classes through clubs and colleges. A great place to take these classes, meet some old friends and make some new ones, and relax the

M.J. COLELLA PHOTO



This detachable pendant of chrysocolla in drusy chalcedony hangs from a strand of natural Bisbee turquoise beads and black freshwater pearls.

body and mind is the Wildacres Workshop, sponsored by the Eastern Federation of Mineralogical Societies (www.amfed.org/efms/wildacres.htm), which takes place twice a year in the serene mountains of North Carolina. Helen was invited as the guest speaker for the fall 2006 session and presented seven lectures during the week.

The complex art of gem sculpture attracts Helen, as it combines knowledge and skills in sculpture, lapidary, drawing, gemology and jewelry, and especially because of its versatility, lending itself to both freestanding sculpture and jewelry art. During recent years, she has been working on "wearable sculptures", sculptures that hold a removable piece, which can be worn as jewelry. These pieces take a lot of time in planning and execution because their physical stability, as well as aesthetic balance, must be correct. Several of these wearable sculptures are part of her Passion for Opals Collection, which features the variety of precious black opals and boulder opals. Although some of her work is the result of a calculated and lengthy approach, at other times it is, as she says, "impulsive—a free-form carving following and showcasing nature's hallmarks".

Helen is always intrigued by the technical lapidary challenges that each gem material poses and is drawn to new, rare and atypical materials, such as Ocean Jasper®, larimar, or blue chalcedony. Colorful patterns and bold color combinations, along with beautiful natural inclusions and drusy vugs, are features to which Helen is attracted, as they can be incorporated into a design to create unique carvings. Generally, she prefers materials with a Mohs hardness over 6 that

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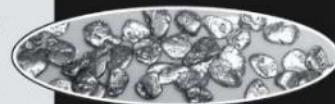
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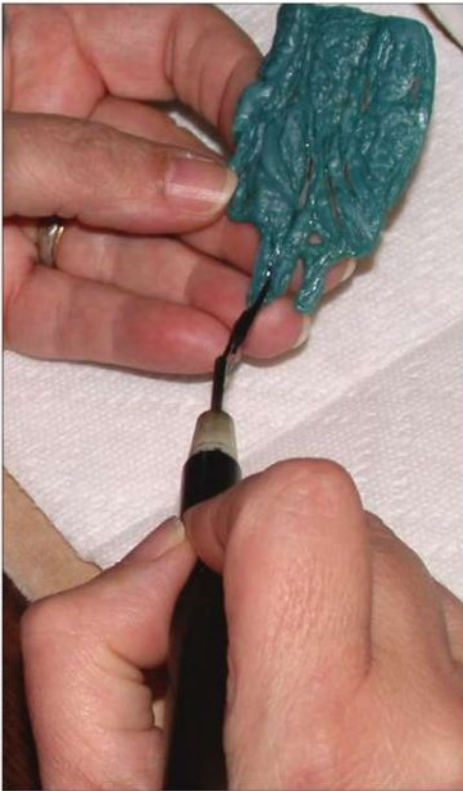
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ANDREW HERMAN PHOTO

Helen hand carves the wax model for the Coral Nymphs silver centerpiece with a hot pen.



ANDREW HERMAN PHOTO

Helen creates her gemstone carvings with a hang-up-style Foredom flexible shaft tool, which has a thin handpiece that she holds like a pen.



HELEN SERRAS-HERMAN PHOTO

Drawings, such as the Silver Faces, are a significant and integral part of the creative process.

are compact and tough and take a high polish. The quartz family gemstones, including jaspers, and the beryl family are, to her, the most desirable materials for lapidary work. Her sculpted gems—or “treasured objects”, as they have been called—are inspired by people and mythology. They often take the symbolic shape of gods, nymphs, or fantastical creatures. In her most recent presentation Gem Carving, Inspiration & Skills, Helen says, “I try to portray [the subjects] with grace and elegance, with exaggeration,

pushing the visual limits”. She frequently chooses themes that allow her to tell a story or make a statement.

Following the style of her earlier portraits in bronze, Helen’s Gem Portraits are an expression of love for the nature of man. Some of these portraits are from the theme series *Homage to a Master*, such as her *Portrait of Leonardo DaVinci*. Iconic among her work, this realistic, yet abstract head utilized an entire smoky quartz crystal, while the torso was carved in rock

crystal quartz and the spine engraved as intaglio, offering an illusion “X-ray” of the chest. Marc Wilson, head of the Minerals Section at the Carnegie Museum of Natural History in Pittsburgh, Pennsylvania, once said about the portrait, “you look at it and you can just see the character engraved in that face. It is just abstract enough so you can tell who it is, but it is not a dry representation”.

Helen creates her carvings with the hang-up style Foredom flexible shaft machine with a thin handpiece that she holds like a pen. She actually has three machines hanging over her bench, with each handpiece fitting different size collets, as the shanks of the carving points vary in size. She uses a shallow water tray at her carving station to collect water from a dripping device, and she often uses a “stone support”, a heavy stone approximately 4 inches in diameter covered with plasteline (also called plasticine) in order to absorb the vibrations. She may lean the carving against the stone support or, when greater accuracy is required, such as for precise intaglio work, she may embed small carvings in the plasteline. Over the years, she has accumulated a large variety of diamond abrasive points, wheels and discs of all shapes, sizes and grits for the carving and sanding stages.

The other important part of her lapidary machinery is her six-wheel rotating unit, a *Genie* made by Diamond Pacific. Besides using this lapidary machine for the tradi-



M.J. COLELLA PHOTO

Gods and nymphs are favorite subjects for sculptures. This 4½-inch-tall gem sculpture combines Oregon sunstone, chrysocholla in chalcedony, and Silver Faces.

tional cabbing work, Helen swaps the right-hand-side flat wheels with convex carving wheels, which come in ¼ inch, ½ inch and 1 inch in diameter, and in sets of three grits, 100, 220 and 600. She usually starts the performing on the rotating wheels, then goes back and forth between the flexible shafts and the rotating wheels. She typically



M.J. COLELLA PHOTO

Helen likes to carve Ocean Jasper from Madagascar. This 14k gold slide pendant and pin are set with Mexican fire opals and grossular garnets.

finishes everything with the hand tools on the flexible shafts.

Since we moved to beautiful and scenic Rio Rico, in Southern Arizona in 2005, the Southwest environment—from Arizona gem materials to the color palette of desert scenes, bright cactus flowers, and vivid sunsets—has inspired Helen's work. Her Turquoise Ensembles Collection features natural untreated Arizona turquoise from mines like the famous Sleeping Beauty mine near Globe and Whitewater turquoise, a trade name for natural material mined near Douglas, Arizona. Its soft pastel blue color and natural inclusions of silver and pyrite crystals make this material unique and identifiable. Her latest collection, Copper Trails, is inspired by Southern Arizona's copper mining history and our visits to several of these mines (see her article in the July 2010 issue of *Rock & Gem*). The one-of-a-kind jewelry pieces in this collection feature many beautiful Arizona gems, as well as opals and emeralds, in some beautiful braided combinations of gold, sterling silver, and copper chains, copper beads, and copper-colored pearls.

For many years, Helen has volunteered her time and knowledge to gem and mineral societies. She has served as president of the Gem, Lapidary & Mineral Society of Washington, D.C., and the Gem Artists of North America, which she joined in 1997 and has exhibited with several times. She is a lifetime member of GLMS DC and the Chesapeake Gem & Mineral Society in Maryland, a member of the Tucson (Arizona) Gem & Mineral Society and the Old Pueblo Lapidary Club (Tucson), and an artist member of the Tubac Center of the Arts, in Tubac, Arizona.

Helen has been honored over the years with several awards, but one of her greatest honors came with her induction into the National Lapidary Hall of Fame in 2003. Helen opens her studio for tours and shares her experiences with anyone who asks for advice. She writes articles discussing carving procedures and has no tool or technique "trade secrets", as she believes that "gem carving should be just like monumental sculpture, where there are no trade secrets, only individual creativity."

To see more of Helen's work, view her show schedule, or find a gallery that features her art, visit her Web site, www.gemartcenter.com.

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Show Dates from page 43

Shows LLC; North Atlanta Trade Center, 1700 Jeurgens Ct.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$4, under 16 free; gemstones, minerals, rough rock, lapidary supplies, beads, wire wrap, jewelry, museum-quality collectibles, hourly gift certificate drawing, grand door prize; contact Richard or Janice Hightower, 7334 Quail Run Rd., Lizella, GA 31052, (478) 935-9345; e-mail: staff@mammothrock.com; Web site: www.mammothrock.com

10-12—ORLANDO, FLORIDA: Show, "The Holiday Mineral & Gem Show and Florida Jewelry Artist Festival"; Central Florida Mineral & Gem Society; Central Florida Fair Grounds, 4803 W. Colonial Dr.; Fri. 1-6, Sat. 10-6, Sun. 10-5; adults \$5, students \$2; beads, minerals, custom jewelry, fossils, lapidary rocks and supplies, door prizes, silent auction, children's areas and activities, demonstrations; contact Mark Robinson, 2721 Forsyth Rd., Winter Park, FL 32792, (407) 538-7343; e-mail: mark.robinson5@att.net; Web site: www.cfmgs.org

10-12—SHARONVILLE, OHIO: Show and sale; GemStreet USA; The Sharonville Convention Center, 11355 Chester Rd.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strieter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

11-12—NASHVILLE, TENNESSEE: Show, "Earth Treasures"; Mid-Tennessee Gem & Mineral Society; Tennessee State Fairgrounds, Creative Arts Bldg., Nolensville Rd. and Smith Ave. (less than 1 mile off I-65 exit 81); Sat. 9-6, Sun. 10-5; adults \$3, students \$1, children free; demonstrations, exhibits, silent auction, door prizes, grand prize, more than 30 dealers, beads, crystals, geodes, rough, cabochons, gemstones, jewelry, tools, supplies, minerals, fossils, stone carvings; contact John Stanley, 2828 Donna Hill Dr., Nashville, TN 37214, (615) 885-5704; e-mail: jstanley@picagroup.com; Web site: www.MTGMS.org

17-19—SAN DIEGO, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Scottish Rite Event Center, 1895 Camino del Rio S.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (603) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

JANUARY 2011

1-31—QUARTZSITE, ARIZONA: Show, "Desert Gardens International Gem & Mineral Show"; Desert Gardens RV Park; 1064 Kuehn St. (I-10 Exit 17, south side); 9-6 daily; free admission; crystals, minerals, rough, polished, jewelry, lapidary equipment; contact Sharon or Sandy, 1064 Kuehn St., Quartzsite, AZ 85346, (928) 927-6361; e-mail: info@desertgardensrvpark.net; Web site: www.desertgardensrvpark.net

14-16—GLOBE, ARIZONA: 54th annual show; Gila Co. Gem & Mineral Society; Gila County Fair Grounds, 3 mi. north of US 60-70 Junction; Fri. 9-5, Sat. 9-5, Sun. 9-4; live demonstrations, door prizes, displays, minerals, jewelry; contact Val Latham, (602) 466-3060; e-mail: val65@cox.net

14-16—LARGO, FLORIDA: 35th annual show and sale; Pinellas Geological Society; Largo Cultural Center, Parkside Room, 105 Central Park Dr., one block east of Seminole Blvd.; Fri. 10-6, Sat. 10-6, Sun. 12-5; free admission; club displays and sales, cut gems, silver and gold jewelry, wire wrapping, beading, cabochons, mineral eggs, rocks, minerals; contact Hugh Sheffield, (727) 894-2440

15-16—DELAND, FLORIDA: 40th annual show and sale; Tomoka Gem & Mineral Society; Volusia County Fairgrounds, Tommy Lawrence Bldg., Rte. 44; Sat. 10-6, Sun. 10-5; adults \$4, children 12 and under free; lapidary, jewelry, demonstrations, supplies, fine jewelry, gems, minerals, fossils, drawings; contact Florence Nordquist, (386) 788-5702; e-mail: fndesign@aol.com

15-16—FREDERICKSBURG, TEXAS: 42nd annual show, "Hill Country Gem & Mineral Show"; Fredericksburg Rockhounds; Pioneer Pavilion, Lady Bird Johnson Municipal Park; Sat. 9-6, Sun. 10-5; free admission; contact Jeff Smith, 208 Castle Pines Dr., Kerrville, TX 78028, (830) 895-9630; e-mail: jeffbrenda@windstreram.net; Web site: www.fredericksburgrockhounds.org

28-30—REDLANDS, CALIFORNIA: Annual symposium; Mineralogical Society of Southern California Micromounters; San Bernardino County Museum, 2024 Orange Tree; give-away tables, mineral sales, silent and live auctions, speakers, field trip; contact Eugene Reynolds, (714) 697-4435, or Dr. Robert Housley; e-mail: rhousley@its.caltech.edu; or Gene Reynolds; e-mail: garquartzman@hotmail.com

29-30—PANAMA CITY, FLORIDA: 20th annual show, "Panama City Gem, Mineral & Fossil Show"; Panama City Gem & Mineral Society; Bay County Fairgrounds, American

Legion Bldg., US Hwy. 98 (15th St.) and Sherman Ave.; Sat. 9-5, Sun. 9-4; free admission; door prizes, gems, minerals, fossils, beads, jewelry, lapidary arts, wire wrapping, exhibits; contact Joseph Schings, 224 Collinhurst Square, Panama City, FL 32404, (850) 871-1846; e-mail: mojo3002@comcast.net

JANUARY-FEBRUARY 2011

28-13—TUCSON, ARIZONA: Show; ColorWright; ColorWright Warehouse, 1201 N. Main Ave.; 10-6 daily; free admission; cutting and carving rough, slabs, cabochons, gemology equipment, fossils, fossil preparation equipment, Covington lapidary equipment, new Highland Park slab saws, books, jewelry; contact Rob Kulakofsky, 1201 N. Main Ave., Tucson, AZ 85705, (520) 792-1439; e-mail: rk3@color-wright.com; Web site: www.rglshow.com

31-6—TUCSON, ARIZONA: Wholesale show; Arizona Global Gem & Jewelry; The Hotel Arizona, 181 W. Broadway; Mon. 10-6, Tue. 10-6, Wed. 10-6, Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-6; contact Ron Swanson, (520) 396-4469; e-mail: ron@aggjs.com; Web site: www.aggjs.com

FEBRUARY 2011

1-28—QUARTZSITE, ARIZONA: Show, "Desert Gardens International Gem & Mineral Show"; Desert Gardens RV Park; 1064 Kuehn St. (I-10 Exit 17, south side); 9-6 daily; free admission; crystals, minerals, rough, polished, jewelry, lapidary equipment; contact Sharon or Sandy, 1064 Kuehn St., Quartzsite, AZ 85346, (928) 927-6361; e-mail: info@desertgardensrvpark.net; Web site: www.desertgardensrvpark.net

12-13—MERRITT ISLAND, FLORIDA: 34th annual show, "Symphony of Gemstones"; Central Brevard Rock & Gem Club; Kiwanis Island, Merritt Island Causeway; Sat. 10-5, Sun. 10-5; adults \$3, children 12 and under free with adult; demonstrations, silent auction, exhibits, grand prize, lapidary supplies and equipment, gemstones, jewelry, beads, rocks, minerals, hourly door prizes; contact Ray Huntington, (321) 799-8536; e-mail: bdewey@cfl.rr.com

12-13—OAK HARBOR, WASHINGTON: 46th annual show, "Sweetheart of Gems"; Whidbey Island Gem Club; Oak Harbor Senior Center, 51 SE Jerome St.; Sat. 9-5, Sun. 9-4; contact Keith Ludemann, (360) 675-1837; e-mail: rock9@whidbey.net

18-27—INDIO, CALIFORNIA: Show, "Riverside County Fair & National Date Festival"; San Geronimo Mineral & Gem Society; Riverside County Fair & National Date Festival, Gem & Mineral Bldg., 46-350 Arabia St.; 10-10 daily; adults \$8, seniors \$7, students \$6, children free; 16 dealers, 108 lapidary display cases, lapidary demonstrations, geode cutting and sales; contact Bert Grisham, 1029 N. 8th St., Banning, CA 92220, (951) 849-1674; e-mail: bert67@verizon.net

19—UPPER MARLBORO, MARYLAND: 21st annual show; Southern Maryland Rock & Mineral Club; The Show Place Arena, 14900 Pennsylvania Ave.; Sat. 10-5; admission \$3, children 6 and under free; vendors, minerals, fossils, gems, original jewelry designs, exhibitors, demonstrations, faceting, bead stringing, wire wrapping, gold panning, children's crafts, door prizes; contact Michael Patterson, 11000 Thrift Rd., Clinton, MD 20735, (301) 297-4575; e-mail: michael.patterson@pgparks.com; Web site: www.smrnc.org/index.html

25-27—GOLDEN, COLORADO: Show; Denver Gem & Mineral Guild; Jefferson County Fairgrounds, 15200 W. 6th Ave.; Fri. 10-6, Sat. 10-6, Sun. 11-5; free admission; gem-cutting demonstrations, geode cutting, mineral sample bags, mineral displays, dealers, gems, minerals, fossils, geodes, jewelry, books; contact Joseph Payne, 6101 S Logan Ct., Centennial, CO 80121, (303) 783-0221; e-mail: jpayne@englewoodgov.org; Web site: www.denvergem.org

25-27—NEWARK, CALIFORNIA: Annual show and sale; Mineral & Gem Society of Castro Valley; Newark Pavilion, 6430 Thornton Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$6 (3-day pass), coupon on Web site; children under 12 free with adult; rare Ice Age fossils, fluorescent rock display, 48 display cases, 40 dealers, eight lapidary demonstrations, rocks, minerals, jewelry, gemstones, fossils, faceted stones, beads, petrified wood, lapidary equipment, jewelry making supplies, kids' Spinning Wheel, live auction, door prizes; contact Larry Ham, P.O. Box 2145, Castro Valley, CA 94546, (510) 887-9007; e-mail: showchair@mgscv.org; Web site: www.mgscv.org

continued on page 64

2010

Lapidary Article of the YEAR CONTEST

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WHO IS ELIGIBLE

U.S. residents only, age 18 and older.

HOW TO ENTER

Submit a step-by-step lapidary project article to *Rock & Gem*. For submission guidelines, visit www.rockngem.com/submissions.asp or write to *Rock & Gem* Writers' Guidelines, P.O. Box 6925, Ventura, CA 93006-9899.

"Lapidary" is defined as the working of precious or semiprecious gem materials or metals into an ornament to be worn or decoratively displayed. How-to stories dealing with the building of lapidary tools, display paraphernalia, and other items are welcome, but are not eligible for the contest.

Authors must complete and return a Contributor Agreement and W-9 form before their entry will be considered for publication. Contact Managing Editor Lynn Varon at (805) 644-3824 ext. 129 or editor@rockngem.com for these forms.

All conditions and requirements of the writers' guidelines and the Contributor Agreement apply.

All step-by-step lapidary projects published in 2010 cover date issues of *Rock*

& *Gem* are eligible for the 2010 contest, regardless of the year of submission, and will be automatically judged.

The number of lapidary project submissions received may exceed the available space. *Rock & Gem* publishes approximately 6 to 12 project article per year.

The authors of all published articles will receive normal payment for the article, as determined by the editor.

If a winning entry was contributed by a separate author and photographer or by multiple authors, one prize will be awarded to the contributors, to be divided as they see fit.

JUDGING

Articles will be judged by a combination of reader response and editorial merit. Readers should send a brief explanation of why a project deserves the big prize to 2008 Lapidary Article of the Year Contest, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003 or to editor@rockngem.com.

Don't wait to send in your vote! The deadline for 2010 votes is January 1, 2011. The winner will be notified by January 17, 2011.

Readers may vote for more than one article per year, but are limited to one vote per article.

The final decision will be made by the Managing Editor of *Rock & Gem*.

THE PRIZE

The winner will receive a complete faceting package from Lapcraft Inc. that includes four 8-inch faceting laps (a 360 Islander, a 1200 standard, a 3000 standard, and a Finalap with 50000 diamond slurry), a bottle of 50000 diamond spray, an 8-ounce bottle of Tool Cool, and a DiaLaser diamond saw blade in the winner's choice of size (4 to 8 inches). It is valued at \$550.



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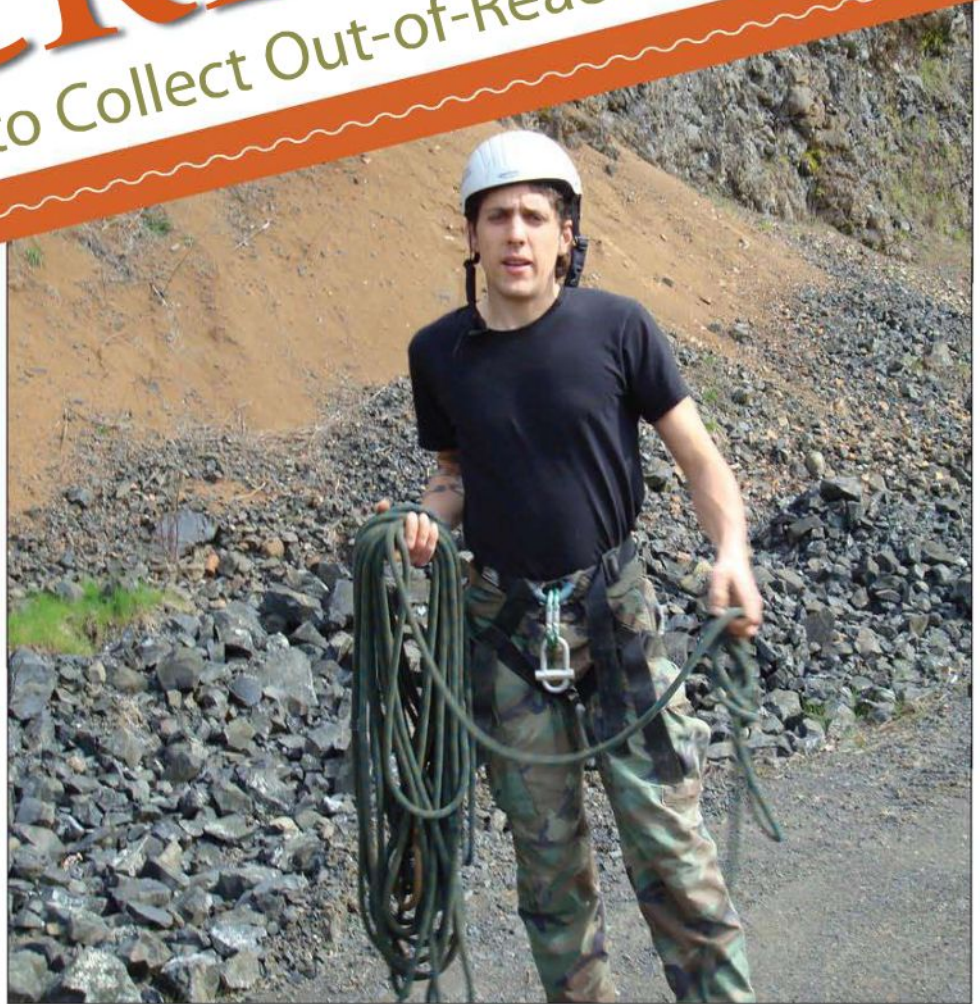
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CLIMBING for CRYSTALS

Learn the Ropes to Collect Out-of-Reach Specimens

Story and Photos by
Stuart "Tate" Wilson

Are you getting tired of just walking around, looking for crystals on the ground? Do you ever notice areas that seem impossible to reach, yet you just know they're where all the best crystals are hiding? When rockhounds sense possible resources in unreachable places, we ponder how to acquire them, and eventually we will find a way. Ropes can be used to access minerals that are located high up on vertical cliffs or deep down in caves, where no other means of access is possible. Climbing is a risky activity and should never be attempted without proper training. But if you are ready to raise the level of excitement in your life, then let's get geared up and go climbing!



With a helmet and harness on, the rockhound is ready to rappel down the wall in search of specimens.

Many professional mineral specimen miners are using climbing gear to discover some of the most beautiful specimens that can be found on today's market, in museums, and in private collections around the world. I have gone along with claim owners to their active mines to help set up the ropes that will allow them to gain access to vugs that were seemingly impossible to get to. While some mine claims are in locations in which it would be easy to set up scaffolding or to create benches in the rock face from which to work, other mines are in remote locations high up in the mountains, where such means of access are impossible. Some mineral claims are in remote, protected wilderness areas, where the stipulations of owning a claim do not allow for much more than using basic extraction methods. Care must be used to not destroy these beautiful, rare locations. Ropes become our best friends in these situations.

I spoke with a miner named Joe who owns a claim high up in the Cascade Mountains of Washington, where using climbing gear is the only way to reach certain areas. He offered some great insights and advice. While the use of climbing gear can be an entirely new way of exploring for the rockhound, he explains "Rope work is just that: work! I usually spend no more than one day at a time on rope because of the intense physical exertion! you go through. I spent three days in a row last fall on rope and then spent two weeks with a very sore back."

It is wise to think long and hard about where you want to prospect and how you plan on extracting specimens. My miner friend explains, "The action of hammering sideways and prying with a big bar on a cliff side is very bad for your back, no matter how you



This rockhound is creating a "bench" in the quarry wall so he can work at a higher level.



Climbing gear is most commonly used for rappelling, which is a controlled descent down a rope.

do it. If you are doing it right, you have to put just about as much time into setting up your rope system for yourself, your tools, and your backpacks as most people spend on digging!"

I asked Joe, who is an experienced miner, where the average rockhound can begin to "learn the ropes". He responded, "Climbing courses are good, but you have to break a lot of the standard climbing dogmas and rules to haul around mining gear and be an effective crystal miner on the cliffs. It takes a lot of knowledge of the different types of gear available, some ingenuity, careful setting of gear, good flexibility, and most importantly, some balls!"

Most rockhounds overlook the option of using climbing gear to discover mineral specimens in those hard-to-reach areas. As rockhounds find all the minerals that are easily collected by sifting through dirt, wading through creeks, or using pry bars and a sledgehammer to break into the ground-level wall, the quality material may become increasingly difficult to obtain. Sometimes, we look up high at a cliff and see all the clues that point to what we are after, but the spot seems impossible to reach! The average collector does not consider the option of getting geared up and climbing straight to that prospect.

Most of us climbers are thrill seekers. I like the way Joe put it: "I kind of like the extreme action of it all! The view is just a tiny bit better from the cliffs, too!" There is nothing like inching toward a 300-foot vertical cliff, looking over, and scaling down the wall with confidence that your gear will keep you safe. Learning to rappel with ease takes a lot of practice and willpower. Looking over the edge can often make you dizzy, even unsure whether it is a good idea to attempt such things. The reward, however, will be finding the best specimens.

Climbing gear is most commonly used for rappelling, which is a controlled descent down a rope. When the prospective collecting area is just too steep and dangerous to get to, you must find a way to get above that spot; then you can safely descend the rope to where you want to be. Tie your rope to a tree, truck, bolt or anchor above and beyond the wall, anything that is without doubt heavy and/or secure enough to hold your weight. Using a low-stretch, static rope will make rappelling easier by reducing the bounce in the rope.

Belaying involves applying friction to a climbing rope to slow the climber's intentional or unintentional descent and usually involves a partner. The belayer remains on the ground at the base of the cliff. The climber's rope is run through a secured anchor at the top of the cliff, then back down to the belayer. Holding onto the rope, secured through carabiners or belay device on the climber's harness, the belayer adjusts the amount slack on the rope to allow his partner to climb or descend. If the climber falls, it is the belayer's job to apply friction to the rope and stop his fall. The belayer must also be aware of the climber's surroundings, letting him know if rocks are falling or seem unstable.

What kinds of areas are appropriate for setting up your climbing gear? I live in an area with thousands of acres of land owned by timber companies. All that timber happens to grow on top of a major basalt flow that extends in every direction for dozens of miles. My uncle and I often cruise the logging roads on dirt bikes, looking for suitable digging locations. Every so often, we come across spots where the timber companies had to create road cuts. These cuts literally go straight through the volcanic basalt flow. Sometimes, the cut is up to 40 feet high. Also, we look for rock quarries that the timber company uses as a source for road building material. Inside a quarry, the rock walls can be up to 200 hundred feet high. Both road cuts and quarries are excellent places in which to set up climbing gear.

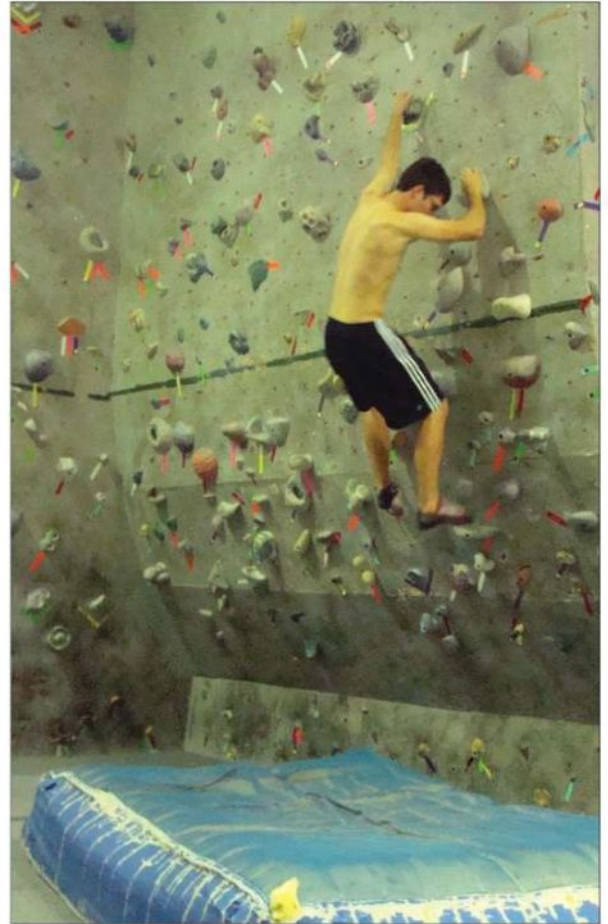
I am an avid back-country hiker, as well. It's just an excuse to look for more crystals, though. The views are ultimate and the possibilities of discovery are high. Sometimes, the work it takes to get your climbing gear and digging tools up there is almost not worth the effort. But there are always those days when all your hard work pays off. When I travel far into the mountains, the selection of perfect climbing spots is endless.

RISK FACTORS

Many factors must be considered when deciding whether or not a hard-to-reach area should be approached. These include rock types, conditions of the rock, weather conditions, environmental impact, and overall risk factor. I cannot over-stress the point that you should never risk your life by attempt to obtain minerals if you know it is not safe. There will always be just as many spots in which the danger level is low.



This climber is rappelling down the wall while prospecting for cavities of crystals in the rock face. He'll spend about as much time setting up his ropes as others spend digging!



Taking lessons at a climbing gym will teach you to use your equipment and make you more comfortable with being suspended in the air.

Granite is a very suitable rock type for climbing. One wonderful quality of granite is that it is very hard, so it can hold your anchors well, and usually very stable, so you will not have rocks falling from overhead as much. Usually, you will encounter granite high up in the mountains.

Basalt rock can be a nightmare to climb on. Oftentimes, basalt is crumbly and unpredictable. It is a good idea to secure your rope to something very sturdy—such as a vehicle, a tree, or a giant boulder on top of the wall—rather than use an anchor set in the rock wall. Basalt was created as lava flowed and slowly cooled long ago. These climbing areas will usually be at low elevations, not up in the mountains.

When the rock wall you are climbing on has loose rocks at the very top, it is important for you to knock down all the loose debris before you start to climb. Stand 20 to 30 feet away from the foot of the wall, hold the end of a used rope (not the one you climb with) that has been secured to something at the top of the wall, and walk to your left and to your right swinging the rope around. Removing the loose rock will prevent it from falling on your head while you are working up on the wall.

It's one thing to work rock well while on the ground. However, it is quite another thing to work well using digging tools sus-

Another important factor to consider will be the **environmental impact** you have on the area you wish to explore.

ended by a rope high above the ground. Do not climb a rock wall while holding onto your gear. You will always need your hands to be free for climbing. One option is to wear a tool belt that can hold all your tools. Another is to attach your gear to a second rope that is suited for holding less weight. You can clip the separate rope onto your harness using a carabiner or anchor it strategically somewhere on the rock wall.

When a good spot has been established as a digging site, secure yourself so you can begin moving rock. Knowing that you have all your tools within arm's reach, but don't have to worry about them falling or being in the way, you can work with confidence and ease.

Weather conditions can make or break your ability to climb the wall. A clear day

with no wind would be ideal. However, as one professional miner put it, "It only gets worse from there." If the sky is full of clouds and the light is dim, it becomes difficult to see where to step and what you're working with. When the wind blows, it becomes hard to keep your balance. When the rain pours, you will slip.

Another important factor to consider will be the environmental impact you have on the area you wish to explore. If you are exploring for minerals in a state park or national wilderness area, it is definitely not OK to carelessly dig in. However, using ropes will allow you to move around freely, while allowing for the preservation of these protected areas.

CLIMBING GEAR

Here is a list of basic gear you will need to safely begin your ascent into the world of climbing for crystals:

Boots/Shoes (\$40-\$150 per pair) Boots will be preferable to shoes if large rocks are falling as a result of you plucking them off the wall. A pair of boots made of thick leather will protect your feet from being squashed, but they will make it more difficult to reach certain spots because your feet will not be able to fit into small cracks and crevices. A pair of shoes that are very thin and fit the shape of your foot will let

you better maneuver the rock wall. When you get to a good working spot, it might be good to switch to a pair of thick boots.


Harness (\$40-\$140) The harness will wrap around your upper thighs and waist. Ropes connect to the harness using carabiners. Other gear may also be attached to your harness. Using a harness is necessary. If you were to fall, you would be glad your ropes are attached to your harness, preventing you from falling all the way to the ground.

Carabiners (\$8-\$30 each) These oval metal loops with a screw lock attach to your harness so ropes can pass through them, allowing you to ascend and descend, while being connected to the rope.

Helmet (\$40-\$100 each) If you enjoy your hobby and your life, then this is mandatory. You must keep your helmet on at all times; all it takes is one falling rock to end the fun. It is safe practice to look up frequently to make sure the rope is not knocking loose any rocks or debris. Even though a helmet will prevent many possible injuries, rocks are harder and will ultimately win. Be aware of what is going on above your head.

Ropes (\$60-\$250 each) A dynamic rope will be the better choice if you're climbing with a belayer. Dynamic rope will stretch, allowing you to bounce a little when you fall to the end of the rope. A static rope will stop you with a sharp jerk, and you'll stand more chance of getting hurt. Use a static rope if you're rappelling from the top of a wall. There will be less bounce as you rappel, allowing for a more controlled descent. Look for a UIAA or CE certification on your rope. This shows that it has passed strict regulations for safety. Buy the rope brand new. Used ropes may have been unknowingly damaged by previous owners.

With your newly purchased gear and inexperience, heading out to that secret spot you've been trying to figure out how to get to, is not the way to go! Chances are, no one else will be climbing up (or down) to it in the time it is going to take you to learn how to properly use your gear at the local rock-wall climbing gym. Taking climbing lessons will teach you how to use your equipment and make you feel more comfortable with being suspended high up in the air.

When you are out in the field, ready to test your newly gained knowledge, make sure you have a friend with you who is also knowledgeable of and experienced in climbing. Always pre-plan what you will do in case of an accident. Many times, crystal collectors dig in areas that are very remote, and because of this, it is important to bring along a cell phone (be aware of signal limitations) in case of emergency. Be safe, know your limits, and go get the best crystals out there. Climb on! 



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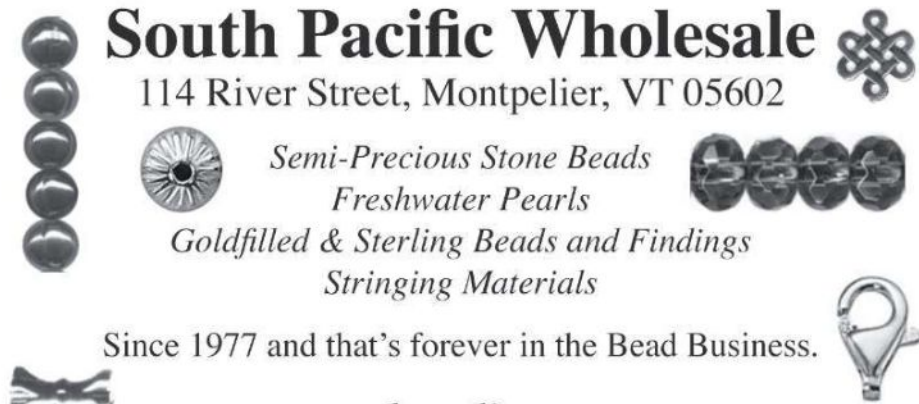
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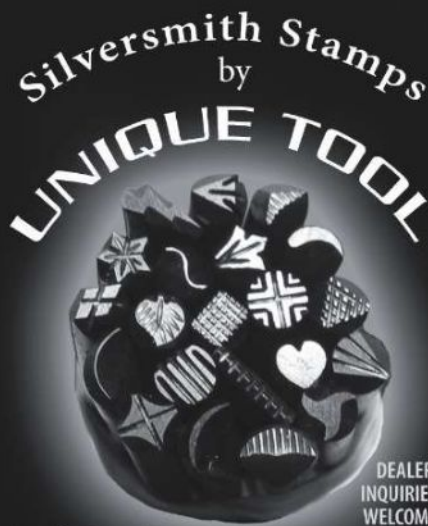
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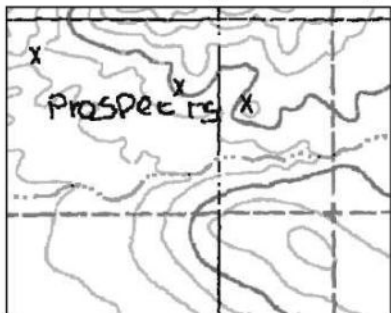


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26-27—EVERETT, WASHINGTON: 58th annual show; Everett Rock & Gem Club; Washington National Guard Armory, 2730 Oakes Ave.; Sat. 10-6, Sun. 10-5; free admission; dealers, demonstrations; contact Fritz Mack, P.O. Box 1615, Everett, WA 98206, (425) 232-0809

26-27—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; Fort Mason Center, 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

MARCH 2011

4-6—RICHMOND, INDIANA: 38th annual show; Eastern Indiana Gem & Geological Society; Wayne County Fairgrounds, 861 N. Salisbury Rd.; Fri. 10-6, Sat. 10-6, Sun. 11-4; adults \$4, seniors (60+) \$3, students (7-18) \$1, children 6 and under free; jewelry, minerals, fossils, crystals, dealers, demonstrations, displays, silent auctions; contact John LaMont, (765) 647-4894, or Dave Straw, (765) 966-4249

5-6—ARCADIA, CALIFORNIA: Show; Monrovia Rockhounds Inc.; LA County Arboretum, Ayres Hall, 301 N. Baldwin Ave., 1 block south of 210 Fwy.; Sat. 9-4:30, Sun. 9-4:30; adults \$8, seniors and students \$6, children \$3; more than 10 dealers, minerals, gems, jewelry, beads, findings, fossils, club geode cracking, Grab Bags, Treasure Wheel, Dino Dig, Fossil Find, prize drawings, grand prize raffle; contact Jo Anna Ritchey, 224 Oaks Ave., Monrovia, CA 91016, (626) 359-1624; e-mail: joannaritchey@gmail.com; Web site: www.moroks.com

5-6—NEWARK (STANTON), DELAWARE: 48th annual show; Delaware Mineralogical Society; Delaware Technical and Community College, Churchmans Rd. (Rte. 58), I-95 Exit 4B; Sat. 10-6, Sun. 11-5; adults \$6, seniors \$5, juniors \$4, children under 12 free with adult; mineral, lapidary and fossil exhibits, museum displays, dealers, minerals, fossils, gems, jewelry, lapidary supplies, door prizes, large specimen raffle, lapidary demonstrations, children's booth, club lapidary work and specimens for sale; contact Wayne Urion, (302) 998-0686; e-mail: wurion@aol.com; Web site: www.delminersociety.net

12-13—KLAMATH FALLS, OREGON: Annual show; Rock and Arrowhead Club; Klamath County Fairgrounds, 3531 S. 6th St.; Sat. 9-5, Sun. 10-4; Petrified Wood; contact Jennifer Zimmerlee, (541) 545-6773; e-mail: jlazys@hotmail.com; or Marv Stump, (541) 882-8341

12-13—SPRECKELS, CALIFORNIA: Show, "Parade of Gems"; Salinas Valley Rock & Gem Club; Spreckels Veteran's Hall, 5th St. and Llano St.; Sat. 10-5, Sun. 10-5; free admission; demonstrators, cab making, bead enameling, youth beading and rock painting, fluorescent display, rock bags with prizes, "wheel of fortune", raffles, free drawings, auction, dealers, jewelry, beads, fossils, craft supplies, minerals, crystals; contact Karen Jones, P.O. Box 668, Soledad, CA 93960, (831) 678-0337; e-mail: kenkaren0337@att.net

18-20—HICKORY, NORTH CAROLINA: 41st show, "Unifour Gem, Mineral, Bead, Fossil and Jewelry Show"; Catawba Valley Gem & Mineral Club; Hickory Metro Convention Center, I-40 Exit 125; Fri. 9-6, Sat. 9-6, Sun. 10-5; adults \$4, children and school groups free; contact Baxter Leonard, 2510 Rolling Ridge Dr., Hickory, NC 28602, (828) 320-4028; e-mail: gailandbaxter@aol.com

18-20—JACKSON, MICHIGAN: 49th annual show; Michigan Gem & Mineral Society; Jackson County Fairgrounds, 200 W. Ganeson St.; Fri. 10-7, Sat. 10-7, Sun. 10-5; jewelry, minerals, fossils, dealers, demonstrations, silent auctions, geode cracking; contact John LaMont, (765) 647-4894, or Dan Hovater, (517) 518-1045

18-20—SPANISH FORK, UTAH: 52nd show, "Spring Parade of Gems"; Timpanogos Gem & Mineral Society; Spanish Fork Fair Grounds, 475 S. Main St.; Fri. 10-7, Sat. 10-7, Sun. 10-5; free admission; displays, dealers, jewelry, fossils, equipment, Mr. Bones, door prizes, touch table, rock sales, kids' grab bags, Wheel of Fortune, instructions on polishing rocks, metal detectors, lapidary equipment, demonstrations, faceting, knapping, wire wrapping, beading, fluorescent mineral display, silent auction; contact Keith Fackrell, 2295 East 700 South, Springville, UT 84663, (801) 489-7525; e-mail: krfackrell@msn.com; Web site: http://timprocks.weebly.com

19-20—BAKERSFIELD, CALIFORNIA: 10th annual show, "Rendezvous"; Lewis M. Helfrich; Kern County Shriners, 1142 S. P St.; Sat. 9-5, Sun. 9-5; free admission; free drawings, demonstrations, sphere making, cabochon making, silversmithing, wire wrapping, grab bags, Wheel of Fortune, raffle, silent auction, General Store, dealers, rocks, fossils, gems, jewelry, rough rock, diachronic glass, lapidary equipment, beads and beading supplies; contact Lewis M. Helfrich, (661) 323-2663 or (661) 378-4450; e-mail: lewsrocks@bak.rr.com

25-27—INDIANAPOLIS, INDIANA: 13th annual show, "Spring Indianapolis Gem, Mineral & Jewelry Show"; Treasures Of The Earth Gem & Jewelry Shows; Indiana State Fairgrounds, Ag/Horticulture Bldg., 1202 E. 38th St.; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$5 (3-day ticket), children under 16 free; jewelry makers, goldsmiths and silversmiths size, reconstruct, repair, design or make original jewelry from customer-selected gems, stones, opals and crystals, wire wrap, wire sculpture, stone beads, pearls, stone setting, dealers, amber, opal, fossils, minerals, door prizes, grand prize, 500 Earth Science Club and Indiana Bead Society displays, silversmithing demonstrations and classes, lampwork bead demonstrations, wire wrapping classes; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

26-27—ANGELS CAMP, CALIFORNIA: Show, "Jump for the Gold"; Calaveras Gem & Mineral Society; Calaveras County Fairground, 101 Frogtown Rd.; Sat. 10-5, Sun. 10-4; adults \$4, children 12 and under free with paying adult; exhibits, demonstrations, kids' activities, silent auction, sales, raffle, door prizes, dealers, fossils, jewelry, meteorites, books, lapidary supplies, slabs, gems, beads; contact Tak Iwata, 18310 Coyote Meadow Rd., Sonoma, CA 95370, (209) 928-5579; e-mail: Tak2me@msn.com; Web site: www.calaverasgemandmineral.org

26-27—HOLYOKE, MASSACHUSETTS: Show; Connecticut Valley Mineral Club; Holiday Inn at Ingleside, I-91 Exit 15; Sat. 10-5, Sun. 10-4; adults \$4, children 12 and under free with adult; minerals, gemstones, jewelry, crystals, beads, fossils, lapidary, demonstrations, exhibits; contact Lee Champigny, (413) 320-9741; e-mail: pulG4fun@verizon.net; Web site: www.cvmineralclub.org

26-27—ROSEVILLE, CALIFORNIA: 49th annual show; Roseville (Placer County) Fairgrounds, 800 All America City Blvd.; Sat. 10-5, Sun. 10-4; adults \$6, seniors (60+) \$5, kids 12 and under free; more than 35 vendors, crystals, gold, geode cracking, beads, gemstones, fossils, polished stones, handcrafted jewelry, opal, world-class mineral specimens, tourmaline, sunstones, amber, mineral identification, "Kids' Junction", demonstrations, silent auctions, more than 40 exhibits, raffle, lapidary shop open house; contact Gloria Marie, (916) 216-1114; e-mail: gloriarosevillerockrollers@gmail.com; Web site: www.rockrollers.com

26-27—SAYRE, PENNSYLVANIA: 42nd annual show; Che-Hanna Rock & Mineral Club; Athens Twp. Volunteer Fire Hall, 211 Herrick Ave.; Sat. 9-5, Sun. 10-5; adults \$3, students \$1, children under 8 free; club demonstrations and displays, dealers, fossils, minerals, gems, junior activities, miniature, geode cutting, Carnegie Museum and Paleontological Research Institute displays; contact Bob McGuire, P.O. Box 224, Lopez, PA 18628, (570) 928-9238; e-mail: uvbob@epix.net; Web site: www.chehannarocks.com

26-27—SWEET HOME, OREGON: 63rd annual show; Sweet Home Rock & Mineral Society; Sweet Home High School Activity Gym, 1641 Long St.; Sat. 10-6, Sun. 10-5; fossils, rocks, gems; contact Joe Cota, P.O. Box 2279, Lebanon, OR 97355, (541) 451-4027

APRIL 2011

7-9—WYOMING, MICHIGAN: Show, "Unburied Ancient Treasures"; Indian Mounds Rock & Mineral Club; Rogers Plaza Town Center, 972 28th St., 0.25 mile west of US 131; Thu. 9:30-9, Fri. 9:30-9, Sat. 9:30-8; free admission; Science Museum of Minnesota display, museum-quality exhibits, mineral and fossil identification, club sales, children's collectibles, demonstrations, dealers, micromounts, crystals, stone beads, carvings, meteorites, jewelry, specimens; contact Don Van Dyke, 4296 Oakview, Hudsonville, MI 49426, (616) 669-6932; e-mail: donvandyke@tm.net; Web site: http://indianmoundsrockclub.com/index.htm

8-10—SPOKANE, WASHINGTON: 52nd annual show; Rock Rollers Club; Spokane County Fair & Expo Center, North 604 Havana at Broadway; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors \$5, children 12 and under free; more than 40 dealers, 60 display cases, fossils, gemstones, mineral specimens, handcrafted jewelry, lapidary supplies and demonstrations, hourly door prizes, youth activities,

continued on page 71

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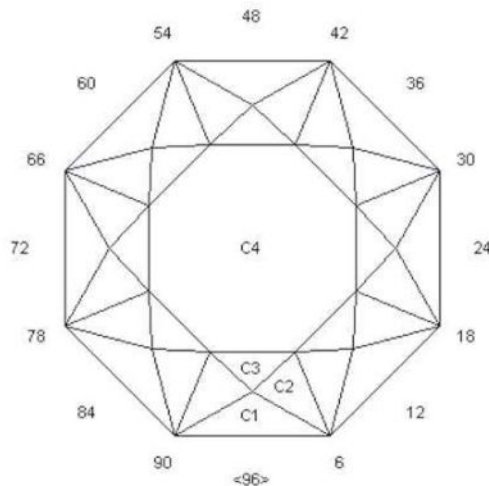
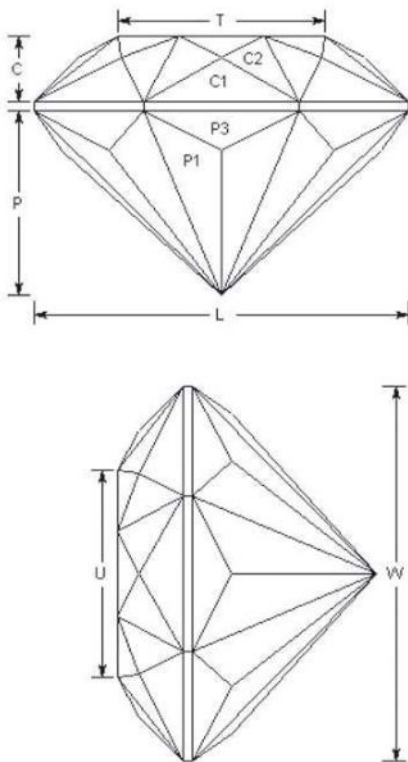
by *Guest Faceters*

Faceters are welcome to submit their original designs for publication. Mail materials to Many Facets Submissions, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003.

Designs with vertically split mains often give beginner faceters problems. I use my prepolish Batt™ Lap charged with 8,000 diamond dust and candle oil to get the facets into position after using a 600 grinding lap. Then I use a Darkside™ Lap with a cerium oxide slurry to polish the facets. I mix the slurry to the consistency of milk and polishing only takes a few seconds on each facet.

What is unique about this design is there are eight break facets and 16 mains, if you count the splits; it is usually the other way around. The design only has 65 facets, including the girdle facets, so it's not a hard stone to cut. I cut my stone into a 14 millimeter octagon that weighed 11 carats. It will be set in 14 millimeter sterling silver. The angle choices are based on the article "Faceting Limits," by Bruce L. Harding (Fall 1975 *Gems & Gemology*), and ray tracing with "Facet Designer" software by Anton Vasiliev, which I find has helped me improve the optical performance of my gems.

—Jim Perkins



AUTUMN SUN

CAD by Jim Perkins, jimperkins@zoominternet.net

© September 2010

Angles for R.I. = 1.550

57 + 8 girdles = 65 facets

8-fold, mirror-image symmetry

96 index

L/W = 1.000 T/W = 0.557 U/W = 0.557

P/W = 0.495 C/W = 0.177

Vol./W³ = 0.262

PAVILION

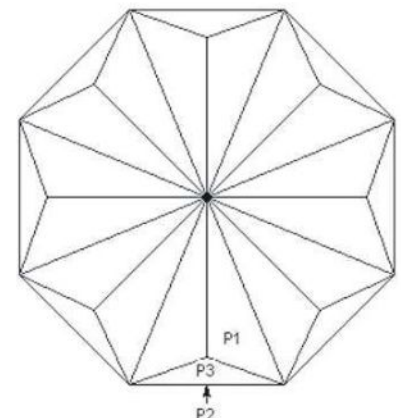
P1	43.00°	03-09-15-21-27-33-39-45-
P2	90.00°	96-12-24-36-48-60-72-84
P3	55.00°	96-12-24-36-48-60-72-84

Create a center point
51-57-63-69-75-81-87-93
Set size; polish girdle
MP @ P1 - PW

CROWN

C1	45.00°	96-12-24-36-48-60-72-84
C2	37.00°	03-09-15-21-27-33-39-45-
C3	30.00°	96-12-24-36-48-60-72-84
C4	0.00°	Table

Set girdle height
GMP
51-57-63-69-75-81-87-93
MP @ C1
MP @ C2



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<input type="checkbox"/> Catalogs	<input type="checkbox"/> Miscellaneous	<input type="checkbox"/> Services
<input type="checkbox"/> Collections	<input type="checkbox"/> Nuggets	<input type="checkbox"/> Wanted to Buy
<input type="checkbox"/> Fossils	<input type="checkbox"/> Opals	<input type="checkbox"/> Other
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February	December 15
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June	April 15

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Show Dates from page 64

grand prize; contact Gerry Pfeiffer, (509) 924-1027; e-mail: patspace@bookorchard.net

9-10—BELLINGHAM, WASHINGTON: 50th anniversary show, 'A Golden Family Affair'; Mt. Baker Rock & Gem Club; Bloedel Donovan Park, 2214 Electric Ave.; Sat. 10-6, Sun. 10-5; free admission; raffle, exhibits, rocks, fossils, gems, jewelry, dealers, door prizes, silent auction, lapidary, gold panning, black light, gem cutting, demonstrations, kids' activities; contact Wes Gannaway, (360) 384-4209; e-mail: debnws@comcast.net

9-10—DES PLAINES, ILLINOIS: 46th annual show; Des Plaines Valley Geological Society; Des Plaines Park District Leisure Center, 2222 Birch St.; Sat. 9:30-5, Sun. 10-4; adults \$3, seniors \$2, students \$1, children under 12 free; dealers, gems, jewelry, fossils, minerals, Kids' Room, demonstrations, exhibits, door prizes, raffles, silent auction; contact Frank Lavin, 9942 Montrose Ave., Schiller Park, IL 60176, (815) 298-9178; e-mail: nival42@hotmail.com; Web site: www.desplainesgeologyclub.org

9-10—MARION, ILLINOIS: Show; Southern Illinois Earth Science Club; Williamson County Pavilion, 1602 Sioux Dr.; Sat. 10-6, Sun. 10-5; adults \$2, ages 18 and under free; gems, minerals, fossils, lapidary, shells, silent auctions, door prizes, fluorescent demonstrations; contact Mike Chontofalsky, 1019 E. Broadway, Centralia, IL 62801, (618) 532-0455; e-mail: chontofalsky@att.net

15-17—RICKREALL, OREGON: 56th annual show; Willamette Agate Mineral Society; Polk County Fairgrounds, 520 S. Pacific Hwy. W.; Fri. 9-6, Sat. 10-6, Sun. 10-4:30; contact Kristi Edwards, (541) 738-6811; e-mail: edwardskk@gmail.com

16-17—WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

MAY 2011

6-8—McPHERSON, KANSAS: 19th annual sale and swap; McPherson Gem & Mineral Club; McPherson 4-H Bldg., 710 W. Woodside; Fri. 9-7, Sat. 9-6, Sun. 10:30-3; free admission; buy or swap, rocks, gems, minerals, fossils, jewelry, door prizes, displays, collections, free rock identification, fluorescent mineral exhibit, kid's spin-and-win; contact Jim Nutter, 1611 Jody Ln., McPherson, KS 67460, (620) 241-2433; e-mail: mcphersongemmineral@hotmail.com

7-8—WASHINGTON, PENNSYLVANIA: Show, "Greater Pittsburg Area Jewelry, Gem, Mineral, Bead & Gift Show; FM Minerals; Washington County Fairgrounds, 2151 N. Main St.; Sat. 10-6, Sun. 10-5; adults \$4, children 12 and under free with an adult; invited dealers, beads, minerals, fossils, metaphysical items, jewelry, gemstones, hand-made jewelry, wire wrapping; contact FM Minerals, P.O. Box 252, Farmington, WV 26571, (304) 825-6845; e-mail: frankoz@juno.com

14-15—WAUWATOSA, WISCONSIN: 54th annual show; Wisconsin Geological Society; Mueller Bldg., Hart Park, 72nd and W. State St.; Sat. 10-5, Sun. 10-4; adults \$3 (2 for \$5), children under 16 free with adult; 22 Midwest dealers, lapidary supplies, tools, books, rough material, slabs, finished specimens, cabochons, jewelry, carvings, fossils, children's activities, exhibits, displays, presentations; contact Paul Schmidt, 8213 Red Arrow Ct., Wauwatosa, WI 53213, (414) 771-8668; e-mail: pvs@wi.rr.com

27-29—SALEM, VIRGINIA: 20th annual show, "Roanoke Valley Spring Gem & Mineral Show"; Treasures Of The Earth Gem & Jewelry Shows; Salem Civic Center, 1001 Boulevard; Fri. 10-6, Sat. 10-6, Sun. 11-6; adults \$4 (3-day ticket), children under 16 free; jewelry makers, goldsmiths and silversmiths size, reconstruct, repair, design or make original jewelry from customer-selected gems, stones, opals and crystals, wire wrap, wire sculpture, stone beads, pearls, stone setting, dealers, amber, opal, fossils, minerals, door prizes, grand prize, children's gift; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

JUNE 2011

4-5—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; Fort Mason

Center, 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

JULY 2011

1-3—FISHERSVILLE, VIRGINIA: 24th annual show, "Fishersville/Waynesboro Area Gem, Mineral & Jewelry Show"; Treasures Of The Earth Gem & Jewelry Shows; Augusta Expoland, 277 Expo Rd., 164 Exit 91; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$3 (3-day ticket), children under 16 free; jewelry makers, goldsmiths, silversmiths, gem trees, wire wrap, wire sculpture, pearls, stone beads, stone setting, dealers, amber, opal, minerals, fossils, door prizes, classes; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

9-10—SYRACUSE, NEW YORK: 45th annual show, "Gems Along the Erie Canal: A Diamond Celebration"; Gem & Mineral Society of Syracuse; New York State Fairgrounds, Center of Progress Bldg., I-690; Sat. 10-6, Sun. 10-4; competitive exhibits, lectures, workshops, demonstrations, kids' activities, minerals, fossils, beads, metaphysical stones, AMFS and EFMLS Convention meetings July 6-8; contact Cathy Patterson, (315) 638-8817; e-mail: cathy@patterson@verizon.net; Web site: www.gmss.us

14-16—NYSSA, OREGON: Show, "Thunderegg Days"; Nyssa Chamber of Commerce; Nyssa Elementary School Grounds, 105 Main St.; Thu. 10-9, Fri. 10-9, Sat. 10-9; free admission; daily rock tours, search for thunder eggs, moss agate, petrified wood, or pink plume, rock and gem vendors; contact Susan Barton, 105 Main St., Nyssa, OR 97913, (541) 372-3091; e-mail: nyssachamber@nyssachamber.com; Web site: www.nyssachamber.com

AUGUST 2011

12-14—DALTON, GEORGIA: 20th annual show, "North Georgia Gem, Mineral & Jewelry Show"; Treasures Of The Earth Gem & Jewelry Shows; Northwest Georgia Trade & Convention Center, 2211 Dug Gap Battle Rd., I-75 Exit 333; Fri. 2-7, Sat. 10-6, Sun. 11-5; adults \$3 (3-day ticket), children under age 16 free; jewelry makers, goldsmiths and silversmiths, jewelry repair and design, wire wrap, wire sculpture, stone beads, pearls, stone setting, dealers, amber, opal, fossils, minerals, door prizes, grand prize; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: vawimmer@verizon.net; Web site: www.toteshows.com

13-14—WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, P.O. Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

OCTOBER 2011

1-2—OMAHA, NEBRASKA: 56th annual show; Nebraska Mineral & Gem Club; Westside Community Center, 108th and Grover St.; Sat. 9-6, Sun. 10-5; contact Tim Kautsch, (402) 397-9606; Web site: www.nerockgem.us

7-9—INDIANAPOLIS, INDIANA: 13th annual show, "Fall Indianapolis Gem, Mineral & Jewelry Show"; Treasures Of The Earth Gem & Jewelry Shows; Indiana State Fairgrounds, Ag/Horticulture Bldg., 1202 E. 38th St.; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$5 (3-day ticket), children under 16 free; jewelry makers, goldsmiths and silversmiths size, reconstruct, repair, design or make original jewelry from customer-selected gems, stones, opals and crystals, wire wrap, wire sculpture, stone beads, pearls, stone setting, dealers, amber, opal, fossils, minerals, door prizes, grand prize, 500 Earth Science Club display, silversmithing demonstrations and classes, lampwork bead demonstrations, wire wrapping classes; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

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O N THE ROCKS

Mineral Travels

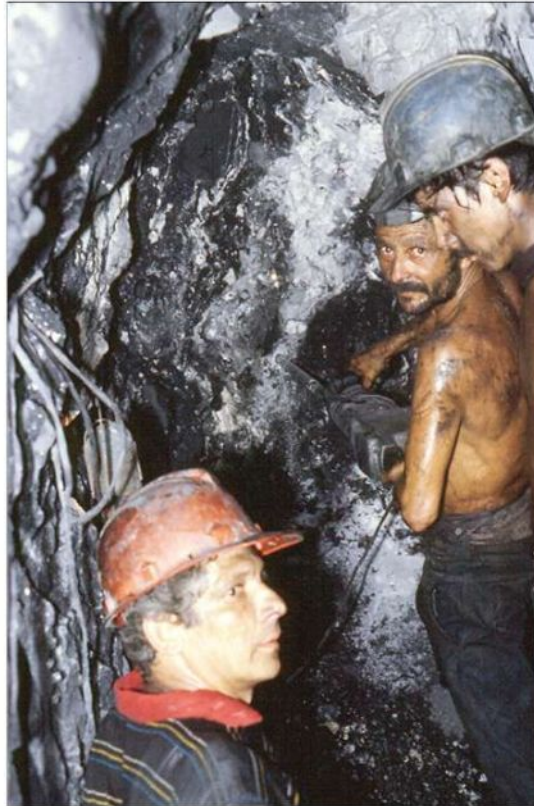
Over 70 years of mineral collecting and almost 50 years of world travel, I've certainly had my share of exceptional and odd mineral-related experiences. Now that I look back on them, I can really appreciate the event that got me started in the hobby in the first place. When I was in the fifth grade, my teacher arranged a class field trip to the Yale Peabody Museum in New Haven, Connecticut. The goal of the trip was to visit the Dinosaur Hall, one of the best in the country at the time.

What really caught my fancy was the mineral room, a vast hall rich with spectacular specimens. In one display case, there were a bunch of shiny, sword-like stibnites from Japan. A couple of the crystals were as long as my arm! I remember a small, bright epidote specimen from Austria with crystals sticking out of a ball of hairy green needles. Years later, I found out those crystals had been stuck into the hairy ball and did not occur there naturally.

What really stuck in my mind was the fluorescent mineral display. I must have stood behind the darkening curtain for half an hour, switching the ultraviolet lights on and off. What a kick! I was in awe. After that experience, I wanted to collect minerals.

Years later, I was photographing minerals at the Smithsonian Institution. That was back when it was allowed! Another photographer was working in the Blue Room, where the more valuable things were kept, so Curator Paul Desautels allowed me to set up my equipment in his office. One day, Paul came rushing in asking whether I had photographed a Pakistan aquamarine he had shown me earlier. He was in a real panic because he was considering making a trade for it and the blue crystal was missing. Paul was distraught, thinking the gem had been lost or stolen while he was at lunch. He dashed all over the department, but had no luck finding the crystal.

Eventually, he came back into his office, a bit embarrassed, explaining his secretary had thought the trade was complete and had started cataloging the crystal into the



You realize just how hot and dirty it is in the emerald mines of Colombia when you see the miners at work.

museum's collection. At midday, to be safe, she had locked the crystal in her desk and left for lunch! Mystery solved.

One of the more intriguing structures I've been in during my travels is Menabilly, the estate home of the Rashleigh family in Cornwall, England, which I've visited a couple of times. This big graystone mansion has a great history that involves a family that was interested in minerals.

In the late 1700s, Philip Rashleigh assembled a marvelous collection of minerals. Many of them are now on display at the Royal Cornwall Museum in Truro, England. On my first visit to Menabilly, I knew about many of the things I would see there. This is because Daphne du Maurier, the famous British novelist, had been inside the home in the 1920s and, described what she had seen in a brief autobiographical article in the *London Times*.

Du Maurier became a novelist and wrote a marvelous book titled, *Rebecca*, one of the great novels of her time. The story is set in a stately greystone manor she called Manderlay! You guessed it. Manderlay was really Rashleigh's home, Menabilly. Du Maurier's

idea for the novel had been triggered by her visit to Menabilly, when she had fantasized about the tales that stately home could tell! Imagine the home of a rockhound being the setting for one of the great novels of literature.

The town of Salisbury, England, is a delightful place to visit, with its magnificent cathedral and quaint shops. It is also close to Stonehenge. I've been to Stonehenge several times, the first time in the 1970s. At that time, you could wander around among the huge Sarsen stones. My visit was in mid-June and, standing in the middle of the huge stone circle, I could watch the sun rise over the Heel Stone, announcing the summer solstice. Due to the disfigurement and damage done to the monument by vandals in the past, visitors are no longer allowed to approach the stone circle!

Of all the places I've visited on six continents, two places stand out as the most exciting: underground in the emerald mines of Colombia and inside St. Isaac's Cathedral in St. Petersburg, Russia. The visit to St. Isaac's was, to say the least, stunning. I'd been through the Kremlin and several museums in Moscow. I'd been through the Hermitage and even behind the scenes in the back rooms. I had visited the Peter and Paul Fortress across the Neva River from the Hermitage, walking on ice to cross the river in 20-below weather to get there. But nothing prepared me for the cathedral.

I was there as part of the team that was shooting the video *Russian Gem Treasures*, and was checking out the cathedral as a possible setting. Unfortunately, filming was not allowed there. It would have been quite a setting because the iconostasis on either side of the czar gate was a panoply of gem materials. The gate was flanked by two 30-foot-high columns of bright-blue lapis. I had never seen anything like that! Anywhere else, these would have been a marvel to behold, but in this cathedral they were eclipsed by 10 50-foot-high columns of bright-green malachite, five on either side of the czar gate! To top it off, the lovely 40-foot-high portraits of revered Russian saints on the iconostasis,

which separates the nave from the sanctuary, were not painted on, but done in colorful gemstone inlay!

I had never seen anything that even remotely competes with the splendor of that wall! It was breathtaking and I really wanted to take pictures of this magnificent mineral spectacle. I was told I could take a photo, but had to pay \$100 U.S. for the privilege. My companion and the producer of the video, Michael Leybov, told me to set up my camera and flash so that I was ready to shoot. I did as I was told. Then Michael pushed the plunger on the camera. As a Russian citizen, he only had to pay \$10 to take the photo. Lucky me! If you ever go to St. Petersburg, don't miss St. Isaac's Cathedral!

The other really exciting places I visited years ago were the several emerald mines in Cosquez and Muzo, Colombia. These remarkable deposits in black metamorphic shale have been producing gem emeralds for perhaps 1,000 years and they are nowhere near exhausted.

I was invited to go to the mines by a couple of great fellows in the emerald business. We flew into Bogota, then took a small plane to an airfield some miles from Muzo, where we stayed for a week. That week was really exciting, as I was able to go underground in six different emerald mines, always with an armed companion!

The most exciting underground trip was to the El Retorno mine near Muzo. My companions chose not to go underground there, but I simply had to do it. The visit involved climbing hundreds of feet down a slippery galvanized iron pipe ladder and stepping off into black water over a foot deep. The tunnel I was in was dark, humid, and only high enough to walk in if you stooped over. To reach the "face", where miners were following an emerald-rich calcite vein, we had to walk in that stooped position for over 1,500 meters (4,921 feet). Try it sometime! Not only did I get familiar with working conditions underground in the emerald mines, but I got very familiar with leg muscles I didn't even know I had!

The walk was well worth the discomfort, though, as I eventually was able to view a handful of emeralds sticking out of the stark white calcite in all their green glory! My guide, the mine superintendent, grabbed a rock pick and used it to hack the crystals out of the calcite.

When it was time to leave, I was not looking forward to that long climb up a slippery ladder with aching legs. The miners asked if I would like to be hoisted out. Gladly, I



The magnificent iconostasis in St. Isaac's Cathedral, with the saints' portraits rendered in gemstones, is flanked by huge columns of malachite and lapis.

slipped into a single rope loop at the end of a wire cable and waited for a ride up a dark, narrow shaft. I knew enough to use my feet to fend off the wall. I started up OK, but suddenly, the hoist gears jammed. There I was, twisting around in the air, hanging from a rope loop, going neither up nor down. After a time that seemed longer than it really was, the miners managed to get the hoist gears unlocked and lowered me back down. I was glad to climb the ladder after that!



The Rashleigh manor house, Menabily, served as the setting for Daphne du Maurier's classic novel *Rebecca*.

Once out of the mine, the superintendent pulled out of his pocket the clutch of emerald crystals he had dug. When I asked their value, he very casually said, "\$50,000!"

Years ago, I collected fluorescent minerals. In fact, I believe I was the first person to write a regular column on the subject. It was published in *Rocks & Minerals* magazine, edited by Peter Zodac, beginning in about 1960. Pete was a great guy who encouraged rockhounds every way he could.

Because of my interest in fluorescent minerals, I really liked yellow-fluorescing wernerite, a variety of scapolite. The finest fluorescent wernerite came from a couple

of places in Canada, but exactly where those sources were remained a well-kept secret at the time.

I was friendly with Ernst Windisch, a former German soldier who had immigrated to Canada after the war. He was a mineral dealer who traveled far and wide selling specimens. He said he'd go collecting with me because he knew where we could find yellow fluorescent wernerite. As a teacher, I had summers off and spent them on my dad's farm in Connecticut, so one summer I arranged to meet Ernst in Montreal. We headed north and, because fluorescent mineral collecting is best done at night, we timed our drive to end near Trout Lake, about 100 miles north of Montreal, at sunset.

Oddly, the first surprise came when we stopped by a fishing camp to have a beer and wait for dark. The place was closed and we were turned away, but I was wearing the team jacket I had gotten when our local fire department's softball team had won the state slow-pitch championship. On the back of the jacket was the name of our town, Stratford, Connecticut. Guess what? The woman running the camp was from my hometown and knew my dad, who was on the town planning commission. So we got our beer and a sandwich!

When it was dark, we started our hunt, which turned out to be very successful! But no one had told me about black flies, which the Indians called "no-see-ums"! These nasty little things get into every opening of your clothing. They don't sting—they bite off a chunk of flesh, leaving a wound that is slow to heal and itches for weeks or sometimes months!

When we had collected enough wernerite to load the car trunk to over capacity, we headed back to Montreal. On the way, we were stopped by the police at about 4 a.m. The reason? They said they thought we had a safe in the trunk of the car. When I showed the gendarme our fluorescent rock, he laughed and sent us on our way. I enjoyed the fluorescent wernerite a great deal, but I sure itched all summer!💎

Bob Jones holds the Carnegie Mineralogical Award, is a member of the Rockhound Hall of Fame, and has been writing for *Rock & Gem* since its inception. He lectures about minerals, and has written several books and video scripts.



Field Notes submissions are subject to editing. Address questions to "Editor" for a private response or to "Readers" and provide the contact information you'd like published. Send to Field Notes, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003.

Utah Dinosaurs

Looking back to the April 2010 *Rock & Gem*, "Walking with Dinosaurs", by Steve Voynick (p. 34) was very well written, but it does not tell all of the story of where the dinosaurs are. Through some disagreement between Utah and Colorado about 35 years ago ... Colorado changed the name of the town of Artesia to Dinosaur. The people of the town were not happy about the change. Also, Colorado built a museum near the town of Dinosaur to draw tourists away from the Dinosaur Quarry at Jensen, Utah, which is about 10 miles east of Vernal, Utah. There is a huge glass building over Dinosaur Quarry where people can watch them dig out the bones and fossils. By the time people get to Dinosaur, Colorado, they have gone 50 miles past the quarry and the Vernal museum, which has full-size dinosaurs. It would be nice if you would check this out and let people know what they are missing in Utah before they go to Colorado. Two years ago, I made a thousand-mile trip to Vernal and donated my rock collection that I collected from seven years in the mines in Utah to the Vernal Museum.

—Donald Marsh
Bonners Ferry, ID

Jackson's Crossroads

In your September issue, the article "Modern Mineral Classics" (p. 60) has wrong information on Jackson's Crossroads in Georgia. The correct owners are Terry Ledford and Paul Geffner; there is no Maynard Ledford. The names Dixie Euhedrals and Rodney Moore are no longer associated with Jackson's Crossroads. I dig there about 20 days a year and it indeed does have some of the best amethyst I've ever seen. I have led several field trips a year to JXR and have seen people, even amateur rockhounds, come out with high quality specimens. People can get the mine's contact information to set up a date to dig by visiting www.dirtyrockhounds.com or www.wncrocks.com (Mine Site Updates).

—Pat Cummings
via e-mail

It is true that Rodney Moore is not involved with the Jackson's Crossroads amethyst mine owned by Terry Ledford and Paul Geffner. However, Rodney is still active and maintains the Web site www.dixieeuhedrals.com.

—Editor

Reflections

When I was younger—a lot younger—my family would travel this great country looking for earth's treasures. Our family consisted of seven people, which didn't leave much room in a midsize car! During these travels, we had many experiences, some good, some not so good.

My father is now in an elder care facility and my mother passed away about a year ago. There comes a time when things must be done to move on with life, whether we want to or not. My job was to go through my parents' rock collection. During my assigned job, I found a poem my mother wrote (right) and thought you may enjoy or even relate to it in some way.

—Andy Champine
Heart of Wisconsin
Gem & Mineral Society
Schofield, WI

A Big Help

I am a teacher in Oklahoma City, and until this year I have been teaching first grade. This year, I got to move back up to fourth grade. My family and I have subscribed to your magazine for several years because we enjoy rockhounding. This year, though, your magazine has come to school with me.

One of the first stories we read was about a prehistoric park. The picture in our reading book matches the picture in your August 2010 issue of Chalcedony Park (p. 12). The class though this was really neat. Then, when they asked how the trees became petrified, I was able to read to them from the article how that happened.

My magazine has since become a fought-over piece of reading material. I am constantly reminding them to be careful. Along with the magazine, I have put out my few pieces of petrified wood for them to look at and touch. I'm sure that I will be bringing more of my magazines to school with me. Thank you for providing such a wonderful resource, that everyone wants to read or at least look at, for my class and family.

—Deborah Ladd
Eugene Field Elementary
Oklahoma City, OK

ROCK HOUND

At Lake Superior, sitting on the beach
When for an agate my old man reached.
"Gee! This is pretty," I heard him exclaim
From that day, life has never been the
same.

He picks a rock here, a crystal there
Everything must be handled with loving
care.
My dining room became a rockhound den
And the dust's flying since then.

Vacation came—and field trips he did
know
We drive over cow paths, jungles, places
no human goes.
And when we're tired and want to rest
A walk along the railroad track was the best.

In South Dakota, he found a treat
Rose quartz and mica scattered on the
street.
We were given boxes and told to go
Pick up specimens while he drove slow.

Teepee Canyon, a rattler's delight
Was our last stop one night.
Of snakes he has a great fright
So from his perch he shouts, "Look to the
right."

At Obsidian Cliff, it said "Don't Pick"
But right away he thought up a trick.
Two watch up front—two from the back
And he went to work with his little old sack

"Petrified Tree" he spied on a map.
And we just had to see that.
Our presence that must have sensed
'Cause around the tree we found a fence.

Next, to the Rockies we did go.
In August, it was cold and there was snow.
Rock hunting took on a slower pace
We were wearing everything but the
suitcase.

To Denver and on to Great Falls.
Back to Casper, our rock hunting calls.
Every mile we have a ball
The specimens so big; and the car too
small.

—Leona Champine



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