PALOMAR GEM & MINERAL CLUB

VOLUME 61 - ISSUE #10
OCTOBER 2020

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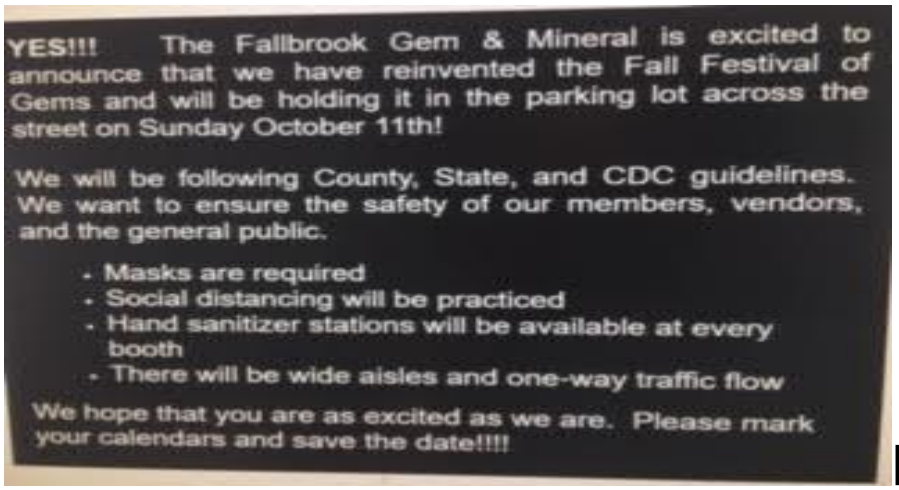
Tourmaline & Opal

VOTE!!!

VOTE!



Fallbrook Gem & Mineral Society one day gem show OCT. 11th FREE!!!

WE NEED VOLUNTEERS

We need YOUR help to make the Fall Festival a success!

This is the first fundraising opportunity of 2020 for FGMS since both the Rough 'N Cut and San Diego Fair were cancelled, and the Gift Shop and Museum have been closed. Revenue from the Fall Festival is critical for our financial stability. ***All*** Fall Festival activities will take place outside in the parking lot across from FGMS. We will have a break area for all volunteers in the auditorium with refreshments.

We need *your* help for the following:

Set-Up (7 am - 9 am): Mick Palculich, Rick Rumsey, and 6 others
Guest Assistance & Traffic Control: Mary Fong/Walker and 4 for the morning shift and 4 for the afternoon shift
"Gift Shop" Sales in FGMS Booth: 3 for the morning shift, and 3 for the afternoon shift
Mineral Sales in the FGMS Booth: Mike Evans plus 2 for the morning shift, and 2 for the afternoon shift
Raffle Sales in the FGMS Booth: 2 for the morning shift, and 2 for the afternoon shift
Rough 'N Cut/Bargain/Equipment Sales in separate booth: Vanessa Jones, Lea Barton, plus 2 for the morning shift and 2 for the afternoon shift
Wheel of Fortune in separate booth: 2 for the morning shift, and 2 for the afternoon shift
Office & Breakroom in FGMS building: 1 for the morning shift, and 1 for the afternoon shift
Clean-Up and Teardown: 8+ people
and finally
After Festival Clean-Up: 4-6 People on two/three different days (we have to put everything back)

If you would like to help, please send us an email at info@fgms.org. Or you can reach out to Michelle Shearer at (760) 805-2184 or Mary Fong/Walker at (760) 612-3424. **Let us know what you would like to help with!**

NOTE: DAYLIGHT SAVINGS ENDS 11/1/2020

INCIDENTS AT TWO COAL MINES

By Gene Ciancanelli

History books give the impression the first 1970s Energy Crisis came as a great surprise. Perhaps it did to the government, but not to people in the energy business. Anticipating the pending energy shortage, I decide, without consulting my employer Geothermal Resources International, that it might be a good idea to consider other energy resources, which can be developed more quickly than a geothermal reservoir. Typically, a decade or more is required to identify, lease, permit, drill, and prove a geothermal reservoir with the follow-on work to obtain an energy sales contract and then permit and build a power plant. That will be too long to make geothermal energy a practical alternative energy resource in a shortage situation. A coal deposit is quicker to develop and coal can be easily marketed.

An interesting opportunity is found in Utah. The Columbine Mine, a small operating coalmine, recently closed after the mine's owner/operator and his wife were killed in an accident. Small children survive their deceased parents and the couple's estate is in a trust administered by a bank. The bank wants to quickly dispense with the trust and obligations and the mine is being sold at a fraction of its true worth for $100,000. The mine equipment alone is worth more than $100,000 and the mine possesses two thick 6 and 8 foot coal seams under 680 acres and controls extensive adjoining unexplored coal leases. The equipment and facilities are relatively modern because the mine entered production in 1960. The coal quality is excellent high Btu, low-ash, and low-sulfur coal. There is an operating rail line and paved road to the Columbine Mine's mouth. There is also a large water reservoir nearby that might be available as cooling water for a mine-mouth power plant. The mine is located in the Wasatch Plateau coalfield at the top of the Wasatch Mountain Range. The mine's location at the range's summit has two advantages. A power plant's emissions will be dissipated by winds blowing across the range's top and there are no nearby cities downwind from this location. Another advantage is that fully loaded coal trains will be traveling down grade in either direction from the mine.

Geothermal Resources International's management decides to obtain an outside opinion after I brought the property to their attention. Dr. Vard Johnson, a preeminent Utah coal expert, with whom I worked in 1963, is retained. Vard's report is positive and it appears Geothermal Resources might make the deal. The Columbine Mine will cost less to purchase than the cost to drill two dry gas wells and this is as close to a sure thing as can be found in the energy business. Geothermal Resources decides to get a second opinion from DeGolyer and McNaughton. They are petroleum reservoir experts, not coal experts, and they raise the question that the mine may be too faulted to be economic. Further work indicates the faulting problem doesn't appear to be as extensive as DeGolyer and McNaughton feared.

I suggest Geothermal Resources form a joint venture with an experienced mining company and I contact Cleveland Cliffs Mining Company. Cleveland Cliffs is a large established mining company, but to Geothermal Resources International's clueless officers, Cleveland Cliffs is an unknown company. A meeting is arranged and two Cleveland Cliffs representatives, fly to Los Angeles. They arrive in the offices of Geothermal Resources and the company's executives say they're too busy to meet with the Cleveland Cliffs representatives. This meeting had been pre-arranged and I'm personally embarrassed by their refusal to leave their offices to greet, let alone meet with the Cleveland Cliffs representatives, who angrily return to Cleveland. One thing that can't be fixed is "STUPID" and Geothermal Resources' executives were if nothing else STUPID. Geothermal Resources is unable to make a

decision and it continues endless stalling negotiations with the bank. The bank becomes frustrated with Geothermal Resources and refuses further negotiations. The mine is quickly sold to another company and shortly afterward the first Energy Crisis occurs. The mine's new owners sell a minority interest in the coal leases for twenty million dollars, which is a nice short-term return on $100,000. This transpires after my resignation from Geothermal Resources International and I can't pass up the opportunity to tell them "I told you so", especially after their treatment toward my family and me, which included threats of physical violence against my wife and very young children when I refused to return as their employee.

The next phase in this story is a second-hand account told to me by Walter Randall, who replaced me as the company's chief geologist after my departure in 1973. Walter was 20 years older than I and wise in the ways of the corporate world. Among Walter's first tasks is to review my work. (Walter) *"As I reviewed the files, I couldn't believe all the work you accomplished in five years. The files contain all your correspondence trying to get your salary paid and expenses reimbursed and you never received a raise or a paid vacation. I decided these are not people who recognize or appreciate hard work, dedication, and professional integrity. The best course is to agree with everything they say and do as little as possible, while always looking busy."*

Geothermal Resources International begins a coal program after realizing they missed a golden opportunity at the Columbine Mine. The Energy Crisis is in full swing and coal mines have suddenly become quite valuable. Geothermal Resources finds a "Mom and Pop" coal mine for sale in West Virginia. The mine contains a thirty-inch coal seam, mined for generations by dirt poor local owners and their relatives. A thirty-inch coal seam is the thinnest bed of coal that can be mined, but mining requires the miners to work on their hands and knees and travel into the mountain lying on their backs on tiny rail cars nicknamed "lizards". Those same rail lines carry the mined coal from the face to the mine mouth. These men work on their hands and knees mining this narrow coal seam for a subsistence living and a premature black-lung death. The mine's underground workings go back about half a mile into the mountain. Walter says, *"You know these narrow coal seams are not profitable to mine. The locals work like dogs on their hands and knees to make enough money to keep their families in poverty. If equipment breaks, they work all night to fix it, because they earn no money except for the coal they mine and sell. All the equipment is second hand used junk they fix up, patch up, and will to run. As for mine safety, there is none. Now Tucker (a Geothermal Resources VP) thinks the company should open and modernize this mine. This is going to be a big mistake, but I go along with everything and pleased with my positive attitude, they give me raises."*

Geothermal Resources acquires the "Mom and Pop" mine and invests millions to modernize it. The mine no longer just supports a few families in poverty. Now the mine's payroll supports the mine with the miners earning union wages, a big fancy New York City office for Tucker and his staff, and the interest on the multi-million-dollar loan to modernize the mine. Geothermal Resources has modernized the mine for more efficient production and to meet mine-safety requirements. The miners are now on a payroll with benefits and they get paid for all work including overtime instead of just the mined coal's value. Tucker, dressed in his usual London tailored suits and hand-crafted Italian shoes, occasionally rides his chauffeured limousine down from New York City. The miners know they are supporting this rich well-dressed playboy snob with clean skin and soft hands. Being human, they have resentment and less incentive to work. They are still working on their hands and knees half a mile inside the mountain while breathing bad air filled with coal dust. No Geothermal Resources person and certainly not "ski resort and yachtsman" Tucker is going to crawl into the mine to check up on how hard or efficiently the miners work. There is a coal mining song by George Tucker, coal miner and folk singer that sums up this thirty-inch coal life.

Grab a pick and shovel and your safety light

Don't forget your fuses and your dynamite

Put on your knee-pads and safety-toes

We're going to the coal mine where the coal is low

Riding' on a lizard in thirty-inch coal

See the cable sparkin', watch the little wheels roll

Oh! Lord have mercy on a miner's soul

Down on your poor knees in thirty-inch coal

Timber up that heading, set the wedges tight

Or your wife and children won't see you tonight

Spread out a little rock dust, spread a little bit more

To keep that coal dust on the mining floor

Riding on a lizard in thirty-inch coal

See the cable sparkin', watch the little wheels roll

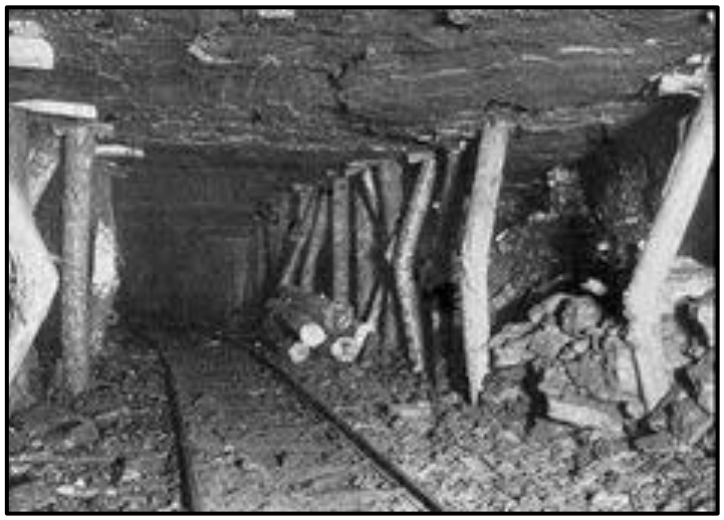
Oh! Lord have mercy on a miner's soul

Down on your poor knees in the thirty-inch coal

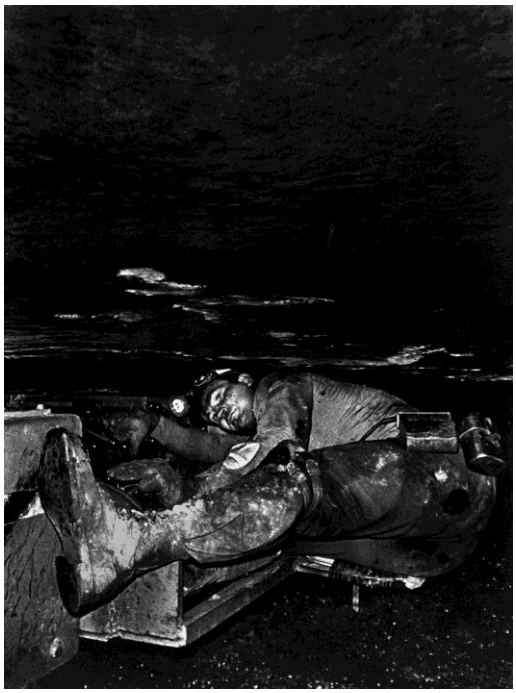
Geothermal Resources tries for several years to make the thirty-inch coal mine profitable, but in the end, they are defeated. Years later, Walter, who had grown to really hate Geothermal Resources' management, told me he took great joy in recommending and then watching them fail in this and many other futile enterprises over the approximately 15 years he worked for the company. That pleased me no end!

Drilling a blast hole in a coal seam about 4 foot thick.

Mining 30-inch coal working on hands and knees. Often the miners will follow such seams a half mile or more into the mountain.



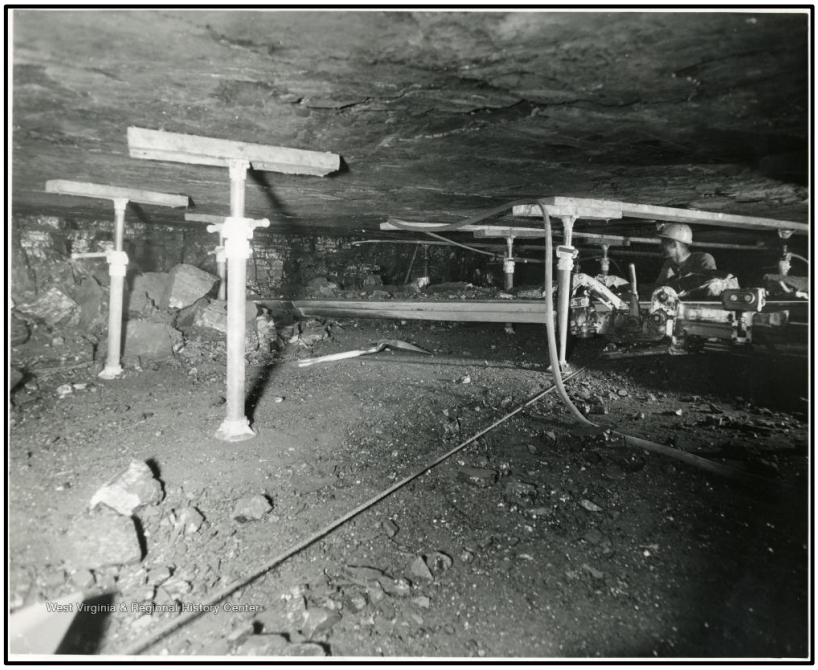
This is an unsafe haulage way. The timber sets can be seen to be breaking and this section will soon collapse.



This miner is loading coal by hand onto a car in a 30-inch coal seam. Think about these working conditions the next time you hear someone complain about working in an air-conditioned office. The plaster on the office ceiling is not likely to fall and crush the life out of you and you won't die young from black lung. There are no coffee breaks, fresh air, water fountains, or rest rooms in this mine. You eat lunch lying on your back in the coal dust. I remember working like a dog and I think about people working like this whenever I hear someone complain how hard they work and are not being paid enough. Welfare and fat government salaries and pensions come out of the pockets of people working like this. Today, even women are working in the mines, but thankfully we no longer employ children as young as 10 years old.

"Oh Boy! Today is casual Friday."

"Homer, we ought to work without neckties every day, not just on casual Friday."



This is approximately a 40-inch coal seam. Notice the conveyor system to move coal from the mine face and load it onto the cars. The jacks, holding up the back (ceiling) will be pulled once this gallery is mined and this section of the mine will be allowed to collapse.

These women miners are cutting mine timbers. It looks like this mine is too cheap to buy a chain saw. Every company I worked for had the same philosophy, which was the tools and employee working conditions and benefits of the 19th Century still are the only way to operate a mine. When I started my career, women were not allowed to work in mines, because they were considered “Bad Luck”. The last time I visited an open pit mine, most of the heavy equipment operators and blasting operations were being done by women, because the mine found women workers had better safety practices than men and generally were more likely to be sober.

Until the latter part of the 20th Century, this was the lifestyle of the families that relied on these narrow coal seams for their income. Imagine how these people felt when Tucker drove into town in his chauffeured limousine and dressed in his tailored suit and handmade shoes. In the 1960s, when I worked for Phelps Dodge mining company, the company housing for workers resembled this picture. When my boss asked me why I had not put my name on

the list to get a company house, he was shocked at my reply, *"I did not go to college to live in 19th Century poverty as a company slave."* He also did not like the fact that I was the only company geologist not in debt to the company store. He said I was not taking advantage of all the company's generous benefits.

WULFENITE

By Gene Ciancanelli

Wulfenite (PbMoO4) is a lead molybdate mineral commonly associated with lead bearing ore deposits. It is the official state mineral of Arizona with approximately 275 known localities within the state. Wulfenite is commonly found crystallize as thin flat tabular crystals varying in color from bright orange red to yellow orange to yellow. Although it is a minor ore of lead and molybdenum, it is most commonly sought after as a mineral specimen because of the spectacular crystals. The mineral is relatively soft with a Mohs hardness of 3 resulting in the mineral specimens being very delicate and easily damaged.

The mineral wulfenite was first described in the mid-19th Century from a deposit in Austria. It was named after Franz Xavier von Wulfen an Austrian mineralogist. The mineral is widely distributed around the world and some famous localities are in the western United States.

Wulfenite crystals from the Red Cloud Mine, La Paz County, Arizona.

The Red Cloud Mine in La Paz County in western Arizona is famous for producing spectacular brilliant red orange crystals. Unfortunately, the mine has been closed and reclaimed due to the environmentalist's zeal to remove all vestiges of mining activity and prevent people from enjoying the hobby of mineral collecting. The Red Cloud Mine was in operation as a silver mine from the 1870's through the 1890's and later there was sporadic mining for wulfenite mineral specimens. The ore deposit occurred as a galena bearing vein 23 to 36 feet thick and 300 feet wide and deep along a fault plane in andesite host rock. The ore grade was 5 to 6 percent lead and 10 ounces of silver per ton. The wulfenite crystals were found in open vugs within the ore zone.

The Glove Mine is located on the southwest side of the Santa Rita Mountains south of Tucson. The mine was discovered in 1907 in a mineral rich area known as the Devil's Cash Box. The deposit formed as a result of a quartz monzonite porphyry intrusion into limestone. The name Glove Mine refers to the occurrence of the orebody as massive sulfides within a glove shaped series of tubes or chimney like fingers. The main ore minerals were galena, sphalerite, covellite, wulfenite, smithsonite, and cerussite, which yielded the metals lead, zinc, silver, copper, molybdenum, and gold. The mine was in production from 1911 through 1917 and then it was inactive until the 1950s, which was its most productive period. Some additional ore was produced in the early 1970s. Some of the ore produced in the 1950s averaged 14 percent silver and 40 percent lead. The Glove Mine's total ore production of 29,260 tons averaged 22% lead, 9% zinc, 7 oz of silver per ton, 0.3% copper, with minor gold.

The Glove Mine has produced some very large wulfenite crystals. I have seen specimens a foot or more across comprised of masses of yellow to black wulfenite with individual crystals several inches in size. A geologist friend, who worked at the mine in the 1950s, said very large cavities were commonly found lined with large wulfenite crystals that were simply mined and crushed as ore. It was his opinion that these cavities should have been preserved as a national treasure. Wulfenite crystals from the mine are usually yellowish black in color due to manganese inclusions in the crystals, but some very attractive yellow crystals are also found. Glove Mine wulfenite crystals are usually thinner and more delicate than those produced in the Red Cloud Mine.

Wulfenite crystals from Glove Mine, Arizona

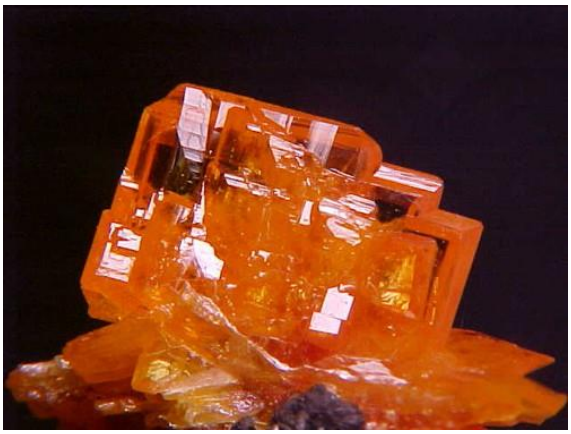
Wulfenite crystals from Glove Mine, Arizona

The 79 Mine is a poly-metallic ore deposit of lead, zinc, copper, silver, gold, molybdenum, antimony, and vanadium. The mine, located in Gila County, Arizona, was discovered in 1879 and has had a long list of owners and operating companies since then. The mine has approximately two miles of underground workings to a total depth of 450 feet.

The ore was deposited in limestone, calcareous shale, and rhyolite. Ore mineralization occurs in fault fractures and broken zones in calcareous shale. Galena and sphalerite ore with pyrite and quartz occur as replacement bodies in shattered, alternating thin-bedded shale and impure limestone and as vein replacements in a fractured and brecciated rhyolite porphyry dike. Approximately 90 different minerals are known to occur in the 79 Mine and vicinity.

Wulfenite crystals from 79 Mine, Gila county, Arizona

Wulfenite crystals from 79 Mine, Gila county, Arizona



Wulfenite crystals from 79 Mine, Gila county, Arizona


A full moon rarely occurs on October 31st.
But naturally, one is happening on Halloween night, 2020.
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NOW YOU KNOW

OCTOBER BIRTHSTONE

Those born in October enjoy two spectacular birthstones to commemorate their birthdays – opal and tourmaline. Both October birthstones have endless color combinations and beautiful coloring characteristics. Learn more about these two October birthstones and discover the perfect gift for those born in the tenth month.

JUMP TO:

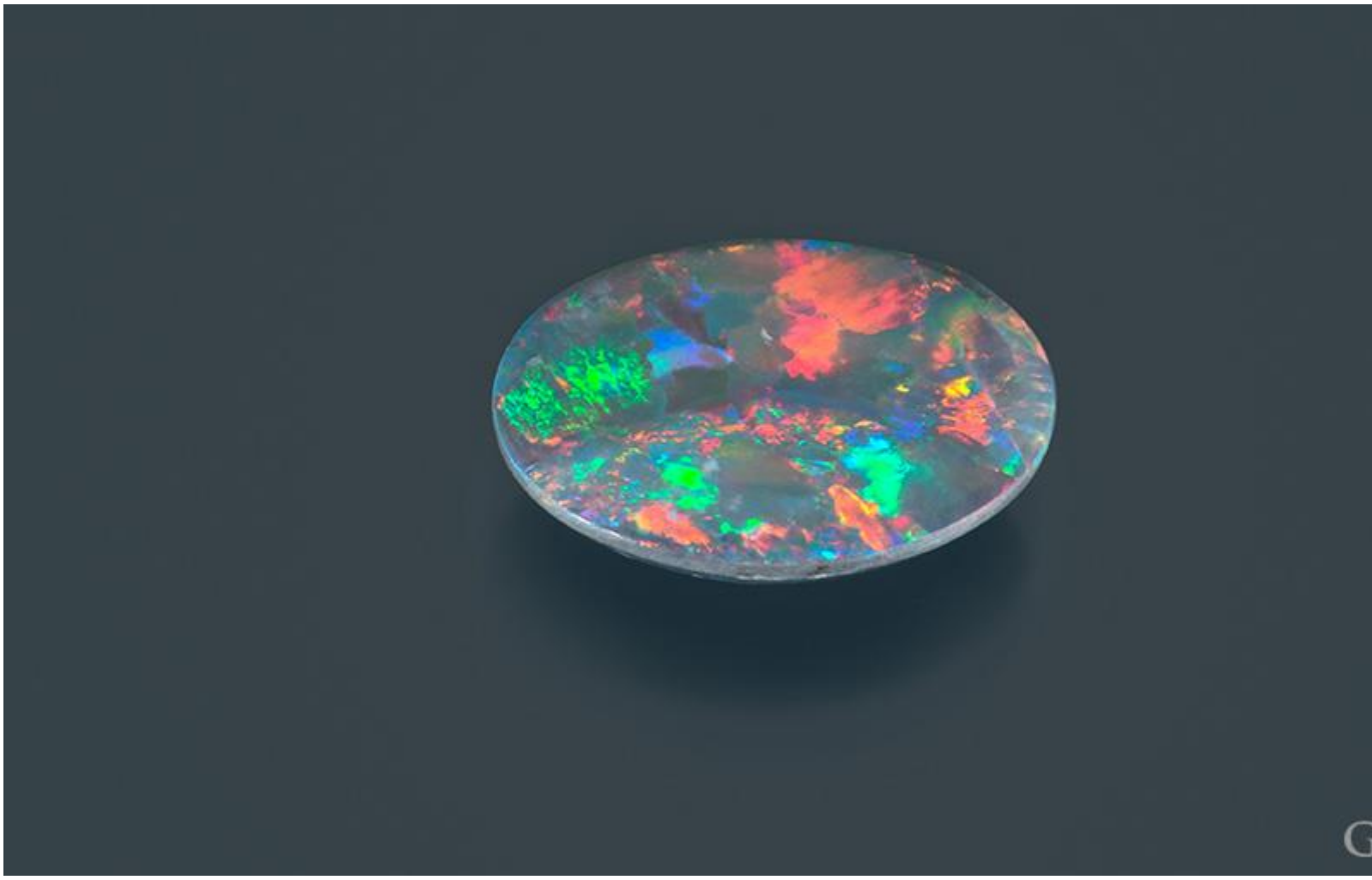
OPAL BIRTHSTONE

OPAL BIRTHSTONE MEANING & HISTORY

The name of this, the traditional October birthstone, is believed to have originated in India (the source of the first opals brought to the Western world), where in Sanskrit it was called *upala*, a “precious stone." .” In ancient Rome, this became *opalus*. Most opals are valued for their shifting colors in rainbow hues – a phenomenon known as “play-of-color.”

The October birthstone’s dramatic play-of-color has inspired writers to compare it to fireworks, galaxies and volcanoes. Bedouins once believed opal held lightning and fell from the sky during thunderstorms. Ancient Greeks thought opals bestowed the gift of prophesy and protection from disease. Europeans long maintained opal to be a symbol of purity, hope and truth. Hundreds of years ago, opal was believed to embody the virtues and powers of all colored stones.

Opal is also the stone given to celebrate the 14th wedding anniversary.



A breathtaking sunset seems to dance on the surface of this 1.72 carat (ct) opal. Photo: Dr. Edward J. Gübelin/GIA

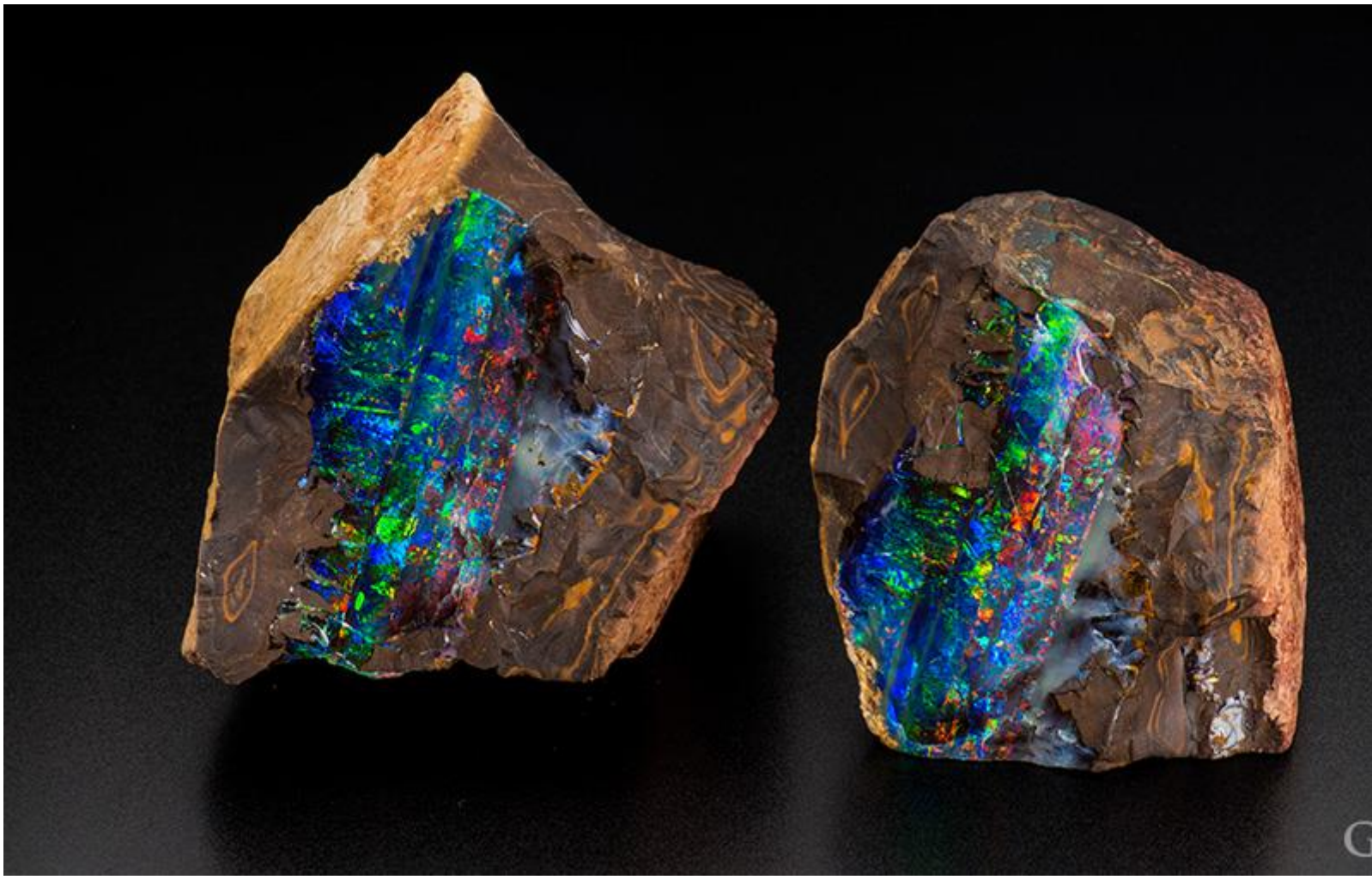
WHERE IS OPAL FOUND?

The opal birthstone can be found in many places. The fields of Australia are the most productive in the world for the October birthstone. Ethiopia, Mexico and Brazil are also important sources. Additional deposits have been found in Central Europe, Honduras, Indonesia, Madagascar, Peru, Turkey and the United States.

Lightning Ridge, a small town in New South Wales, Australia, is famed for producing prized black opal. A dry and rocky region softened only by small trees and scrub brush, Lightning Ridge gets little rain and bakes in the scorching summer temperatures. The climate is so unforgiving that miners often live underground to find respite from the punishing heat.

Black opal nodules are sometimes found in a line, as you can see in this photo from the Lightning Ridge mine. Photo: Vincent Pardieu

Australia is also a source of other types of the October birthstone. White opal is found in the White Cliffs area of New South Wales, as well as in Mintabie, Andamooka and Coober Pedy in South Australia. Boulder opal, which comes from only one location in the world, is mined in Queensland.



Two pieces of boulder opal that is found only in Queensland. Photo: Robert Weldon/GIA

In Ethiopia, the October birthstone is found near the village of Wegel Tena, in Wollo Province. Travel 340 miles (about 550 kilometers) north of the capital Addis Ababa and up 8,000 feet (2,400 meters), where miners pry opal from shafts dug into the side of a plateau. Gems unearthed here range in body color from white, yellow, orange and brownish red to “chocolate” brown. Some of the opals show play-of-color. Another mine, in Ethiopia’s Shewa Province, yields the coveted black opal, as well as orange, white and crystal opal. Its treasures are buried in steep cliffs that tower over the landscape.

Querétero, a state in Mexico, is known for producing fire opal in yellow, orange and reddish orange to red, some with good play-of-color. The mines are a tourist destination, and getting to them requires taking a dirt road through dense forests of pine and oak, past scrubby plateaus of cacti and shrubs, and up winding mountain roads.

OPAL BIRTHSTONE CARE & CLEANING

Opal may be treated by impregnation with oil, wax or plastic. Opal doublets or triplets are fine slices of opal glued to a base material and covered with a thin dome of clear quartz. The safest way to clean this October birthstone is with warm, soapy water. Other cleaning methods might damage the opal or filler material. Note that prolonged exposure to water may weaken the adhesive in opal doublets and triplets. Even natural opal can fracture if exposed to high heat or sudden temperature changes.

This October birthstone ranges from 5 to 6.5 on the Mohs scale of hardness. To prevent jewelry set with harder gems from scratching opal, store it by itself. Diamonds, rubies, sapphires, and emeralds are just a few of the gems that can scratch the October birthstone.

Sapphires and diamonds encircle a 1.92 carat (ct) black opal in this stunning 18K yellow gold and black rhodium ring. Courtesy: Omi Privé

TOURMALINE BIRTHSTONE

TOURMALINE BIRTHSTONE MEANING & HISTORY

Tourmaline is the newer October birthstone. The name comes from the Sinhalese word toramalli, which means “stone with mixed colors,” because it often has multiple colors in one crystal. Very few gems match tourmaline’s dazzling array of colors. Perhaps this is why ancient mystics believed this October birthstone could inspire artistic expression – it has a color palette for every mood. Among the most popular are the pink and red rubellites, the emerald green “chrome” tourmalines, and the neon green and blue-to-violet “paraíba” tourmalines.

Because of its vast range of colors, tourmaline was often mistaken for other gemstones One of the “rubies” in the Russian crown jewels, the “Caesar’s Ruby” pendant, is actually red (rubellite) tourmaline. A Spanish conquistador found green tourmaline crystals in Brazil in the 1500s and confused the stones with emerald. These and other cases of mistaken identity continued for centuries until scientists recognized tourmaline as a distinct mineral species in the 1800s.

Suite of multi-color tourmaline. Photo: Robert Weldon/GIA

Different colors of tourmaline are thought to have their own healing properties. Black tourmaline is believed to protect the wearer and give a sense of self-confidence. Pink tourmaline embodies love and is associated with compassion and gentleness. Green tourmaline promotes courage, strength and stamina. Tourmaline is given to celebrate the eighth wedding anniversary.

WHERE IS TOURMALINE FOUND?

This October birthstone is most commonly found in Brazil, but it is also mined in Afghanistan, Pakistan, Kenya, Madagascar and Mozambique (among other countries in Africa). California and Maine are historically important producers of fine tourmaline in the United States.

Examining purple and green tourmaline rough while visiting the tourmaline deposit near Mavuco village on a field expedition to Mozambique. Photo: Vincent Pardieu

Most of the tourmaline mined in Brazil over the centuries comes from pegmatites in the state of Minas Gerais. These subterranean intrusions of magma are the source of a virtual kaleidoscope of gem minerals. In the late 1980s, however, electric green, blue and violet tourmalines entered the gem market from pegmatites in Brazil's Paraíba State. Scientists found that the intense colors were caused by trace amounts of copper, which had previously not been recorded as a coloring agent in any other tourmaline. In the early 2000s, Paraíba-type copper-bearing tourmalines were also discovered in Mozambique and Nigeria. Overall, prices for the best Paraíba and Paraíba-type tourmalines easily surpass other tourmalines due to their vivid hues, higher color saturation and greater rarity.

Old tunnel entrance at the Tourmaline King mine. Photo: Brendan Laurs

In the United States, both Southern California and Maine host several pegmatite districts. For more than a century, they have sporadically yielded large quantities of tourmaline.

Maine's first major tourmaline deposit was discovered in 1820 at Mount Mica in Paris, by two young boys exploring the local area. Even today, a quarry at Mount Mica intermittently produces various colors of gem tourmaline. The Dunton mine, near Plumbago Mountain, is the most prolific producer of tourmaline in Maine.

In 1898, California's first commercial tourmaline mine opened at the Himalaya pegmatite in the Mesa Grande district – famed for the production of fine rubellite. To feed Empress Dowager Cixi's obsession with the vibrant color, San Diego mines sent 120 tons of gem rubellite to Imperial China between 1902 and 1910. With the death of Cixi in 1908 and the subsequent overthrow of the Qing dynasty, the heyday

of tourmaline mining in California ended. Today, only a few mines in San Diego County occasionally produce gem-quality tourmaline.

TOURMALINE BIRTHSTONE CARE & CLEANING

The tourmaline birthstone is rated 7 to 7.5 on the Mohs scale of hardness and is generally suitable for everyday wear. These colorful gems are usually stable enough to withstand light and most chemicals, but heat can be damaging. This October birthstone is best cleaned with warm, soapy water and a soft brush The use of ultrasonic and steam cleaners is not recommended.

HAPPY BIRTHDAY TO ALL ROCK TOBER BIRTHDAY FOLKS!!!