

THE OPAL OF QUERETARO

By June Culp Zeitner

SPECIAL ASSISTANT EDITOR

With the charming Mexican City of Queretaro getting ready to celebrate its first annual Opal and Quarry Stone Fair, and with opal becoming more and more popular as a precious gemstone, perhaps we should take another look at the famous opal of this Mexican State. I have been to several of the opal mines, and have visited the picturesque villages of the Mexican State of Queretaro, as well as the charming capital city, which has been called the "opal headquarters of the western hemisphere."

There is nothing like going to a producing opal mine in this area. Not only is there the mystique of a long treasured gem, but there is some of the most splendid scenery in the world . . . soaring mountains, lacy trees, tropical birds and flowers, miles of stone fences, and exciting rock formations. The little settlements are neat, and the people have genuine smiles.

Although the Aztecs mined Mexican opal many centuries ago, it was not until the 19th Century that commercial production began of the deposits in the Queretaro region. Queretaro was a flourishing center of the great Aztec empire long before the Spanish invasion of 1531. The Spanish admired the city and made it among their most beautiful colonial show pieces. There are graceful stone buildings of classic Old World architecture which are still in use, as is the five mile arched stone aqueduct built so long ago to bring water to the tropical city.

Few mining centers have the glamour of Queretaro. Father Junipero Serra



This part of the extensive La Carbonera mine is called El Pirindongo. The mine operator is Eugenio Ontiveros.

officiated at the church of Santa Cruz before beginning his famous missions in California. The Church of San Francisco is an ornamental landmark of 1545. Bright, handmade Spanish tiles, inlaid marble, exquisitely carved woods, narrow cobblestone streets, gilded domes, and a spacious city square with long rows of carefully manicured trees, distinguish this progressive and historic

city. Opals and other gems are much in evidence, from the matrix pieces in water filled jars sold by street vendors for a few pesos, to the magnificent jewelry glistening in a velvet lined window. Virtually every shop in the area near the plaza has opals, or gems, or jewels in some form. But opals are not all the city has to offer. Rich in history, the city is
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Eugenio Ontiveros, present owner of La Carbonera, says this mine has been operating near San Juan del Rio, Queretaro, since 1856.



Las Aguanosas is a part of the Nameless mine, or the Collier, which are other names for La Carbonera. The mine is near Tequisquiapan.

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now a modern industrial center of nearly 100,000 people.

The smaller cities and villages near Queretaro are also opal marking places. Tequisquiapan is a plush health spa near some of the mines. San Juan del Rio is a unique small city shortly south-east of Queretaro, not far from La Guadalupeana, a mine which has for some time been operated by the Cabrera family. La Trinidad is a quaint village near La Carbonera and other mines. The recent operator of La Carbonera has been Senor Eugenio Ontiveros. Another opal mining municipality, about thirteen miles from Queretaro, is Colon, where the old El Iris Mine of the Ramirez brothers of Lapidaria Queretaro is located.

The opal of Queretaro occurs in a rhyolite matrix "quarry stone" to the Mexicans. The matrix varies in color from mine to mine, and within a mine as well. With mines located in the igneous flows of rugged mountains, it is surprising to remember that Queretaro itself is at 6,000 feet in elevation.

As in other mining areas, the last few miles of roadway are often rugged and impassable. Visiting collectors are sometimes taken to the mines in trucks or jeeps. Many of the mines have recently been closed after years of production. A few are still working, and there is always a curious mixture of optimism and pessimism about the future of the mines.

At present the good opal is just not coming out as it was in the 1960's and earlier. There are those who say the mines have played out. Nevertheless, prospecting is continuing, new mines are

started with high hopes, and older mines change hands and are enlarged. When I saw the vast areas of rhyolite flows stretching to the horizon, the rock of one mountain looking very similar to the next, I decided it was just about impossible that all opal localities have been found.

The actual mining is by the opencut method. Some of the mines look like typical quarries, but I remember one which resembled a series of man-made canyons with high, straight walls. The amount of waste material from an opal mine is staggering. Light charges are used to break the rhyolite into large blocks, which are then broken up by hand into smaller pieces in order to find the opal. The porous rock has innumerable bubble-like cavities, plus cracks and crevices, which are either hollow or filled with some silica material, which is sometimes precious opal. Any promising patch of opal is carefully chipped out, often retaining some of the matrix. Most of the opal is at least partially attached to the walls of the cavity in which it was deposited, but sometimes a really fine opal is found lying loose in the cavity. The waste material is carried away in baskets, often by young boys.

Experienced miners can tell by the color and quality of the matrix if it is likely to be opal producing. The rhyolite where good opal is found is finer grained and uniform with numerous cavities, and may be a pleasing red, beige, white, or pink in color. Another cutting material is sometimes found in the mines, an orbicular opaque silica gem material, locally called "chalcedonia,"

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One of the finest gem shops in all of Mexico is Lapidaria Queretaro in the city of Queretaro, in the historic Mexican opal state. The cordial owners, Jose and Ismael Ramirez, have an opal mine, a cutting shop, and this well stocked gem and jewelry store. Customers can buy everything from rough specimens to original finished jewelry.

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Opal is by far the most popular native gem in Mexico and the most highly exploited, but Mexico also has good amethyst, topaz, chrysocolla, turquoise, and agate. Photo in Lapidaria Queretaro's specimen gallery.

resembling orbicular jasper, except for the unusual off-white background color.

Older mines, such as El Iris, have extensive workings and deep walls. Various sections of such mines have their own names. La Carbonera has a part called El Pirindongo, another called Las Aguanosas, and a cave called San Martin.

Many families have made their livelihood from the opal mines. But precious opal is becoming scarce, so in the last fifteen years or so, the mine operators have taken tour groups to the mines. Mine tours can sometimes be arranged through the Guadalupeana shop in San Juan del Rio. The Ameri-

can collectors find plenty of scrap opal and occasionally a prize, they buy from the miners families in villages like La Trinidad, and they patronize the shops of the gem and jewelry dealers and manufacturers in Queretaro and nearby cities. I found a fiery tear-drop shaped opal on a local dump; it's so attractive as it is that I will never shape or polish it.

The gem cutting business such as that of Ismael and Jose Ramirez uses modern equipment. The cutters are skilled workmen who make the most of each stone. Not all of the stone cut in Queretaro comes from the state of Queretaro, not even all of the opal. Also synthetics are cut in this city as well as fine natural stones.

Generally speaking, the rough opal brought from the street vendors is not of good quality. There could be a layer of colorful (when wet) matrix pieces around the exterior of the jar, with an interior solidly full of useless matrix. The selection from reputable dealers is better. However, the best opal is not sold in the rough, but is sold as cut stones, or in well designed gold jewelry. Precious opal is not and should not be cheap. Expect to pay \$20.00 per carat and up for an unset opal with fine color, and remember the better the opal the higher the price. This is true wherever true gems are mined.

Matrix opals are often a good buy. These are spell binding, if cut correctly. If there is a limpid lake of fiery precious opal well centered in a graceful cabochon of contrasting hard polished rhyolite, the stone will be impressive and durable. A few years ago such stones started at a dollar or less. Now the good ones start at about 110 pesos (about \$5.00) while the less desirable ones may be purchased for around 44 pesos (\$2.00). But the really top drawer matrix cabochons, those with superior play of color, well centered, gracefully shaped, and highly polished,

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The Ramirez brother's shop, Lapidaria Queretaro, is neatly arranged and has a surprising variety of Mexican materials and arts and crafts, in addition to the exquisite Queretaro opal. Shown here are jars of opal, opal eggs and specimens, Mexican geodes, crystals, and jewelry.



Ismael and Jose Ramirez operate the old El Iris Mine at Colon in the State of Queretaro. Worked for over 120 years the famous mine is still productive. The brothers continue looking for new opal prospects.

may run the equivalent of \$25.00 or more.

For some years Mexican opal had a reputation of being somehow inferior to other fine opal. This is simply not true. One reason may have been that visitors so often brought back the jars of cheap opal to show their friends. Or they purchased only matrix opals. But a major reason has to be that opal qualities and opal nomenclature are widely misunderstood.

Mexico produces many variations of opal in addition to precious opal. One kind is transparent and flame red in color. It is called *fire opal*. Many people think that fire opal is synonymous with precious opal. It is not. So if people see a red Mexican opal without play of color, they immediately classify Mexican opal as pretty but not precious. The high quality Mexican fire opal does have a splendid and fascinating play of color, equal to any fine opal in the world, and this is true, precious opal.

The colors of this exceptionally transparent Mexican opal vary from a light straw color to yellow, orange, red orange, and red, with all the subtle nuances in between. The ever-changing color patterns also have an enormous range. There is the pin fire, with ever twinkling tiny dots of color, harlequin opal with jig-saw like patches of color, the flash opal which has a directional play of color, the abanderado opal with its ribbons of color, and the strange contra-luz opal which must be held against the light for maximum color.

Queretaro's choice opal includes the unique *water opal* which is as clear and transparent as a drop of spring water, but with a rainbow of brilliant iridescent colors shimmering with every change of light.

The clear varieties of Mexican opal are sometimes faceted, and this includes both those with and without the play of color. The yellow or red faceted opals have overall colors which cannot be duplicated by any other gem. For this reason faceted opals are often seen in competitive display cases.

Translucent and opaque opal are also found in the mines of Queretaro. One of the best of these is called *Lechoso* or *milk opal*. This opal which has a white background and rich color flashes, has been compared to Hungarian opal. It also more nearly resembles some fine Australian opal than the transparent varieties of Mexican opal which are so readily distinguishable. This is an excellent precious opal, and is also rare, so it is expensive, and not often seen in the United States. Lechosos opal and other varieties of precious Mexican opal have for years been popular with Japanese cutters, who are willing to pay top price for good material.

There are also translucent and opaque opals of unusual tints, decorator colors of peach, brick, salmon, honey, pitch, and cherry. Some of these colorful opals have play of fire, and are therefore precious opals. An orange opal with rich flashes of green and blue is an incredible gem. Vividly colored opal from Queretaro, such as *cherry opal*, which does not have the play of color of precious opal, is used as a gem material for more inexpensive jewelry and ornamental novelties. Sometimes the showy cherry opal is used in jewelry in combination with the local precious opal. It also can be tumbled.

Some of the other occurrences of Queretaro opal Queretaro which I have not mentioned are *hydrophane*, an opal which shows its bright spectrum only in water; *azules*, blue opal; *hyalite*, colorless common opal; *luvisnando*, rainfire opal; *claro*, pale translucent opal; and *anaranjados*, orange opal.

An unusual Mexican opal is the color of the best grade of smoky quartz, and

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The Ramirez brothers have modern equipment for their El Iris Mine, which is worked in the open pit method.

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equally transparent. Bob Dowell, who dubbed it "Morion" opal had several faceted pieces of up to 30 carats, which fooled experts until they handled it. (The locality given for the smoky opal was San Luis Potosi). I have seen faceted orange colored opals around 70 to 80 carats.

Of special interest to mineral collectors are the Queretaro opals with inclusions. The inclusions may be little spheres or freeforms of a different color or degree of transparency, or variations in structure at the point of attachment to the matrix, which sometimes look like whipped jello, or sometimes like tiny flower gardens, or even like dendrites. The inclusions of this type may be variations in the opal itself, or earthly materials, or small amounts of iron or manganese oxides. Although one never hears the term "rutilated opal," I have seen excellent precious opals from Queretaro with delicate inclusions of acicular crystals of rutile, brookite, goethite, and perhaps zedites. Other inclusions of opals may be chalcedony, lussatite, and gypsum.

The color of the Queretaro opal has some relation to the color of the matrix, but there are exceptions. One attractive matrix found in recent years is almost white. The precious opal in the white matrix is usually pale straw color. A rose beige matrix often has light orange



The rhyolite is grainy, porous, and opaque, but seams and cavities are filled with translucent to transparent opal of every color of the rainbow. The colorful specimens are from Lapidaria Queretaro.

opal fillings. The deeper red opal occurs in a more richly colored matrix. We used to be able to buy exquisite large pieces of matrix opal with several vari-colored opal cavities scattered on the specimen. Now each of the splashes of opal is cut into a gemstone.

Queretaro uses every bit of precious opal. There are many uses. The best is used for jewelry. Popular shapes of cabochons are oval, pear, oblong, marquise, and round. Recently more free-form shapes are seen than formerly. Some matrix pieces are given geometric shapes such as trapezium, pentahedron, polyhedron, etc. Most cabochons are cut with rounded bottoms, adding to their weight, but not to their attractiveness or usefulness as gems. Many cabochons are given high domes. Some pieces are cut for pendants or dangle earrings.

Sometimes larger pieces of opal, precious opal, matrix opal, or cherry opal, are carved into turtles, frogs, fish, butterflies and other miniatures, or are carefully shaped as eggs, obelisks, etc. The small matrix opal turtles which used to sell for about \$2.00 to \$3.00 are now \$10.00 and up. The price depends on the quality of opal and workmanship. Besides the carvings made of fairly average to good opal, broken pieces, irregular pieces, and small bits are used as mosaic material, or are embedded in resin, with or without matrix, in such shapes as spheres or eggs. Fiery small pieces are used in the style we call intarsia, closely fitted together and polished as one. Squares of opal treated in this way are inlaid in metal for cuff links and larger pieces of jewelry. Pieces of opal are also used

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There is much hand work to mining opal, and piles and piles of waste. However, the rhyolite or "quarry rock" as the Mexicans call it, can be polished. The Cueva San Martin of the Ontiveros Mine is shown.

in desk novelties, wall ornaments, boxes, tray borders, dressing table items, Christmas ornaments and numerous other ways.

The best rule to remember in buying the opal items is the old law "You get what you pay for." In other words, if the amount of opal is considerable, and the quality is excellent, and the workmanship is artistic and careful, the finished item is bound to be expensive. Although it is perfectly possible to get inexpensive opals and items made of opal in Queretaro, they cannot be compared to the best this Mexican state has to offer. There is no doubt but that the

entire opal industry of Queretaro has suffered to some extent by the fact that many tourists are entranced with the name "opal," and buy inferior material, poorly cut and mounted.

Opal is, geologically speaking, a recent mineral. It can occur in igneous, sedimentary, and metamorphic rocks. It is a hydrous silica ($\text{SiO}_2 \cdot n\text{H}_2\text{O}$). The opal of Mexico was deposited in recent lava flows by low temperature silica bearing waters. Mexican opal contains more water than the opal from many other opal areas. Opal is between $5\frac{1}{2}$ and $6\frac{1}{2}$ in hardness, but Mexican opal is nearer to $5\frac{1}{2}$ in most cases. The specific gravity of this opal is about 2, considerably less than most gems, and therefore one of the means used to identify it. Opal has a conchoidal fracture and vitreous luster, two other helps in identification. But the opal can't be identified by its crystals, since such crystals have not been found. However, such crystals as glauberite have been found replaced by opal.

Opal has been called an amorphous mineral, a hardened silica gel. New laboratory examinations have revealed that opal is not as lacking in regular structure as formerly thought. In fact, it is its very orderly structure which gives precious opal its play of color.

The play of color which makes opals so entrancing, and so precious, is due to

the diffraction of light caused by the minute spherical building blocks laid in orderly rows which make up the gem material. The spaces between the spheres may be filled with water, other silica mineral varieties, or they may be hollow. Electron microscopes have demonstrated the true nature of the opalescent optical phenomena.

Dehydration causes some opals to crack. Opals are a fragile stone, being brittle as well as soft. Many opals are kept for long periods in water or glycerin, both to show them off, and to prevent them from crazing. Certain opals will craze regardless of treatment.



PHOTOGRAPH COURTESY OF ISMAEL AND JOSE RAMIREZ OF "LAPIDARIA QUERETARO"
A close up of rhyolite opal matrix with a cavity filled with transparent precious opal shows some of the distinctive qualities of fine Queretaro opal.

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Usually an opal which has been mined and cut some time ago can be considered stable.

The trip from the Rio Grande Valley of Texas to Queretaro is less than 600 miles, encompassing spectacular scenery, with almost countless changes in terrain, economy, arts and crafts, products, folkways, and village life. From the verdant tropical valley of the Rio Grande, you wind through some of the world's finest citrus country through beautiful Santa Rosa Canyon and then into the heartland of Mexico, the high plateau of the towering Sierra Madres.

An attraction soon after you enter the mountains is one of the world's few mountain carvings, "Los Altares," a large carved mural chiseled on the huge expanse of lack rock facing a mountainside. Carved by Mexican sculptor Federico Cantu, it depicts the Aztecs and the founding of the Mexican nation.

Along the road there are cacti, some as big as trees, and there are also native trees and flowering plants, including huisache, Spanish bayonet, gaillardia, and cultivated trees such as avocado and delicious apples. Birds are the green jays, roadrunners, phainopeplas, and chachalacas and other species which seldom venture north. Every little village has lots of flowers and an impressive church. There are miles of stone walls. Next to a field being plowed by a man or a mule, there may be an expensive array of the latest in heavy machinery. Along the road you may see burros tethered awaiting the return of their owners who have taken the bus to the city. Goats look for sparse grass in rocky fields. The absence of highway billboards is at first gratifying, and later frustrating.

Some of the cities you will enjoy along the way are the old mining town of Matchuala, and its nearby ghost town, Real de Catorce; San Luis Potosi, which is near the topaz fields of Tepatate; and maybe a side trip to San Miguel de Allende, an arts and crafts center.

There are a number of gem shops easily accessible in Queretaro. An attractive and reliable shop which does its own mining and cutting and has an excellent variety of opals and other gems, is "Lapidaria Queretaro S.A.," owned by the popular Ramirez brothers, Ismael and Jose.

Eugenio Ontiveros is a wholesale and retail dealer in gems who also has mining interests. He specializes in topaz and amethyst as well as opal.

The indispensable "Sanborn Log Book" of the *Sanborn Insurance Company* recommends "El Rubi," a shop just off the plaza run by the Villalon family. Other gem shops are "Arnulfo Garcia's," "Casa Pueblito," and "Paris," all on or near the main plaza.

Queretaro has excellent accommodations, including a familiar Holiday Inn. The most lavish hotel is the *Jurica*, a fabulous reconstructed Spanish hacienda 200 years old, now reconstructed and refurbished in luxurious fashion as a 180 room inn. Thermal pools make this place a fashionable spa. The Jacal Real de Minas is a 200 room motel, also with thermal waters and a high rating. The Azteca Motel on the highway north of the city has parking for trailers, campers, and motor homes. All of these places have dining rooms, but two more good places to eat are Fonda Del Refugio and Fondo San Antonio.

The main highways in the Queretaro are safe, well engineered modern roads, with the toll road to Mexico City being a traveler's delight. Other roads may be cobblestone, blacktop, gravel and dirt. Four wheel drive vehicles are necessary for some of the mine roads, but in most cases it is not desirable for people traveling alone to attempt travel in rugged areas. A guide, tour leader, or mine operator for such trips is necessary.

What about the future of the opal mines of Queretaro? It is possible that sometime in the future new opal sites will be found and developed. After

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all, there is a vast amount of rocky and rugged land, where land slides, excavations, road building or other activity could reveal an illusive precious vein. In the meantime, current mines are not as productive as they once were, so prices will probably continue to go up. And we can be assured that the craftsmen of Queretaro will find uses for each scrap of precious opal from their legendary mines.

My visits to Queretaro and the opal mines stand as some of the most memorable trips I have taken. I marveled at seeing the stark mountains where the opals formed, at seeing how they were mined, and it was a thrill to find a little precious opal through my own efforts. But more than that I enjoyed the beautiful city and the friendly people. I bought a few good opals of several varieties, a large free form faceted opal, some small opal carvings, and for good measure a Guerrero amethyst and a Tepatate topaz. I learned that Queretaro's opals are among the real treasures of the mineral kingdom.

