COLORED STONE GOES DIGITAL! See pgs. 3 & 51 for details.

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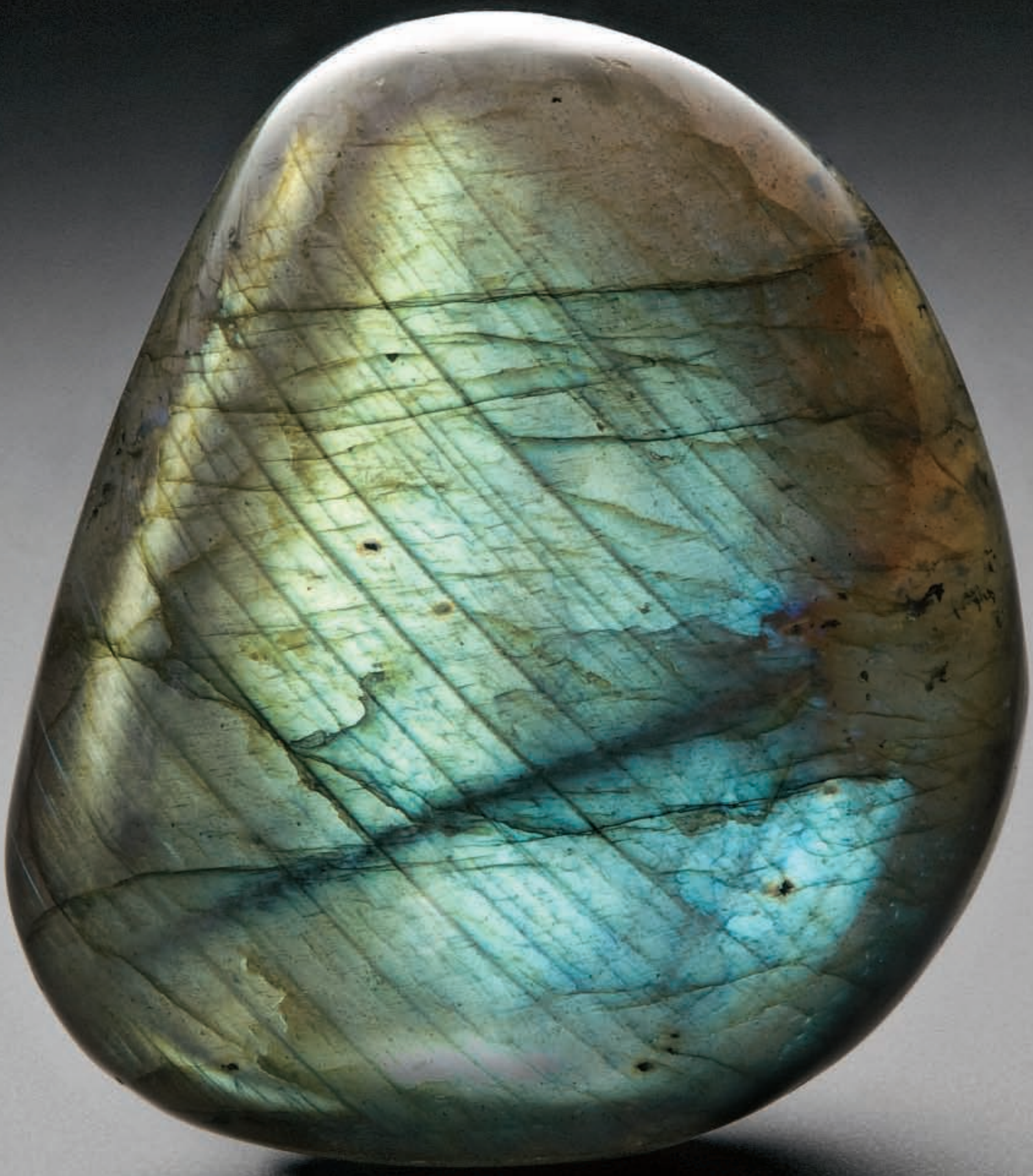
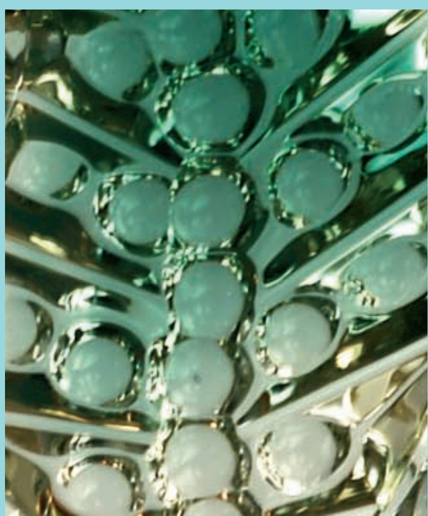
meet the feldspars



the gem kingdom's next rock star dynasty

BY JOEL E. AREM, SCIENCE EDITOR

The world may not be paved with diamonds, but it is paved with feldspar, a large mineral group with many members which could excel as gemstones. Already feldspars like moonstone and sunstone have become international rock stars — with more waiting in the wings. *Colored Stone* takes a much-needed look at this little-known group of up-and-comers.



OPPOSITE PAGE: Labradorite cabochon, courtesy of Sierra Madre Mining. Photo by Jim Lawson. TOP LEFT: 27.22ct Sunstone Sculptural Gem™, courtesy of John Dyer & Co. Photo by Linda Dyer. TOP RIGHT: 5ct green sunstone ring, designed by John D. Woodmark. FAR LEFT: Mary Nottingham-designed pendant with rare 16.43ct watermelon sunstone and 4mm green sunstone. ABOVE: 10ct red sunstone set in 14ct gold on a pearl necklace; designed by Gary Richmond. Photos courtesy of Desert Sun Mining & Gems. LEFT: 13.39ct Oregon Sunstone Dreamscape™ cut by John Dyer. Photo courtesy of John Dyer & Co.

Have you looked at your TV screen or computer monitor lately? If you were shopping for gems, chances are great that you saw sunstone, moonstone, labradorite, or amazonite making the rounds on rotating merchandise trays or standing still for snapshots in on-line catalogs.

Well, then, did you know that each of these gems share membership in a mineral clan that is the largest and yet least known on earth? And did you also know that despite the many celebrity stones it has produced, this clan is perhaps the least understood gem group?

I'm talking about feldspar. That's the identity factor in common between all those persimmon and salmon-red shimmering natural sunstones and treated andesines you've been seeing — not to mention the cloudy, gelatinous blue and pink sheen moonstones and iridescent oil-slick-like labradorites.

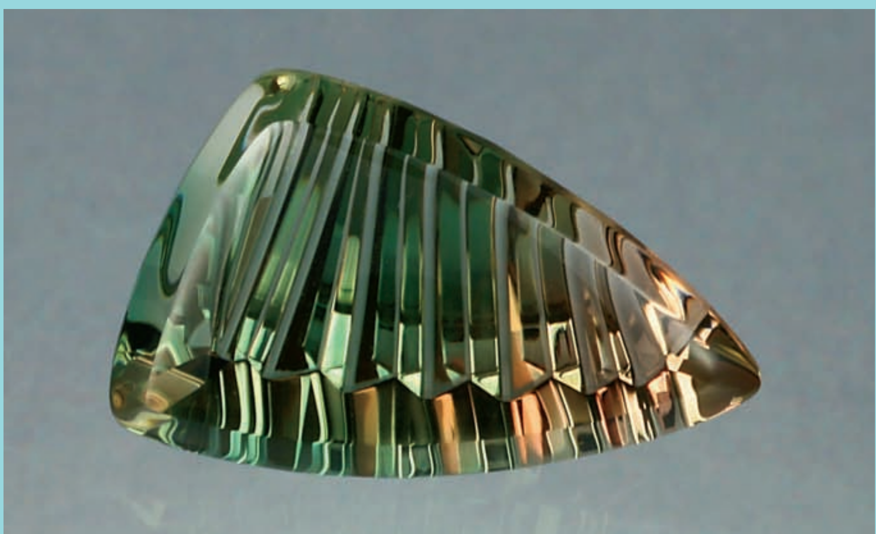
But just thumb through any gemological textbook worth its basalt and you'll see how their writers usually divide the clan into arbitrary subsections or give it short shrift. Such treatment does not exactly inspire or even encourage enthusiasm for feldspar among readers, many of whom are jewelers looking for new gem prospects. Since the world is in desperate need of new gem varieties, it is time to look to feldspar as a possible answer to this pressing need. — David Federman

Feldspar refers to a group of minerals with related structures and compositions. All are framework silicates made of silicon, oxygen, aluminum, and various other metals such as calcium, sodium, potassium, and barium. As a group, they are the most abundant minerals on planet Earth.

Feldspars make up nearly 60 percent of the earth's crust. They are present in almost every type of igneous rock (those formed by cooling of a molten substance called magma). They also can be deposited by hot watery solutions in cracks and veins. Slow cooling of such liquids can result in crystals of enormous size, especially in very coarse-grained igneous rocks called pegmatites. The typical feldspar in such rocks is a pinkish mineral called microcline. There are reports in the mineralogical literature of microcline crystals of almost mythic size. One such crystal, in a quarry north of Kristiansand, Norway, reportedly had dimensions of 30 x 12 x 7 feet!

Despite superabundance and gargantuan crystals, transparent feldspar gems (with a few notable exceptions) are usually tiny and rare. The vast majority of ornamental feldspars are opaque or translucent, white, gray, or a very pale hue and often display a "phenomenon," such as iridescence. Extreme rarity, small size, and lack of bright coloration have prevented the gemstone world from paying as much attention to feldspars as the group deserves.

BELOW: A 6.41ct Oregon Sunstone Dreamscape™ cut by John Dyer. Photo by Linda Dyer, courtesy of John Dyer & Co.



THE FELDSPAR GROUP

Feldspars are "framework" silicates. The feldspar structure is a three-dimensional network of oxygen, silicon, and aluminum atoms, linked at specific points by atoms of three specific metals: potassium, sodium, and calcium. The silicon and aluminum atoms share a structural position ("A"), and the other metals occupy a different structural site ("B"). All feldspars display either monoclinic or triclinic symmetry. All have cleavage, and most can occur in well-formed crystals; some rocks are made entirely of feldspar crystals.

The feldspar family has two main groups: alkali feldspars (potassium, with a bit of sodium, in the B position) and plagioclase feldspars (mainly sodium and calcium on the B site). There is nearly a complete range of compositions between sodium-rich and calcium-rich plagioclases. Potassium feldspar, even at low temperature, is monoclinic. Sodium and calcium feldspars are triclinic. A more detailed feldspar classification scheme involves both chemistry and structure.

"B" position ions such as sodium and

ABOVE: A grouping of rare and unusual cut and polished pink sunstones from Oregon. Photo courtesy of Desert Sun Mining & Gems.

calcium are very similar in size, but the potassium ion is much larger. Potassium and sodium ions have a charge of 1+; the charge of the aluminum ion is 3+, calcium is 2+, and silicon is 4+. The formula for alkali feldspar is $(K,Na)AlSi_3O_8$. If a calcium substitutes for either a sodium or potassium atom in the structure there would be a surplus of positive charge. The electrical balance is achieved by reducing the amount of aluminum, and we have the plagioclase formula: $Na(AlSi_3O_8)$ — $Ca(Al_2Si_2O_8)$. Every calcium atom present is balanced by an aluminum atom replacing one of silicon in the structure. Barium substituting for calcium produces a mineral called celsian. Hyalophane has barium replacing sodium or potassium.

FELDSPAR FORMATION

In magmas that cool very slowly, it is possible for a single temperature and therefore a single feldspar composition to be maintained, for a long time, allowing relatively pure crystals to grow to large size. But rapid cooling results in feldspar crystals that are typically highly zoned. Such crystals are always richer in calcium in their core than in succeeding layers of growth. Magma chambers may have convection currents, allowing crystals that are forming within them to rise and fall repeatedly, changing the crystallization temperature around the floating crystals. Succeeding layers therefore alternate between being richer and poorer in calcium. This "oscillatory growth" is relatively common in plagioclase.

TWINNING

Twins are crystal intergrowths, in which alternating units are related by symmetry elements of the crystal host. Mineral intergrowths themselves are extremely common; but they are not "twins" unless the participants are joined along an element of symmetry (such as a specific plane, called the "composition plane"). Twinning creates a crystalline entity that has a "built-in" symmetry element (e.g. a twin plane or axis), and so the end result may be a form that looks more symmetrical than the untwinned material. This "pseudosymmetry" is extremely common in feldspars.

THE FELDSPAR FAMILY

There is a huge list of names associated with feldspar mineralogy. Most of the names are related, not just to the chemistry of the material, but also to symmetry, temperature of formation, intergrowths, and other characteristics.

PLAGIOCLASE

Pure sodium plagioclase feldspar is called albite (there is a platy variety called cleavelandite). Pure calcium plagioclase is called anorthite. Intermediate mixed Na-Ca feldspars are no longer considered "species," but the names are so useful and have been around so long, that getting rid of them seems not to be worth the effort.

Albite includes the range from pure sodium to a composition that has ten percent calcium. From ten to 30 percent calcium, the name given is oligoclase. From 30 percent to 50 percent, it's called andesine. Next in the sequence is labradorite (50 percent to 70 percent calcium), then bytownite (70 to 90 percent). Anorthite refers to a plagioclase that has zero to ten percent sodium, i.e. a pure calcium "end member" of the series. Albite with a high percentage of potassium has been called anorthoclase.

ABOVE: Gary Richmond's Ponderosa Madeira Ring is a three-stone 6.5ct men's ring. Photo courtesy of Desert Sun Mining & Gems.

ALKALI FELDSPAR

Orthoclase is the potassium "end member." The potassium feldspar most stable at low temperatures is microcline, which is usually twinned, often in two directions. This texture is clearly visible in thin rock sections, and sometimes even on crystal surfaces, and is known as "cross-hatching." Sodium in the formula gives a range of intermediate compositions known as sanidine. At high temperature, there is a large range of feldspars with intermediate compositions.

At lower temperatures, however, the intermediate compositions segregate into two different minerals. This "unmixing" or "exsolution" results in a material called perthite, characterized by intergrowths of sodium- rich and potassium-rich feldspar. Perthites have distinctive textures and patterns of twinning that can be macroscopic (perthite), very small (microperthite), or microscopic (cryptoperthite). Feldspars along the Na-K line that are sodium-rich are sometimes called "potassium-high albite" or anorthoclase.

FELDSPAR GEMS

Feldspar without inclusions, exsolutions, and chemical impurities is colorless. A trace of ferric iron will create a yellow hue. Triclinic potassium feldspar (e.g. microcline) with a blue-green color is generally known as amazonite. The cause of this coloration is lead (the more lead, the greener the hue) combined with structural water in proximity to the lead, and a dose of radiation to create a Pb+ color center. Blue oligoclase from Kenya has also been seen in the marketplace in recent years. Reddish feldspars (such as the ones found in a typical granite) owe their red/pink hue to a trace of ferric iron that is likely present as oxide inclusions.

Gem feldspars fall into three categories: feldspars that are transparent enough to yield faceted gemstones; feldspars that display optical effects; and feldspars that are translucent or opaque but have ornamental value because of distinctive textures or admixtures with other minerals (i.e., rocks).

The combination of complex chemistry and intergrowths, changes in structure upon cooling, and pervasive twinning is the reason why feldspars are seldom transparent.

Despite ubiquity, abundance, and huge crystal size, feldspars have so many internal light-blocking features that it is all but impossible to find material transparent enough to cut faceted gemstones. There are, of course, notable exceptions. Orthoclase from the Malagasy Republic, colored yellow by a trace of ferric iron, is found as transparent crystals up to the size of small shoe boxes. These have yielded the largest known feldspar gems, some of them exceeding 1,000 carats.

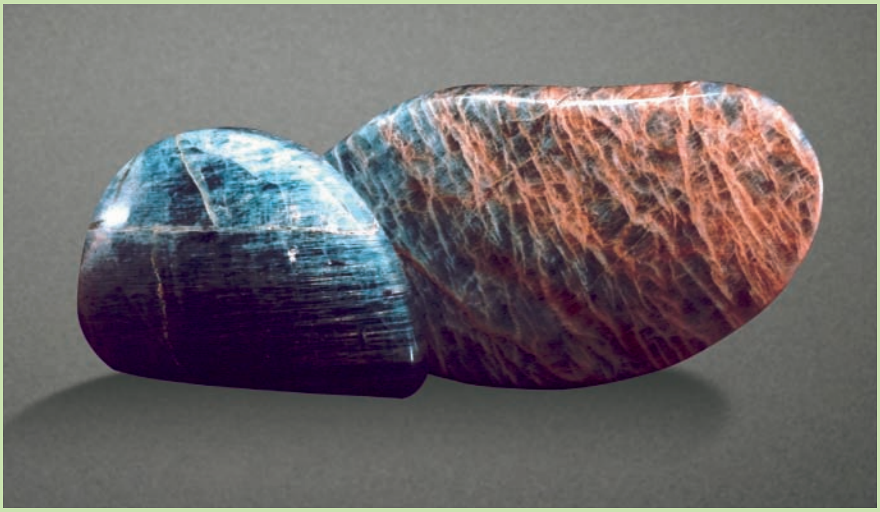
All the plagioclases have been faceted and exist in collections as small, colorless or pale colored gems, typically under five carats in weight. Large cuttable plagioclase feldspars occur as phenocrysts — crystals grown to macroscopic size by slow cooling at depth, followed by sudden quenching caused by extrusion to a surface or near-surface environment (i.e., a volcanic eruption or lava flow). The phenocrysts are embedded in a fine grained igneous rock, typically basalt.

OREGON SUNSTONE

Labradorite phenocrysts found in basalt flows in south-central Oregon have come to be known as Oregon sunstone. Oregon sunstone is, commercially, the best known of all transparent feldspars. Colors include pale yellow, orange, red,

alkali

One of the two main feldspar classifications, alkali feldspar is potassium-rich. The assorted varieties of alkali feldspars have differing combinations of potassium and sodium, giving them each unique looks. The most potassium-rich of the alkalis is orthoclase, while on the other end of the scale, anorthoclase has the highest percentage of sodium. Between these two extremes, the alkali family also includes amazonite, sanidine, perthite, microcline, and granite. The most “rock-like” of all the feldspars in appearance, alkali feldspars are nonetheless remarkably gorgeous when cut and polished and make fantastic, low-cost “alternative gems” for jewelry.



TOP: Orthoclase cabochon, courtesy of Sierra Madre Mining. Photo by Jim Lawson. SECOND ROW FROM TOP, RIGHT: Granite. Photo by Jim Lawson. SECOND ROW FROM TOP, LEFT: Sanidine. Photo courtesy of Denis Tasa. RIGHT: Cut and polished amazonite. Photo courtesy of Joel E. Arem. BELOW LEFT: Perthite. Photo courtesy of Dave Dyat. BELOW RIGHT: Amazonite rough. Photo courtesy of Joel E. Arem.

BELOW: A labradorite and sterling silver pendant designed by John Bajoras. Pendant courtesy of Village Silversmith. Photo by Jim Lawson.

and green. Some yellow crystals contain numerous oriented tiny flakes of metallic copper which reflect light as orangy-pink schiller.

PHENOMENAL STONES

Gems displaying "phenomena" include familiar stars and catseyes as well as gems that have iridescent and reflective features. Iridescence is caused by light "interference," i.e. the separation of white light into colors by reflection from thin parallel layers of an inhomogeneous medium. Feldspars almost always consist of layered structures with alternating sheets of minerals having different compositions, or with alternating layers having a twinned relationship. Some plagioclases display bright iridescence with a pearly grey-white or bluish tint; they were originally dubbed "peristerites" because the colors resembled a pigeon's neck feathers (after the Greek for pigeon: peristera). Intermediate plagioclase feldspars like anorthite typically display "schiller" (German for iridescence), and also "labradorescence" (named for rocks found on the Isle of Paul, Labrador). Labradorite from Finland displays unusually intense colors and has been named spectrolite. Labradorite from the Malagasy Republic is well known for its intense blue schiller, most evident in well oriented cabochons. Iridescent labradorite is common wordwide and sometimes is the single component of certain types of rocks (anorthosites). The optical effect seen in moonstone is due to so-called "Tyndall scattering," with a diffuse milky sheen similar to that observed in milky opals. Sunstone, a name widely used for Oregon labradorite, is historically better known as oligoclase feldspar containing tiny platelets of hematite that produce an orange color and a lustrous surface made up of myriad individual reflections (aventurescence). India is a classic source of this material.

FELDSPAR ROCKS

Most feldspars are opaque (translucent at best) because of the presence of twinning and intergrowths, as well as further complications due to unmixing, diffusion, and alteration. But feldspars can be white, green, pink, orangy, reddish, bluish, and brown and can display a wide variety of optical effects. Rocks are mixtures of minerals, and the cooling history of rocks may vary widely. The combination of mineralogy, grain size and texture therefore produces an almost endless variety of geological materials that are hard and durable enough to be used as ornaments.

Anorthosite is a rock composed entirely of plagioclase feldspar that frequently displays schiller, and a polished rock slab can display large, randomly oriented feldspar crystals that "wink on and off" with a silvery or bluish iridescence. Such rocks are commonly used as facing materials on large buildings. Granite is a common rock made up (usually) of potassium feldspar, quartz and mica. A granite made up of pinkish/orangy orthoclase mixed with green epidote (and a bit of quartz) was found in the Unaka Mountains of the southeastern U.S. and acquired the name unakite. It is widely used for cabochons, beads, carvings, and other ornamental applications.

The global wealth of patterned rocks may be one of the largest and most diverse potential resources available to the gemstone community. The supply of these materials is effectively endless.

FELDSPAR TREATMENT

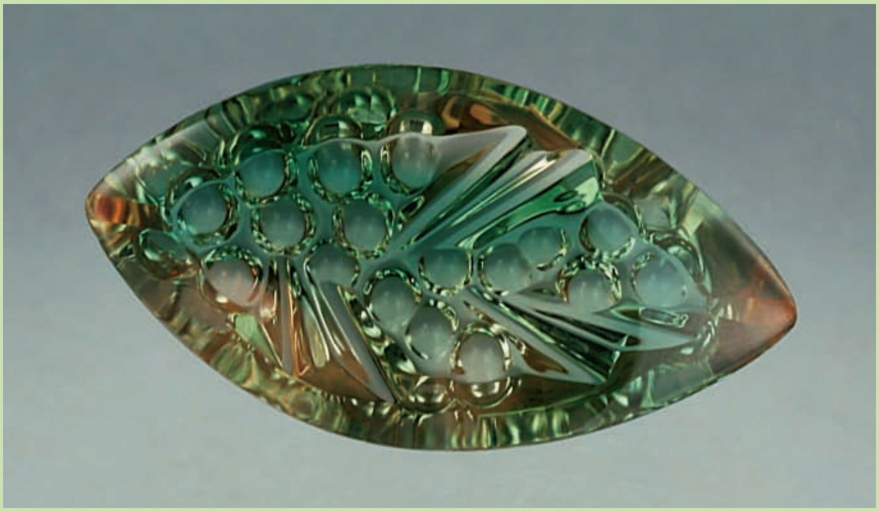
The open framework of the feldspar structure appears to allow significant ionic mobility. Ordering and unmixing produce compositional lamellae and complex twinning, complicated by other compositional changes due to subsequent alteration and reactions in a melt or solution. All of these structural "disruptions" provide conduits for the movement of atoms. It has been suggested that diffusion along twins, grain boundaries, etc. increases atomic movement in a feldspar (versus "intracrystalline" diffusion, i.e. through the structure) by a factor of one million or more.

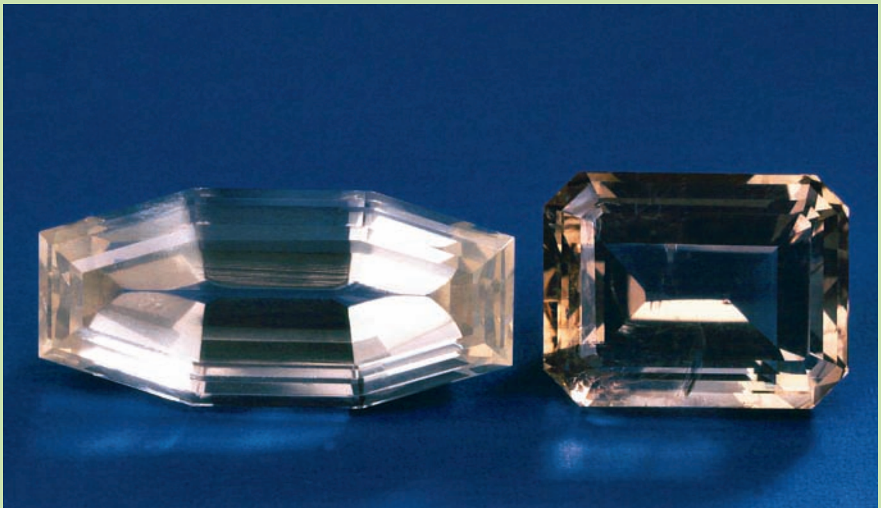
Copper is present in Oregon sunstone. Plagioclase feldspars have been altered in laboratories by saturating them with

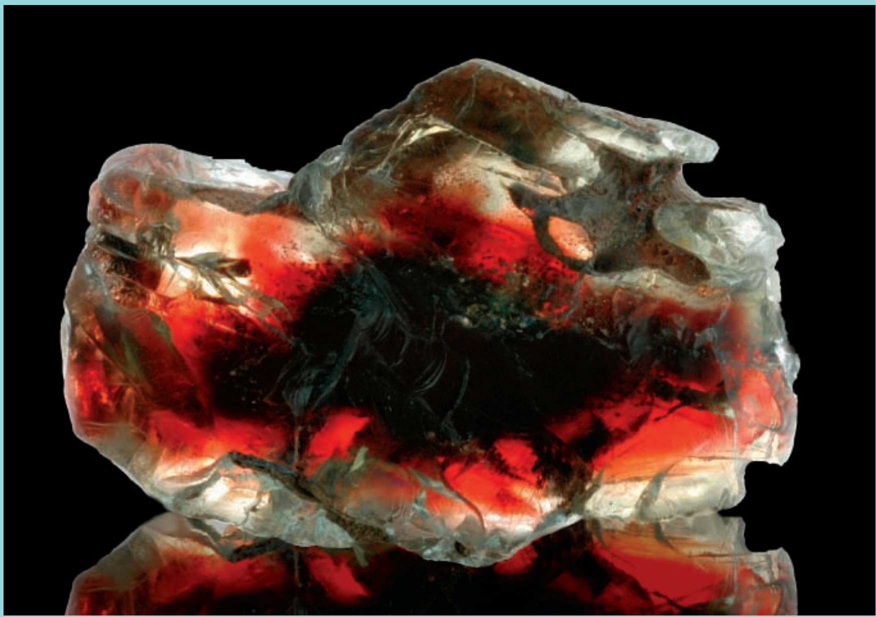
plagioclase

Plagioclase feldspars are composed of varying percentages and combinations of sodium and calcium. Albite is a plagioclase feldspar made of pure sodium without calcium, while anorthite is a pure calcium plagioclase. Other feldspars in the plagioclase subcategory include oligoclase and bytownite. Another family member is the lovely andesine and its popular offspring, sunstone. Labradorite also falls under the plagioclase heading but, with its unique properties, is considered a category all its own.

BELOW, CLOCKWISE FROM TOP LEFT: Bytownite Reverse Checker Cushion cut by Bruce White; photo courtesy of Sierra Gems. Andesine rough with cut and polished cabochons, courtesy of Sierra Madre Mining; photo by Jim Lawson. 18.68 "Radiant Shield" sunstone with schiller from the Dust Devil Mine, cut by John Dyer; photo courtesy of John Dyer & Co. Albite cabochons; photo courtesy of Joel E. Arem. 7.98 carat oligoclase cut by John Dyer; photo courtesy of John Dyer & Co. 13.61ct bi-color Oregon Sunstone Dreamscape™ courtesy of John Dyer & Co.; photo by Linda Dyer.







copper via diffusion, thereby artificially producing intense red and green colors. This material has been marketed as "red andesine". We have not seen the last of such treatments, and gemologists must be ever vigilant in their efforts to maintain awareness and improve detection.

CONCLUSION

The feldspar family is amazing. In terms of variety, including colors, optical effects, and textures, it is unrivaled in the gemstone world. Lack of transparency may be considered by some to be a failing and a limitation on gemstone use. But in feldspars this is more than compensated by a wealth of attractive optical and physical at-

labradorite

Labeled a "phenomena" stone, labradorite has a unique appearance among the feldspar family and, indeed, among all gemstones. In fact, the term "labradorecsence" was coined to refer to the "oily" sheen and almost fluorescent-like look of this stone. Originally discovered on the Isle of Paul in Labrador (and hence the name), labradorite is also found in India, Madagascar, Scandinavia, and the U.S. Labradorite from Finland has incredibly intense colors and has been dubbed "spectrolite." Another phenomena stone related to labradorite (a subcategory of a subcategory, if you will) is the ever-popular moonstone with its trademark milky sheen.

RIGHT: Moonstone rough. OPPOSITE PAGE BOTTOM, CLOCKWISE FROM TOP LEFT: Oligoclase cabochon; labradorite cabochons; blue-hued moonstone; "milky" moonstones. Stones and cabochons courtesy of Sierra Madre Mining; photos by Jim Lawson.

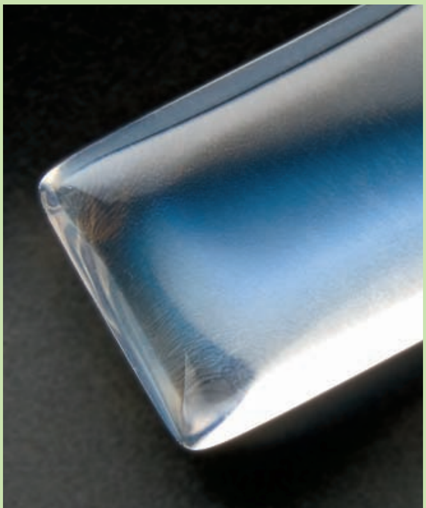


tributes. The jewelry industry would be well advised to broaden its awareness and acceptance of many kinds of geological materials and perhaps even create public awareness (and demand) through active promotion.

Tanzanite, now considered an "alternate birthstone," did not even exist as a marketable gem material only 40 years ago. The internet and rapid communication have forever changed the development of markets, compressing into decades what previously took centuries. We only need look around (and down at the ground) to see where the future of the gemstone trade might lie. ❍

OPPOSITE PAGE TOP: 310ct deep red sunstone rough, mined in 2006. ABOVE, LEFT TO RIGHT: Deep red Oregon sunstone and diamond pendant; John D. Woodmark's 2.5ct deep red schiller sunstone and diamond ring; Woodmark's 6.3 deep Ponderosa red sunstone and diamond pendant. Photos courtesy of Desert Sun Mining & Gems.



feldspar's flying colors

BY DAVID FEDERMAN, EDITOR-IN-CHIEF

Front-page publicity about the scandal surrounding color-faked red andesine has, for the moment, quieted down. Now the real thing — Oregon sunstone — is finally taking its rightful place in jewelry stores as all natural, all-American and, as far as anyone knows, all there is of this volcanic gem.

12.10 ct Oregon Sunstone, cut by Gary Kratochvil. Photo by Gary Kratochvil, Sunstone Mining Co.

Anyone who reads the papers or watches the evening news knows that this year the Grinch is planning to steal Christmas from more jewelers than last year. But jeweler Steve Douglas is confident he has Grinch-proofed his business with a secret sales weapon he wishes weren't so secret.

He is using Oregon sunstone — much of it mined by him — to boost sales in his Bend, Oregon, store, Douglas Fine Jewelry Design. And he has been doing so for eight years, ever since a miner approached his wife, Elyse, about introducing it to a jewelry buying public the miner said was starved for new gems.

This year, more than ever before, sunstone's beauty, status (since 1987) as its home state's official gemstone, and affordability are paying high turnover dividends. Douglas says purchases of Oregon sunstone jewelry now account for 20 percent of his store's sales. What's more, it isn't just the famed red and greens of this breed that are moving briskly. With 70 percent of sales anchored in bridal, Douglas is betting that colorless and champagne sunstones will earn new appeal as diamond alternatives for penny-pinching customers in his recession-ravaged city.

The concept is not new — legendary sunstone pioneer Larry Gray produced, more than a decade ago, a broad line of calibrated baguettes for use as a non-synthetic alternative diamond simulant. The current plan to make what is known as "clear" Oregon sunstone an all-natural native diamond substitute will no doubt gladden sunstone miner John Durbin of Oregon State Gem Inc. who has launched a full-scale commercial mining venture dedicated to the same hunch — namely, making a market for Oregon sunstone clear cuts in both calibrated and free sizes. Durbin could very well succeed but first sunstone will have to gain enough popularity as a red and green gem to create a strong sales tailwind for its other colors.

That seems to be happening. At present, Oregon sunstone is revered for its reds, pinks, greens, and to a lesser extent, yellows. It is also gaining popularity as a phenomenon stone — thanks to a unique special effect called "schiller" caused by tiny copper platelets that act as tiny light interference filters. The resulting silken sheen that schiller imparts to stones gives them a shimmering sensuality that heightens the appeal of this labradorite and gives it a uniqueness that is fast becoming a principal factor in its popularity. Indeed, schiller is what sets apart Oregon labradorite from the far cheaper artificially-colored red andesine with which it has had to compete for the past few years.

Schiller in Oregon sunstone has always been a unique and attractive characteristic of the material. The more recent celebration of schiller as a positive aesthetic element is, to be sure, done out of necessity to differentiate natural sunstone from treated andesine. But by making a virtue out of what once some considered a vice shows just how much this feldspar and those who mine it have come of age. Only two decades ago, when sunstone had its first burst of global stardom, some sellers were apologetic about schiller. Now prejudice against this phenomenon has give way to pride. My, how times have changed!

DESERT WONDER

The name "sunstone" has for many years been associated with various feldspars, including an orange material from India containing plates of hematite and displaying aventurescence.

OPPOSITE PAGE, FAR LEFT: Faceted red Oregon sunstone; photo courtesy of Joel Arem. OPPOSITE PAGE, RIGHT, TOP TO BOTTOM: Sunstone cab with schiller; photo courtesy of Joel Arem. RedSun faceted sunstone; photo courtesy of Outback Sunstone Mining Co. Copper brass Mokume Gane pendant with schiller sunstone cab; photo courtesy of Steven J. Douglas. 106ct. sunstone rough; photo courtesy of John Aldrich, Double Eagle Mining. Sunstone rough; photo courtesy of Outback Sunstone Mining Co. Sunstone rough prepared for customers; photo courtesy of Don Buford, Dust Devil Mining. Orange red sunstone from the Dust Devil Mine; photo courtesy of Karla Proud, Exotic Gemstones. The Plush Oregon desert, home to several sunstone mines. Photo courtesy of Karla Proud.

But the term sunstone has now become virtually synonymous with Oregon, despite repeated claims of red andesine mines in Tibet, Mongolia, and other places. We're not saying that such mines don't exist; we're just saying that no proof of them has yet been furnished that meets any recognized standard of verification. And this isn't just this magazine's opinion. At a recent colloquium on so-called red andesine held at the GIA's main campus in Carlsbad, California, participants voted to withhold all judgment until a team of geologists could be sent to China to once and for all verify claims of such mines.

But even if the existence of such mines is one day confirmed, much of the current massive production of red and green stones that has been widely sold on TV cannot be called sunstone or even natural because the colors of Oregon material are caused by the naturally occurring presence of copper. The copper found in furnace-reddened and greened andesine has been forced into stones at near-melting point temperatures using a rigorous chemical colorizing process called diffusion. Again, this is not our personal opinion. This is a consensus opinion reached by the international gemological community.

Why Oregon sunstone has been blessed with natural copper tones remains a diligently studied mystery. This is not the place to talk about the vast stretches of lava flow that once covered Oregon and in which various feldspars formed. Suffice it to say that copper is not a frequent lava bedmate. But somehow or other copper either wormed its way into some Oregon labradorite or was already present at formation. It doesn't seem to have done so anywhere else, which is why some have taken to calling Oregon sunstone cuprian, or copper-bearing, labradorite, in order to further individualize this material.

Oregon sunstone is mined in two separate areas about 150 miles apart, both rich in volcanic rock and requiring heavy machinery to free crystals from the basalt in which they grew.

Although gem mining annals note sunstone extraction early in the 20th century, this gem first captured wide attention when gem miner and promoter Larry Gray became an apostle for production at his Ponderosa Mine located in the Rabbit Basin area of eastern Oregon in the late 1980s. The rich orangey-red stones he showed at Tucson earned sunstone temporary regard and rivalry with stones like red spinel and rubellite. This writer was so impressed with Oregon's red labradorite that he became a fellow sunstone missionary and wrote a series of articles on this spell-binding material. Tiffany & Co. was impressed as well, paying as much as $1,700 per carat for spectacular Ponderosa stones, and briefly sold the gem as American Sunstone.

During the 1990s, the sunstone crusade lost some of its market momentum — that is, until miners in Oregon's south-central Plush area like Don Buford of Dust Devil Mining started to once again bang the drum loudly for it around 2000. Buford was joined by other sunstone miner zealots like Chris Rose at Spectrum Sunstone Mines; Derek Lusk and Steve and Gary Andrus at Outback Mining; Gary Kratochvil at Sunstone Mining, and John and Debbie Aldrich at Double Eagle Mining. In 2003, the Ponderosa Mine was purchased by John and Talley Woodmark and rechristened Desert Sun Mining, with annual production now said to be around 3 million carats. With all of these ventures currently active, sunstone production has reached a new crest and could easily rise farther if demand warrants it.

FROM MINE TO MARKET

Some Oregon sunstone producers have "strategic alliances" with cutters and jewelry designers. A good example is the highly successful partnership of Dust Devil Mining and designer Karla Proud's "Rainbow Collection" and the award-winning creations of cutter Dalan Hargrave featuring Dust Devil's red and green stones. But some wholesalers and retailers with a passion for Oregon sunstone practice the one-man vertical integration possible only with a native gem — mining many of the stones they sell and sometimes even cutting them. Several times a year cut-

BELOW LEFT: Sunstone rough as it looks straight out of the mine. Photo courtesy of Don Buford, Dust Devil Mining Co. BELOW RIGHT: Mining sunstone at the Outback mine. Photo courtesy of Outback Sunstone Mining Co./Opalcolors.

ter John Franke leaves his store, Facet Shoppe, in Burley, Washington, to mine roughs at a claim in which he has a small interest.

Becoming a mine owner is an outgrowth of regular digging in the Plush area for the past eight years. To create a bond with sunstone as deep and devout as their own, miners invited cutters and designers to work alongside them, often giving them crystals on credit, asking for payment only after finished stones were set and sold. Eventually, says part-time miner Douglas, "I wanted to be a mine stakeholder, sharing the risks and rewards with the miners who devoted their lives to sunstone."

Franke says that mining has so deepened his love of sunstone that most of his output as a cutter is now in this feldspar. "You ask me what my specialty is, and I've got to tell you it is Oregon sunstone. When I'm not cutting it, I'm out mining it. This gem has become my life. And since much of my sales are of sunstone, I've got to assume this gem is making big inroads into the American jewelry scene." ❍

TOP LEFT: Entrance to the Spectrum Sunstone Mine. TOP RIGHT: Miner and gem cutter Gary Kratochvil. Photos by Gary Kratochvil, Sunstone Mining Co. ABOVE CENTER, TOP TO BOTTOM: Two cut and faceted sunstones from the Outback Mine. Photos courtesy of Karla Proud, Exotic Gemstones. Sunstone rough from the Dust Devil mine, ready for cutting. Photo courtesy of Bruce White, Sierra Gems. Red sunstone rough from Dust Devil. Photo courtesy of Don Bufore, Dust Devil Mining. RIGHT: Large Oregon sunstone rough. Photo courtesy of John Durbin, Oregon State Gems.

PLUSH MINING GROUP
Sunstone Gems

Exotic Gemstones LLC
www.oregon-sunstone.com

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Bend, OR 97708-5424

Products:
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Faceted Dust Devil Mine
Plush Sunstone
Sunstone Beads and Cabochons

Contact: Karla Proud
541-633-6301
Karla@oregon-sunstone.com

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Double Eagle Mining Company
www.doubleeaglemine.com

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Lakeview, OR 97630

Products:
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Contact: John & Debbie Aldrich
541-417-0158
john@doubleeaglemine.com

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Oregon State Gems, Inc.

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Sunstone Mining Company
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www.jewelcutter.com

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San Antonio, TX 78218-0383

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Contact: Gary Kratochvil
gary@sunstonemining.com

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Outback Sunstone Mining Company

Contact:
Steve Andruss 509-538-2772
Gary Andruss 541-386-2397
Derek Lusk 707-367-2141

Spectrum Sunstone Mining
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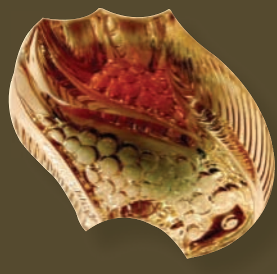

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ddmc@oregoncoast.com

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