# GEM SCOOPS

Vol. 52, No. 9 Pendleton District Gem and Mineral Society September 2014


# ALL ABOUT OPALS

## SEPTEMBER MEETING

**WHEN:** September 16, 2014 at 7:00 pm
**WHERE:** Cheezem OLLI Education Center
**SPEAKER:** Bob Green
**TOPIC:** All About Opals

Opal is a gemstone that few people know much about. Bob Green will introduce us to the gem, where they are found, and how to cut them. He will bring and show us uncut rough and finished opal gemstones he has cut. His wife will be wearing some of the opals they have cut and that she has incorporated into jewelry.

Bob Green is a retired Mechanical Engineer who has become seriously interested in minerals and lapidary. He has studied opal cutting at workshops in Georgia. He is active in the Southeast Federation of Mineralogical Societies and is currently the Safety Representative of the organization. He is the President of the Greenville Club.

Dard & Bob Whitmore have signed up to provide snacks at the meeting. Visitors are always welcome.

## President's Remarks

Welcome back everyone! I hope you all had an excellent summer. The new academic year has started and we have an exciting Fall lineup in store for you. Temperatures are cooling, football is heating up, and the rock club is back in session.

On Tuesday, September 16, Bob Green, from the Greenville Rock Club, will speak to the PDGMS club about opals. Locations where opals are found and the types of opals extracted from various sites will be discussed. Some rough and finished opals will be on display along with some that are set in jewelry. The event will take place at 7 pm at our usual OLLI center location. We expect some geology visitors/friends at this event!

ON Tuesday, October 21, the PDGMS club will meet at John and Candy Palmers' place in Salem, SC for a potluck dinner. The purpose of this event is to eat, have a good time, and discuss plans for our newly purchased mobile storage/teaching shed. While a bit of daylight savings time may still warm the evening air, darkness will impact this meeting-- the starting time is 6 pm, one hour earlier than normal. The location is near State Highway 11, and with the changing leaf colors, should be a pleasurable evening.

While on this topic, I'd like to thank everyone for their donations to the storage/teaching shed. We've raised over $350 so far --- and it's still coming in! Much to the relief of Treasurer John Ishler, this has relieved any club budgetary concerns. Our next step lies with consolidating all group equipment into this shed. In the event that you might have some club tools and/or property floating about, we would much appreciate it if you'd bring them to this event.

Lastly, please think start thinking of the PDGMS Board for the next year. As I will be on sabbatical next January -- June (The University of Calgary, Canada), there will be at least one slot where you can help!

*Robert*

### OCTOBER MEETING

The next meeting of the PDGMS will be on October 21, 2014. Put it on your calendar.

**Officers for 2014**
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**Carol Lund, Secretary.....864-888-8719**
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# The Opal Mineraloid

Opal is a hydrated amorphous form of silica; its water content may range from 3 to 21% by weight, but is usually between 6 and 10%. Because of its amorphous character, it is classed as a mineraloid, unlike the other crystalline forms of silica, which are classed as minerals. It is deposited at a relatively low temperature and may occur in the fissures of almost any kind of rock, being most commonly found with limonite, sandstone, rhyolite, marl, and basalt. Opal is the national gemstone of Australia, which produces 97% of the world's supply.[4] This includes the production of the state of South Australia, which accounts for about 80% of the world's supply.[5]

The internal structure of precious opal makes it diffract light; depending on the conditions in which it formed, it can take on many colors. Precious opal ranges from clear through white, gray, red, orange, yellow, green, blue, magenta, rose, pink, slate, olive, brown, and black. Of these hues, the reds against black are the most rare, whereas white and greens are the most common. It varies in optical density from opaque to semi-transparent.

Common opal, called "potch" by miners, does not show the display of color exhibited in precious opal.

Precious opal shows a variable interplay of internal colors, and though it is a mineraloid, it has an internal structure. At microscopic scales, precious opal is composed of silica spheres some 150 to 300 nm in diameter in a hexagonal or cubic close-packed lattice. These ordered silica spheres produce the internal colors by causing the interference and diffraction of light passing through the microstructure of the opal.[8] The regularity of the sizes and the packing of these spheres determines the quality of precious opal. Where the distance between the regularly packed planes of spheres is around half the wavelength of a component of visible light, the light of that wavelength may be subject to diffraction from the grating created by the stacked planes. The spacing between the planes and the orientation of planes with respect to the incident light determines the colors observed. The process can be described by Bragg's law of diffraction.

Visible light of diffracted wavelengths cannot pass through large thicknesses of the opal. This is the basis of the optical band gap in a photonic crystal, of which opal is the best-known natural example. In addition, microfractures may be filled with secondary silica and form thin lamellae inside the opal during solidification. The term opalescence is commonly and erroneously used to describe this unique and beautiful phenomenon, which is correctly termed play of color. Contrarily, opalescence is correctly applied to the milky, turbid appearance of common or potch opal. Potch does not show a play of color.

For gemstone use, most opal is cut and polished to form a cabochon. "Solid" opal refers to polished stones consisting wholly of precious opal. Opals too thin to produce a "solid" may be combined with other materials to form attractive gems. An opal doublet consists of a relatively thin layer of precious opal, backed by a layer of dark-colored material, most commonly ironstone, dark or black common opal (potch), onyx, or obsidian. The darker backing emphasizes the play of color, and results in a more attractive display than a lighter potch. An opal triplet is similar to a doublet, but has a third layer, a domed cap of clear quartz or plastic on the top. The cap takes a high polish and acts as a protective layer for the opal. The top layer also acts as a magnifier, to emphasize the play of color of the opal beneath, which is often of lower quality. Triplet opals therefore have a more artificial appearance, and are not classed as precious opal.

Combined with modern techniques of polishing, doublet opal produces similar effect of black or boulder opals at a mere fraction of the price. Doublet opal also has the added benefit of having genuine opal as the top visible and touchable layer, unlike triplet opals.

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