

Crystal Opal *A 360 Degree Discussion*

/Introduction

Mystery. Malady. Superstition. Ill-fortune. Treachery. A mere sampling of words used to describe precious opal. The mention of it brings about images of ever changing flashes of vivid colors. Every flash of color is a new page, turning, telling the observer its story; The greatest story ever told in each and every precious piece. For as long as opals are mined the story will continue. Its skeletal closet will forever keep its secrets hidden deep within each precious gem. Many have, and many will continue, to assess value in opal but we will truly fail. History and lore aside, precious opal is an ever changing artists pallet. Comprised of the most intensely vivid spectral colors. Can we *truly* recognize its value? Every turn to the observer yields more fascination. This is held truest with crystal opal. Anything but transparent.

Opal has always had an aura that transcends the confines of its non-crystalline structure. There are many documented myths and an equal amount of documented tales of treachery, deceit, failure and success in the hunt for truly magnificent opal. Perhaps the former three are pre-requisites and a prequel to the latter.

The earliest known opal artifacts were found in Kenyan caves. These artifacts dated back to around 4000 B.C. and most likely came from Ethiopia¹. Generally speaking it was the Ancient Romans who provided the first opal market by about 100 B.C. Part of the Slovak Republic, formerly an area in Hungary, produced the vast majority of *Old World* opal.

Opal can be found in modern times throughout the world. Australia (dominant provider), Zambia, Peru, Canada, Mexico and the USA are some of the notable suppliers. Not unlike other gem stone mining of ancient times, opal mining consisted of a strong back, strong will, period hand tools and a bit of luck. The modern era has provided opal miners with far superior mining methodology. Nevertheless, the majority of the basic principles remains the same.

Opal was highly regarded in ancient times. Gaius Plinius Secundus (23 A.D.-79A.D.), better known as Pliny the Elder, an ancient Roman author and philosopher, found opal to be second in value only to emeralds. He described opal as having "a refulgent fire of the carbuncle (ruby or garnet), the glorious purple of amethyst, the sea green of emerald, and all those colors glittering together mixed in an incredible way."² Very simplistic yes, but accurate. There were also beliefs that it had evil mystical power bringing about ill fortune to its wearer. Other myths touted opal as being able to provide its wearer with acute sense of sight.

¹ Opals by Fred Ward

² Opals by Fred Ward

The Slovak Republic mines can be credited for supplying opal for more than two thousand years. An incredible mine life span even to this day. Today, most opal is mined from regions within Australia. Up until the late 1800's, the European opal market had really only seen the Hungarian brand of opal. When Australian opal started to surface there was scepticism and reserve. People were suspicious and believed they were imitations. The Australian opals were so vivid and brilliant in comparison to what the market was accustomed to. The Australian opal boom occurred quite quickly. White Cliffs in New South Wales was the first Australian commercial opal mine in 1863. The mine produced white opal. Shortly thereafter fabulous black opal from neighbouring Lightning Ridge emerged. Lightning Ridge is but one of the many now infamous mines of Australia. This includes the massive deposits at Coober Pedy. The black, light and dark opal of Mintabie and the rugged fields at Andamooka.

Opal is non crystalline. It does not form a consistence characteristic shape. Chemically it is a hydrated silicon dioxide containing a small percentage of water (up to 10%). It is not an overly hard gem, having a hardness of 6 mohs. Its refractive index is between 1.40 and 1.45 (depending on variety) with a specific gravity between 2.00 and 2.10.

There are several beautiful varieties, namely: Black, boulder, matrix, crystal, light, patch (common opal) and fire opal. It is generally believed that opal formed when silica rich water deposited in cavities and faults. Sediments liberated the silica. The dissolved silica was trapped. Silica rich water continued to collect and eventually the water evaporated and the silica collated. This steady process produced opal.

Within opal are microscopic silica spheres of somewhat orderly arrangement. Light striking these spheres diffracts at different speeds. This overlap of light waves causes a combination of diffraction and interference thus creating the *play of color* phenomenon in precious opal. One remarkable aspect of precious opal is its ability to show such a wide range of colors as it is rotated in light. Always keeping its observer on his heels.

Crystal Opal

Essentially any opal mine is capable of producing crystal opal. Crystal opal is particularly interesting because it has two very distinctive characteristics. Play of color and transparency. The term crystal opal can be misleading. The term crystal often refers to crystalline gem material. In fact crystal opal, and all varieties of opal, are not crystalline. Crystal is used in the descriptive sense referring to its transparency. There are conflicting opinions in gemmological circles about when or when not to call opal, crystal opal. The conflicts arise around two issues a) it's clear enough to read through, b) it's clear enough to read through on a light background. Really there are two very simple tests the gemmologist and/or appraiser should be doing when presented with precious opal, a) transparency test, b) background test. It is generally accepted that opal must be transparent or semi transparent to be classified as crystal opal.

Both tests are very simple yet both require conscientious effort to include them in the gemmologists *routine* when examining precious opal. Transparency tests refer to the visibility of an object viewed through the stone. To come to a definitive conclusion one

must look at the opal from various directions using a variety of light. For example, the play of color may be so intense it convinces the observer that he/she is looking at a good piece of black or dark opal. This is truest when the observer tries to conduct the read through test on such a piece using overhead daylight equivalent light. If the observer used transmitted light and concentrated on looking through the opal they would then see that the piece is in fact transparent or semi-transparent. The observer must be cautious and not confuse transparency with translucency. Translucency refers to the stones ability to transmit light through the stone but objects can not be seen through the stone. To confuse the two issues is grievous. My research failed to surface any publications on guidelines for conducting transparency tests. Suffice to say that transparency tests should be carried out with the naked eye using a variety of light sources.

Read through tests are a fairly obvious technique, in most cases. When presented with an obvious transparent piece of opal a read through test is quite simple. However, it becomes problematic when presented with an opal with intense play of color. Such is the case with opal viewed on dark backgrounds. The dark background only intensifies the colors. Therefore, even in transmitted light, a dark background is never recommended as a sole means of classification. The gemmologist should however never omit this from their methodology. Rather, observe the stone on a dark background and then on a light background (ie: newsprint on a white background). The difference can be quite dramatic. Where the dark background intensified the body color, the light background softens it and in some cases provides proof that the stone is in fact transparent. Some pieces have likely been mistakenly classified as dark opal when in fact they were crystal

opal on a black or dark background. Such is the danger when examining a piece that is mounted in a closed back setting.

A particularly interesting variety of crystal opal is Contra Luz (*against the light*). With this particular variety the play of color is only visible when illuminated from the sides or behind. It is particularly dramatic when viewed against a black background. The play of color can be delicate and appear to be floating. Without paying particular attention to lighting it would be easy to dismiss this as common opal.

Aside from the two aforementioned techniques a characteristic exists that will assist in confidently identifying crystal opal. The effect of *crazing* is prevalent on crystal opal. Particularly those mined at Virgin Valley, Nevada USA. Crazing occurs when any opal spontaneously develops a network of fine internal cracks³. This occurs as a result of the opals gradual loss of water content. This is most certainly identifiable. It also reminds us just how precious crystal opal really is. Crazing is difficult to control because generally speaking one does not know when the gem will decide to start cracking. Some believe frequent soaks in mineral oils or water may assist in combatting crazing. A fine piece of crystal opal will therefore stand up better in a pendant than a ring due to its fragility and softness.

³ Gems and Jewelry, Joel E. Arem, 2nd Edition

C^{onclusion}

Having come full circle one can see the importance of proper identification of opal.

Crystal opal specimens are some of the rarest and expensive collectible varieties of opal.

Gemmologists owe it to the gem to conduct thorough gemmological testing. Frankly speaking, the necessary testing is quite elementary, as has been discussed. Where the gemmologist will truly struggle is assessing value. Precious opal has been highly regarded for centuries. Can we put a price on its history, its lore. As we struggle with subjectivity can we define the "perfect" play of color? Even more so can we then assess value to that "perfection." In a time where markets are driven by supply and demand value is often redirected in the form of a statement, "what is someone willing to pay." True value will surely take a back seat to market demand. But what does the *market* demand of the crystal opal? Those answers lay hidden between the intimate relationship of truly magnificent crystal opal and the observer who is able to convey its story.

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