

CIBJO Opal Guide

Progress Report

Charles Abouchar
President
CIBJO Coloured Stone Commission



CIBJO Guides

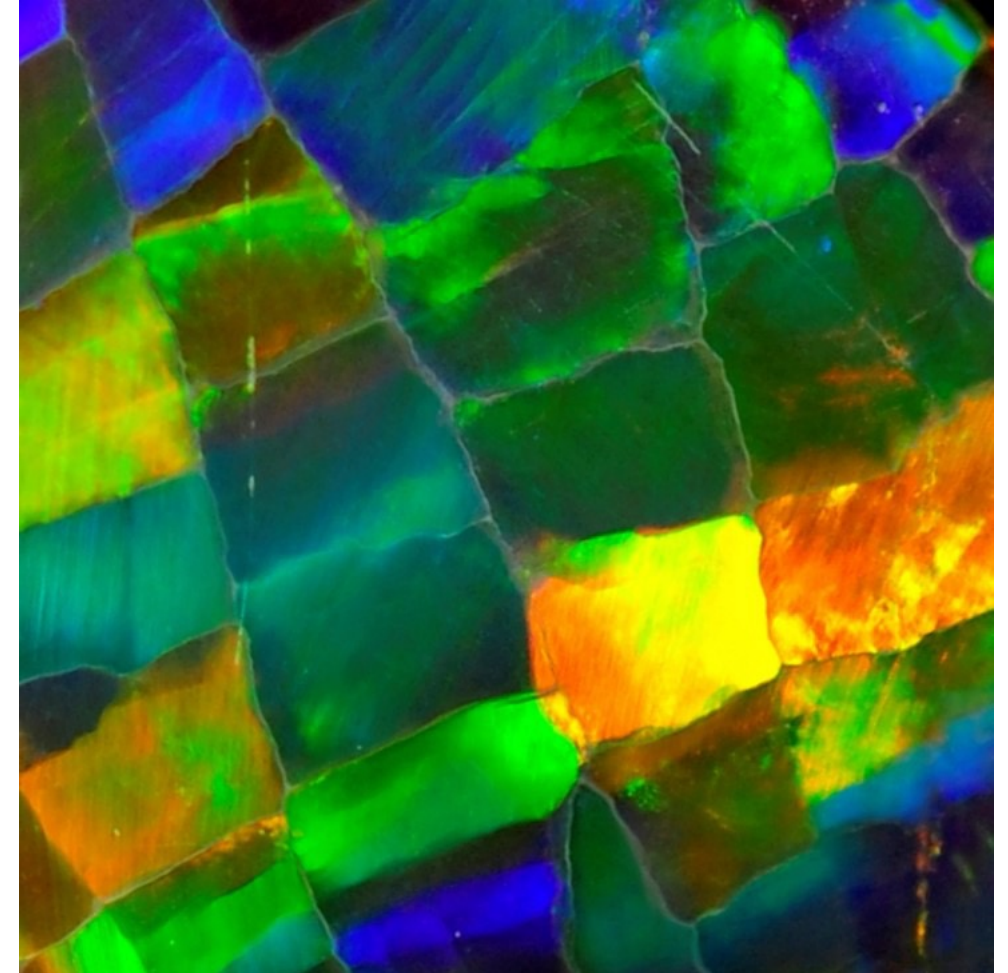
Opal

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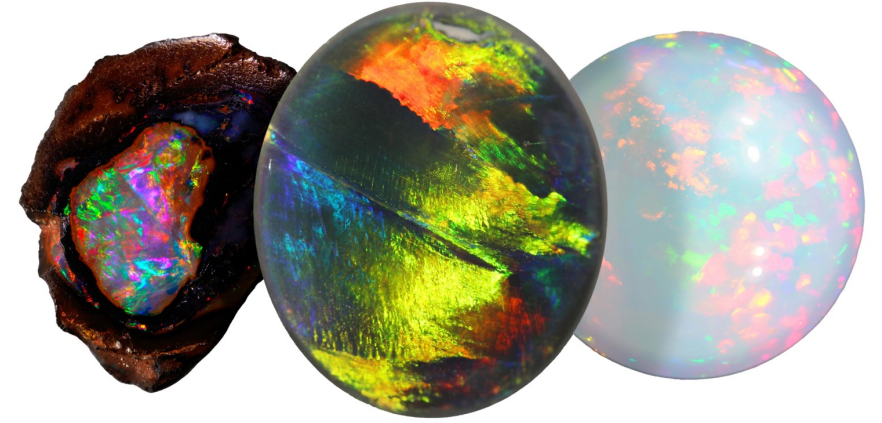
Opal Guide Working Group

composed of opal specialists from Australia, Mexico, Brazil, and Ethiopia.

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A brief overview of progress



- All meetings have been via Zoom video conferencing with e-mail and other messaging applications in between.
- Currently at 122 educational pages of illustrated opal information
- Hundreds of potential images
- Covers all opal producing (present and historic) and the opals produced

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1. Definitions

Absorbency; Absorbency in opal relates to the absorption, or loss, of water or another liquid by an opal either when immersed, or exposed in air, under normal conditions. Absorbency varies; some opal is not very absorbent and changes very little in mass or appearance, but in some cases changes to the appearance, mass and/or stability of the opal can be dramatic.

Absorption Factor; is measured by percentage change in weight after immersion in a fluid. Hydrophane opal may have varying rates of absorption and capacity for absorption.

Artificial; all material that simulates or resembles natural opal but is manufactured.

Black Opal; shows play-of-colour within or on a black body tone when viewed face up and may be designated N1, N2, N3 or N4 on the Scale of Body Tone.

Black Crystal Opal; shows a degree of transparency and the colours are often brilliant and can appear to come from the depths of the gemstone.

Body Hue; the hue or colour of the body of an opal when ignoring its play of colour (if present).

Body Lightness; synonym for body tone (cross ref).

Body Hue/Colour Saturation; the intensity or purity of a colour.

Body Tone; the relative darkness or lightness of an opal when ignoring its play of colour (if present). It is assessed from the 'Face Up' or top view of the stone, not the base.

Boulder Opal; Natural Opal presented as one piece where the opal naturally occurs in or on the host rock..

Brightness in play of colour; The intensity level of the light within the play of colour returned to the observer after diffraction by the opal.

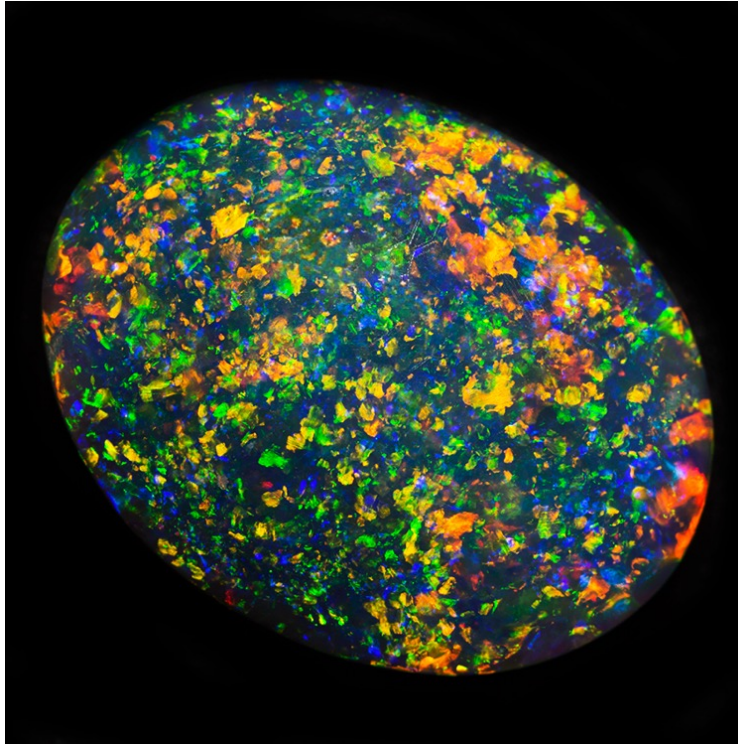
Colour play; See play of colour.

Common Opal; An historical mineralogical or gemmological term used to describe an opal that does not exhibit play of colour.

Composite; natural and/or synthetic opal composed of two or more components which have been assembled by bonding or other artificial methods. Composites include but are not limited to doublets, triplets, mosaics, inlay and plastic embedded opal.

Contra-luz opal; a transparent opal that shows play-of-colour when light is transmitted through it. The words contra-luz literally translates to "against the light."

Crazing; the formation of a network of fine cracks or fissures on or in an opal



Crystal Opal; opal with play of colour that is translucent or transparent.

Cutting and polishing; the process of sawing, grinding and polishing an opal from rough; includes carving

Dark Opal; opal with a dark body tone (body lightness) when viewed face up and may be designated N1, N2, N3 or N4 on the scale of body tone.

Diaphaneity; Diaphaneity refers to the degree of transparency of an opal. An opal may be: transparent allows most light to pass through with little distortion of images seen through the opal. Translucent – allows some light to pass through but does not permit resolution of images viewed through the opal. Opaque – no light passes through

Diffraction; the process by which a beam of light or other system of waves is spread out as a result of passing through a narrow aperture or across an edge or lattice, typically accompanied by interference between the wave forms produced.

Directionality; Directionality implies a tendency or ability to move or be oriented in a specific direction.

Doublet; a composite of two pieces where a slice of natural or artificial opal is cemented to a base material.

Fire Opal; a transparent to translucent opal that has a yellow, orange, or red body hue. Fire opal may present with or without a play of colour.

Face; presentation face of a stone.

Host Rock; The rock in which opal forms. This rock is sometimes included in the opal when cut as a gemstone.

Hydrophane Opal; opal with or without play of colour that is absorbent. Hydrophane opal can change appearance, mass and/or stability depending on the amount of water it contains at any given point in time.

Imitation; imitation opal is material manufactured to simulate or resemble natural opal but that has different chemical composition, optical or physical properties to natural opal.

Impermeable; Impermeable opal does not absorb, or lose water or other liquid, either when immersed, or exposed in air.

Inlay; Embedding pieces of an opal manually attached to any material, flush with its surface or pieces of precious opal that have been cut and fitted into specially cast pieces of jewellery and are polished flat and flush to the surface of the item.

Intarsia; 'Stone in stone' inlay. In opal intarsia, pieces of opal are inlaid into stone.

Ironstone; a sedimentary rock, either deposited directly as a ferruginous sediment or created by chemical replacement, containing a substantial proportion of an iron compound

Jelly opal – (also called water opal); is transparent to semi-transparent, and exhibits no to slight play-of-colour.

Light Opal; translucent to semitranslucent opal with play of colour against a white or light body tone (N7, N8, N9).

Matrix Opal; Natural Opal in Host Rock; that is, opal presented in one piece where the opal is intimately diffused as infillings of veins, pores or holes or between grains of the host rock.

Mosaic; a picture or pattern produced by arranging multiple small pieces of opal closely adjacent to one another and manually attached to a base of any material or are a composition of a small flat or irregularly shaped pieces or "tiles" of natural opal cemented as mosaic pattern on a dark base material. Sometimes pieces of opal are also encompassed in a resin as in 'opal chip' gemstones.

Moss opal; opal containing dendrite inclusions of another mineral that cause a moss or fern-like appearance within the gem

Natural Opal; Opal derived solely from nature presented in one piece in a natural state except for cutting and polishing.

Nomenclature; The devising or choosing of names for things, especially in a science or other discipline. The terms used and names given in the classification of opal.

Non-Absorbent; Does not absorb or soak up liquids.

Opal; Opal is an hydrated amorphous form of silica $\text{SiO}_2 \cdot n\text{H}_2\text{O}$.

Oolitic opal; Opal containing dark black, brown or white spherical inclusions.

Opal in host rock; Opal presented in its natural state (apart from cutting and polishing) where the opal is intimately diffused as infilling veins, pores, holes and voids, or between grains in the host rock.

Opal on host rock; Opal presented in its natural state (apart from cutting and polishing) and naturally attached to the host rock as a layer or where there is a substantial amount of opal on the presentation face.

Opaque; not transparent or translucent; impenetrable to light; not allowing light to pass through.

Play of Colour; the phenomenon whereby opal may display spectral colours. It is caused by the diffraction of white light. The presence of play of colour identifies the opal as Precious opal.

Potch; colloquial term for some Australian common opal.

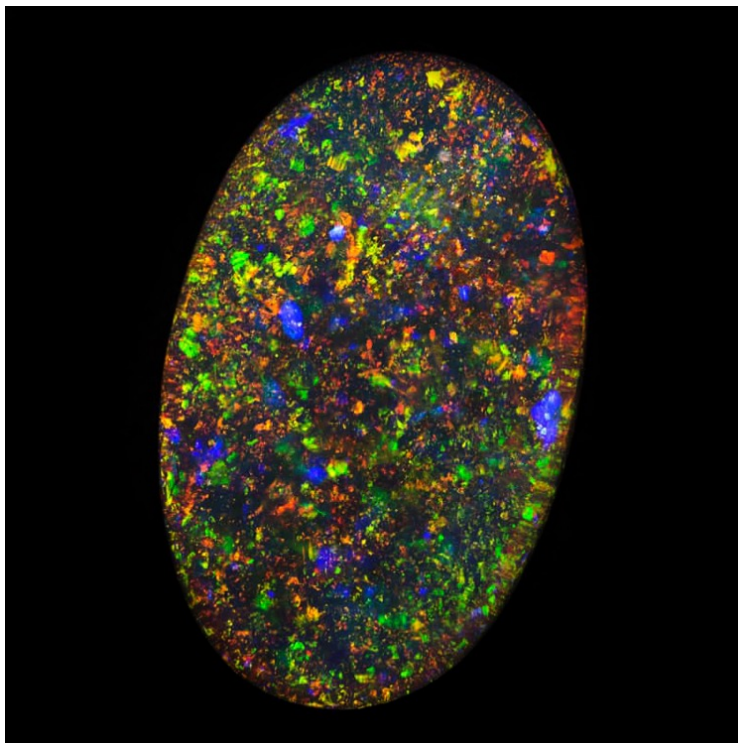
Precious Opal; opal which exhibits a play of colour.

Refraction; The deflection of electromagnetic radiation, e.g., visible light, infrared, passing through the interface between one medium and another.

Sedimentary opal; Descriptive term for opal formed within a sedimentary environment.

Simulant; A material which exhibits a visual appearance similar to opal but that does not have the same structural or chemical properties of opal.

Solid opal; term has been traditionally used to describe homogeneous opal.



Synthetic opal; Synthetic opal is a manufactured material with the same chemical composition ($\text{SiO}_2 \cdot n\text{H}_2\text{O}$), microstructure, optical and physical properties as natural opal¹.

Translucent; transmitting and diffusing light so that objects beyond cannot be seen clearly

Transparent; allowing light to pass through so that objects behind can be clearly seen.

Treated opal; Opal that has been treated in order to change its appearance or properties, for example to change body tone or colour, stability or hardness. Includes, but is not limited to, dyeing, smoking, painting, coating, impregnation, filling, stabilisation, heating, or enhancement processes of any kind. Cutting and polishing is not considered a treatment.

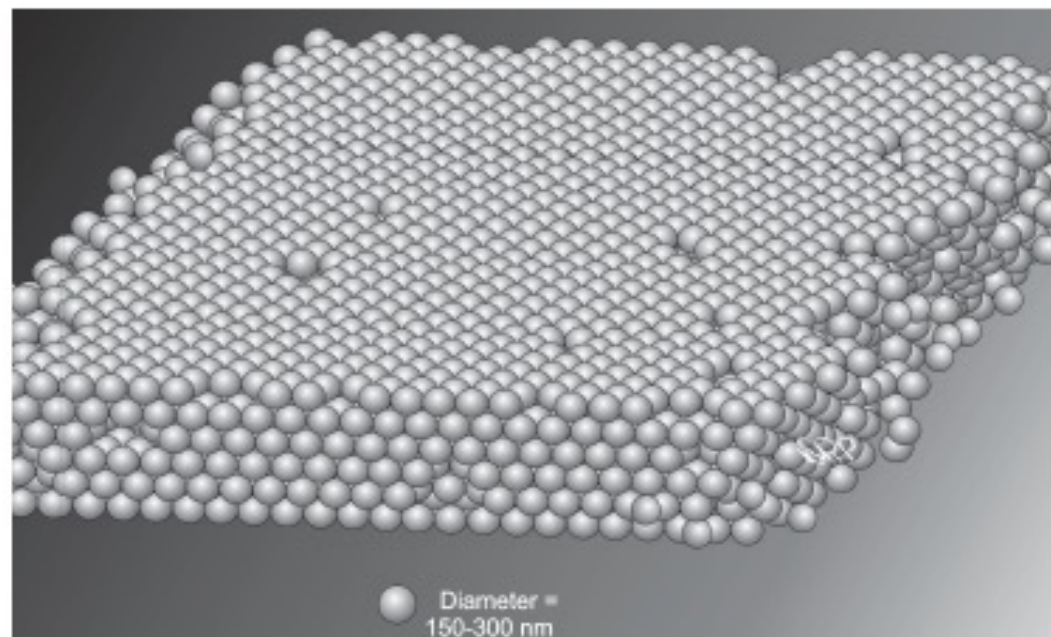
Variety; Factors such as diaphaneity, diffracted colours, patterns, body colour, phenomena, morphology, form and other gemmological factors can all play a role in the determination of an opal's variety.

Volcanic opal; opal found in volcanic environments.

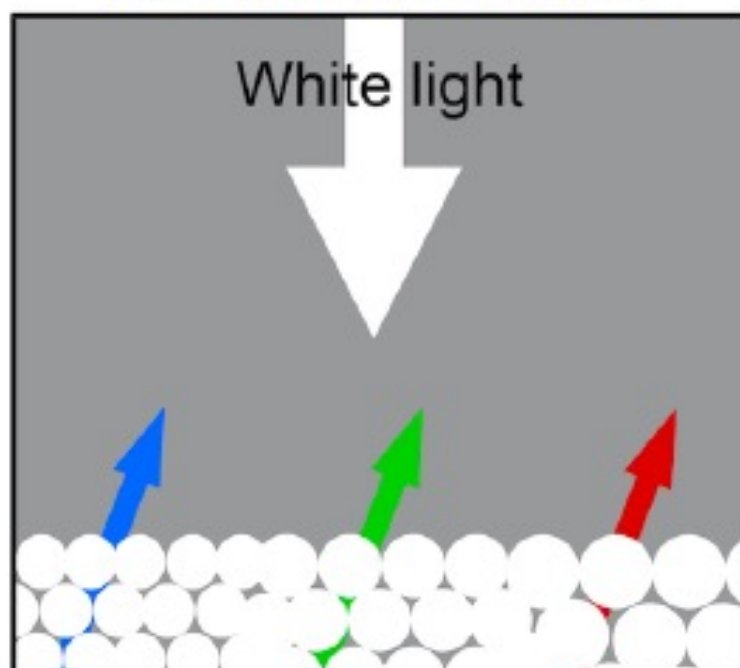
Water opal; is transparent (clear) opal to from Mexico, exhibiting no to slight play-of-colour.

White opal; White opals are those that exhibit a white or light grey bodycolor with or without a play of colour.

¹ It should be noted that much of the material presently marketed as synthetic opal does not meet the definition of a synthetic as it does not have the same chemical composition, under such circumstances it should be referred to as an opal imitation.



Opal molecular structure via scanning EM (idealized) By Dpultzer - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=137276056>



2. Understanding Opal

2.1. Introduction

This guide is created to aid in describing and classifying opal. Opal as a gemstone occurs in many differing types, from a multitude of differing localities, each displaying its own special features and characteristics making it desirable as a gem material. Opal may be subjected to treatments, manufactured, or combined with other materials before being fashioned as a gemstone.

The name opal likely derives from the Latin word opalus, and was mentioned in Pliny the Elder's Natural History (Pliny the Elder 1855–1857), the word opalus may have derived from ancient Sanskrit "upala" a precious stone.

The fascination for opal may be due its principal features: it's play of colour and wide range of body colours. A range of spectral colours can be enjoyed within a single gem.

Opal is a form of hydrated silica, a naturally occurring mineral composed of disordered silicon dioxide molecules and attached "water"² molecules with the general formula $\text{SiO}_2 \cdot n\text{H}_2\text{O}$, where 'n' is the number of "water" molecules in the chemical formula, as the amount of "water" in opal may vary (Gailou et al. 2008b). Traditionally the water content is quoted as a weight percent mass (Graetsch et al. 1985). Opal does not have a single crystal structure and it is unusual for a mineral as it has such a variable component – 'n' has no limit. Opal may have unique features such as body colour (O), patterning, translucency or opacity and other optical phenomena making it suitable to be used as a gem material (Gailou et al. 2008a). In this guide the term "opal" is used as the name for any form of opal considered to be a gemstone.

For the formation of opal millions of years ago three main factors were needed, a source of silica, a means of transporting the silica and sometimes a void into which it may be deposited. Most opal occurs in sedimentary rocks, examples being Australia and Brazil, or volcanic rocks examples being Mexico and Ethiopia.

² The quotation marks here follow a scientific practice for which water is not necessarily the liquid everybody knows, but the components of water (oxygen and hydrogen) present in a variety of forms : molecular water, bond water, hydroxyl groups (OH), even hydrogen is sometimes listed under "water".

2.2. Opal Classification

Classification is the categorization of opal according to Variety and Characteristics using defined Nomenclature. Over past decades there has been several opal classification systems proposed. CIBJO recommends the adoption of a classification system created in 2021 by the Australian Opal Association and the Gemmological Association of Australia on behalf of all those involved in the Australian opal industry.

Determine variety, then list characteristics (see definitions)

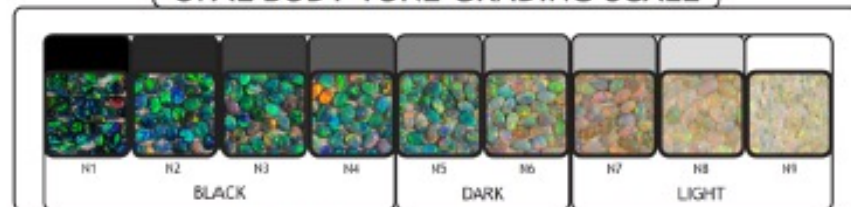
Variety

Natural Opal	→	Natural Homogeneous Opal (Solid Opal) Natural Opal on Host Rock Natural Opal in Host Rock
Composite Opal	→	Type and composition
Synthetic Opal	→	Manufacturer/Trade name
Opal Imitation/Simulant	→	Materials/Composition

Characteristic

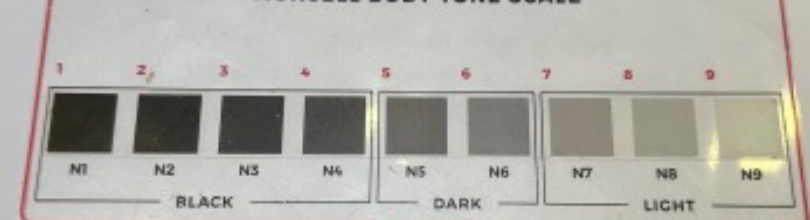
Absorbency	→	Impermeable: Opal that does not absorb water or other liquid Absorbent (Hydrophane): Opal that does absorb water or other liquid
Play of Colour	→	Exhibits Play of Colour (Precious Opal) Does not exhibit a Play of Colour (Common Opal)
Body Tone	→	Black (N1, N2, N3, N4 on the scale of body tone) Dark (N5 or N6 on the scale of body tone) Light (N7, N8, N9 on the scale of body tone)
Diaphaneity	→	Opaque Translucent Transparent
Treatment	→	No Treatment (apart from cutting and polishing) Treatment (detail all treatments)

OPAL BODY TONE GRADING SCALE



Opal with play of colour examples against the body tone scale

MUNSELL BODY TONE SCALE



Opal with no play of colour examples against the body tone scale (photo Steve's materials)

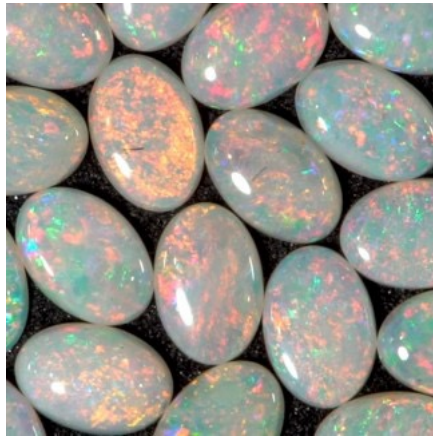
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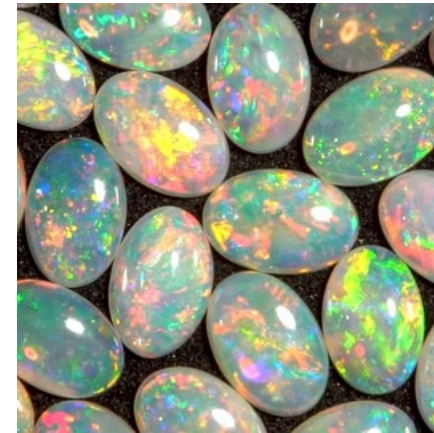
2



3



4



5



1 light opal faint. 2, light opal subdued. 3, light opal moderately bright. 4, light opal bright 5, light opal very bright.

(Images Cody Opal)

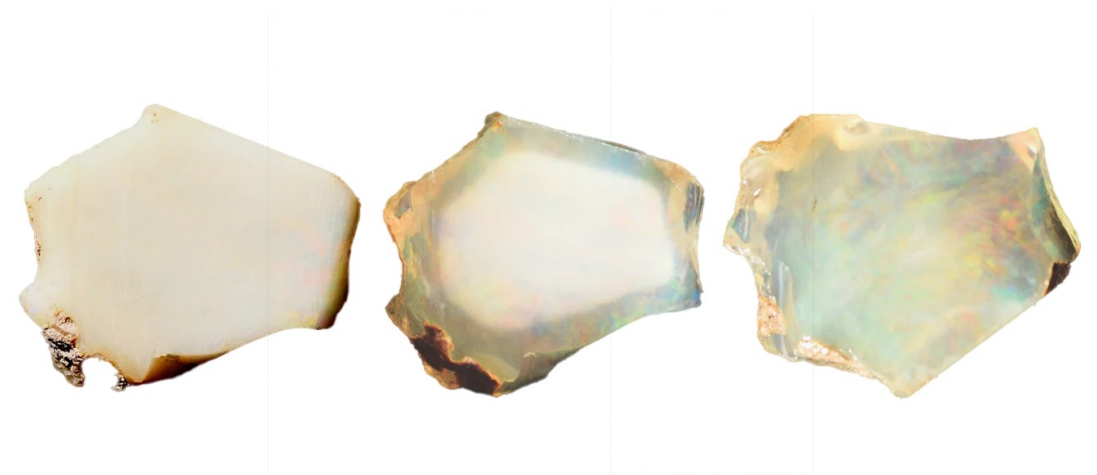
2.3. Opal Characteristics

2.3.1. Absorbency

Absorbency in opal relates to the absorption, or loss, of water or another liquid by an opal either when immersed, or exposed in air, under normal conditions. Absorbency varies; some opal is not very absorbent and changes very little in mass or appearance but in some cases changes to the appearance, mass and/or stability of the opal can be dramatic.

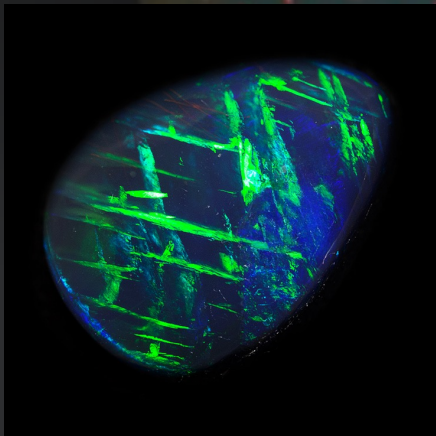
2.3.2. Hydrophane

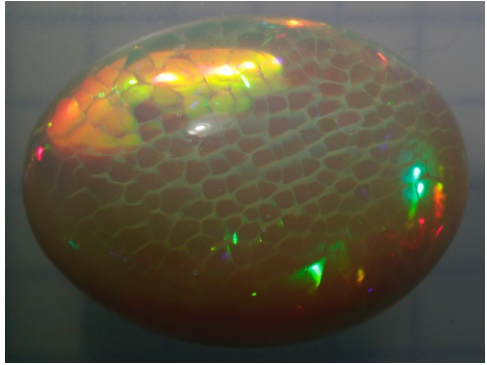
opal with or without play of colour that is absorbent. Hydrophane opal can change appearance, mass and/or stability depending on the amount of water it contains at any given point in time.



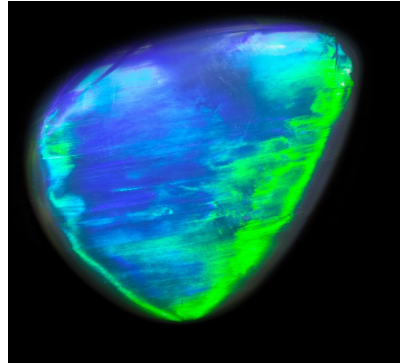
2.4.3. Patterns

There are a great variety of patterns of Play of Colour that have been named and described.

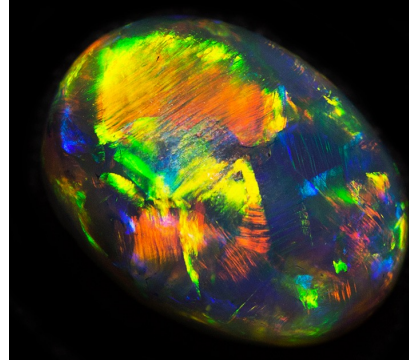




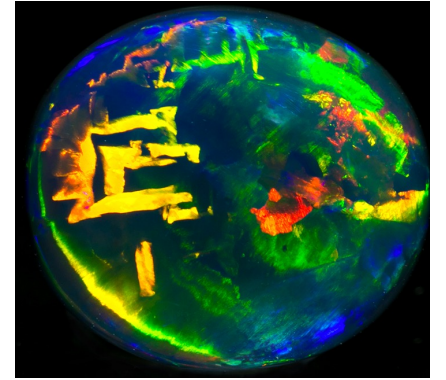
honeycomb pattern



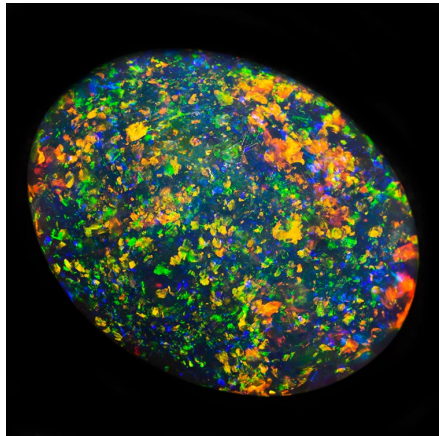
Broad flash



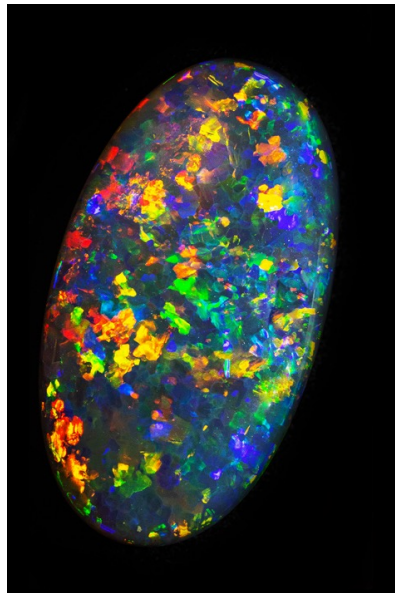
Chaff.



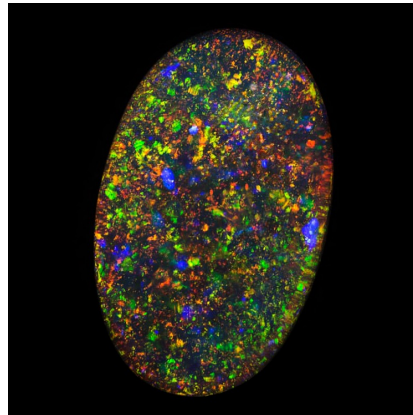
Script



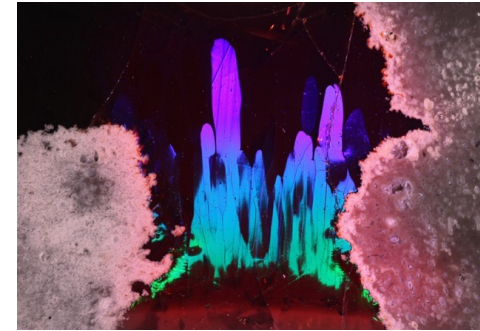
Flora



Cloverleaf.



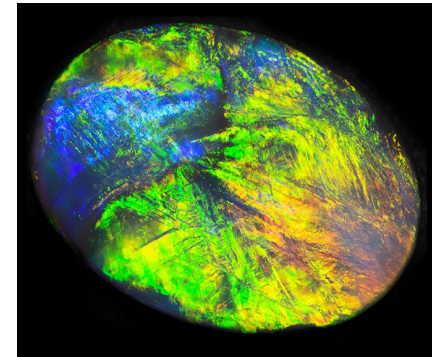
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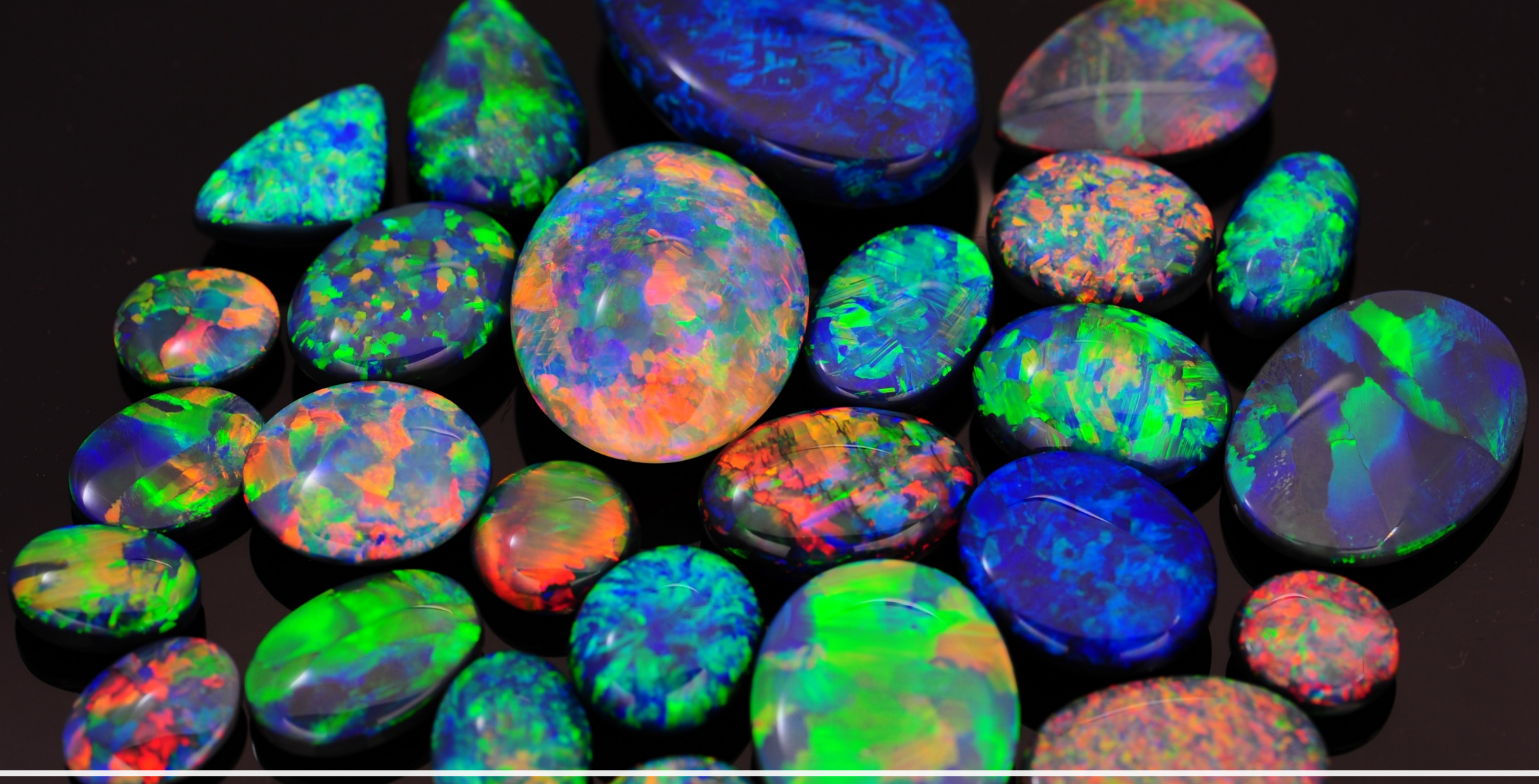


digits



Ribbon pattern





OPAL CLASSIFICATION CHARTS

10.2. Natural opal – Opal on host rock (presented naturally attached to the host rock)

Variety	Characteristics	Description characteristics	Terms used	Examples of additional descriptive terms that may be applied.
Opal on Host Rock				
Absorbency	Imperious	Absorbent	Hydrophane	
		Exhibits Play of Colour	Precious Opal	Predominant colours, Brilliance, Pattern
Play of Colour in opal	No Play of colour		Common Opal	
Body Tone of opal	Black			
Diaphaneity of opal	Dark	Light		
Treatment	Opaque			
Other Features	Translucent	Transparent		
Treatment	No Treatment	Treatment	Treated	dyed, smoked, carbonised, filled, impregnated, coated,
Other Features	Body Hue			Colour/s such as pink, blue, grey, yellow.
Presentation	Fashioned			Cabochon, carved, shape, polished slab, object, full face, split,
Rough	Nutm, pipe, split,			fossil, pseudomorph
Special features	Host Rock Type			Ironstone, sandstone, quartzite, basalt, andesite.
Source				Country, location, field, area



10.3. Natural opal – Opal in host rock (Natural opal as infillings of voids or between grains of a host rock. Presented in one piece)

Variety	Characteristics	Description	Term	Examples of additional descriptive terms that may be applied.
Opal in Host Rock				
	Absorbency of opal	Impermeable		
		Absorbent	Hydrophane	
	Play of Colour in opal	Exhibits Play of Colour	Precious Opal	Predominant colours, Brilliance, Pattern
		No Play of colour	Common Opal	
	Body Tone of opal	Black		
		Dark		
		Light		
	Diaphaneity of opal	Opaque		
		Translucent		
		Transparent		
	Treatment	No Treatment		
		Treatment	Treated	dyed, smoked, carbonised, filled, impregnated, coated,
	Other Features	Body Hue		Colour/s such as pink, blue, grey, yellow.
		Presentation	Fashioned	Cabochon, carved, shape, polished slab, object, full face, split,
			Rough	Nut, pipe, split,
		Special features		fossil, pseudomorph, patterns - rivulet, conglomerate, granular
		Host Rock Type		Ironstone, sandstone, quartzite, basalt, andesite.
		Source		Country, location, field, area



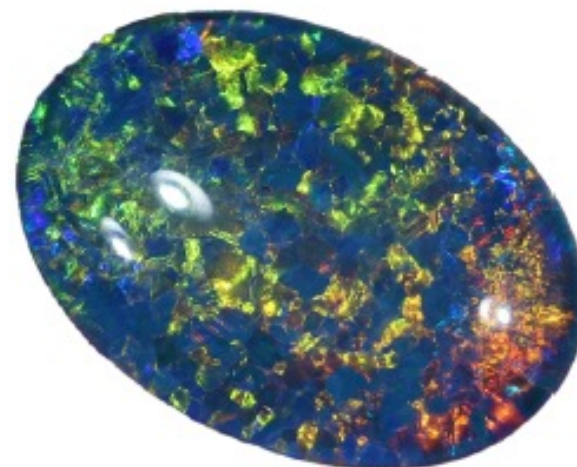
Boulder opal (Image Francesco Mazzaro)



Boulder opal matrix Church Window red (Image Cody Opal)

10.4. Composite opal (opal of any variety which has been manually attached to any material)

Variety	Description	Characteristics	Components	Examples of additional descriptive terms that may be applied.
Opal Composite				
	Doublet	Two layers cemented together to form one piece.	Top Layer	Precious opal black, dark, or light, synthetic opal, opal simulat, treated opal.
			Base Layer	Common opal, ironstone, ironstone/epoxy composite, onyx, plastic
	Triplet	Three layers cemented to form one piece.	Top Layer	Quartz, synthetic spinel, plastic, glass.
			Centre Layer	Precious opal, synthetic opal, imitation opal, diffraction grating
			Base Layer	Common opal, ironstone, ironstone/epoxy composite, onyx, plastic
Mosaic			Opal component	Precious opal, synthetic opal
			Base	Common opal, onyx, plastic or resin
			Other components	Transparent top layer, glass, clear epoxy
Intarsia			Opal Component	Precious opal, synthetic opal
			Other Components	Common Opal, any gem material, metal, wood, epoxy.
Inlay			Opal Component	Precious opal, synthetic opal
			Other Components	Resin, epoxy and metal



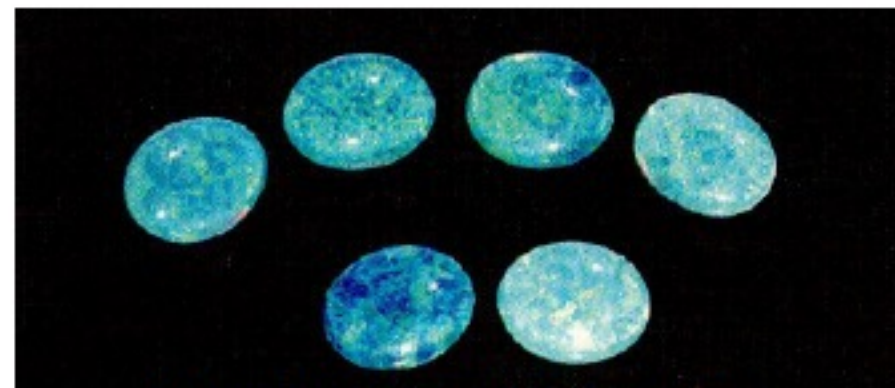
Opal triplet (Image Opal Auctions [need permissions](#))



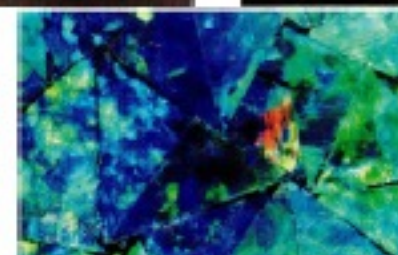
Mosaic: opal cabochons (Image Opal Auctions [need permissions](#))

10.6. Imitation or simulant of opal

Variety	Type	Description	Characteristics	Components	Term	Other descriptive terms to be applied when known
Opal Imitant or Simulant		Natural or manufactured materials that are not opal but have opal like characteristics.				
	Natural Materials	Iridescent Shell	Displaying spectral colours			Paua Shell, Fossil ammonite (Ammonite)
		Iridescent gem materials	Displaying spectral colours			Labradorite, Fire Agate, Rainbow Moonstone
	Manufactured Materials	Iridescent manufactured materials	Displaying spectral colours			Slucum Stone, Coloured foil in Glass, Plastic or resin, dichroic glass, glass or plastic with light diffracting properties
			Other Features	Presentation	Fashioned	Cabochon, carved, shape, polished slab, object.
				Special features	Rough	
				Source		Manufacturer or brand name

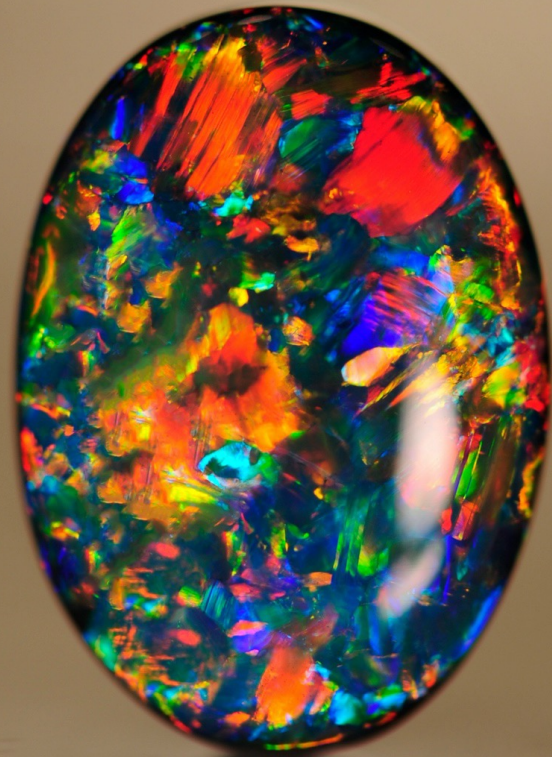


"Opalite" triplets (Image Maha DeMaggio – GIA – from (Scarratt et al. 1993))



Above left top view of Mosaic 'opalite' triplets and above right side-on views of these triplets, below a magnified image showing the mosaic made up of 'opalite' pieces (Images Maha DeMaggio – GIA – from (Scarratt et al. 1993))

11.2. Important opal producing countries



11.2.1. Australia

The number of occurrences of precious opal in Australia producing a diverse range of opal types in sustainable quantities means Australia has become the most important reliable source of precious opal in the world. At first glance the geographic locations of the Australian precious opal occurrences across South Australia, New South Wales and Queensland appear disconnected and random. It is only when the geology of the area is considered it can be noted that all the deposits have a common factor, their location within a large sedimentary basin known as "The Great Australian Basin" (GAB). (Altmann 1961; Anderson and Jevons 1905; Anonymous 1896, 1901, 1912; Durpré 1937; Gardiner 1925; Giops 1895; Heath 1965; Macdonald 1904; McIntosh 1960; Plumer 1901; Swindler 1950)

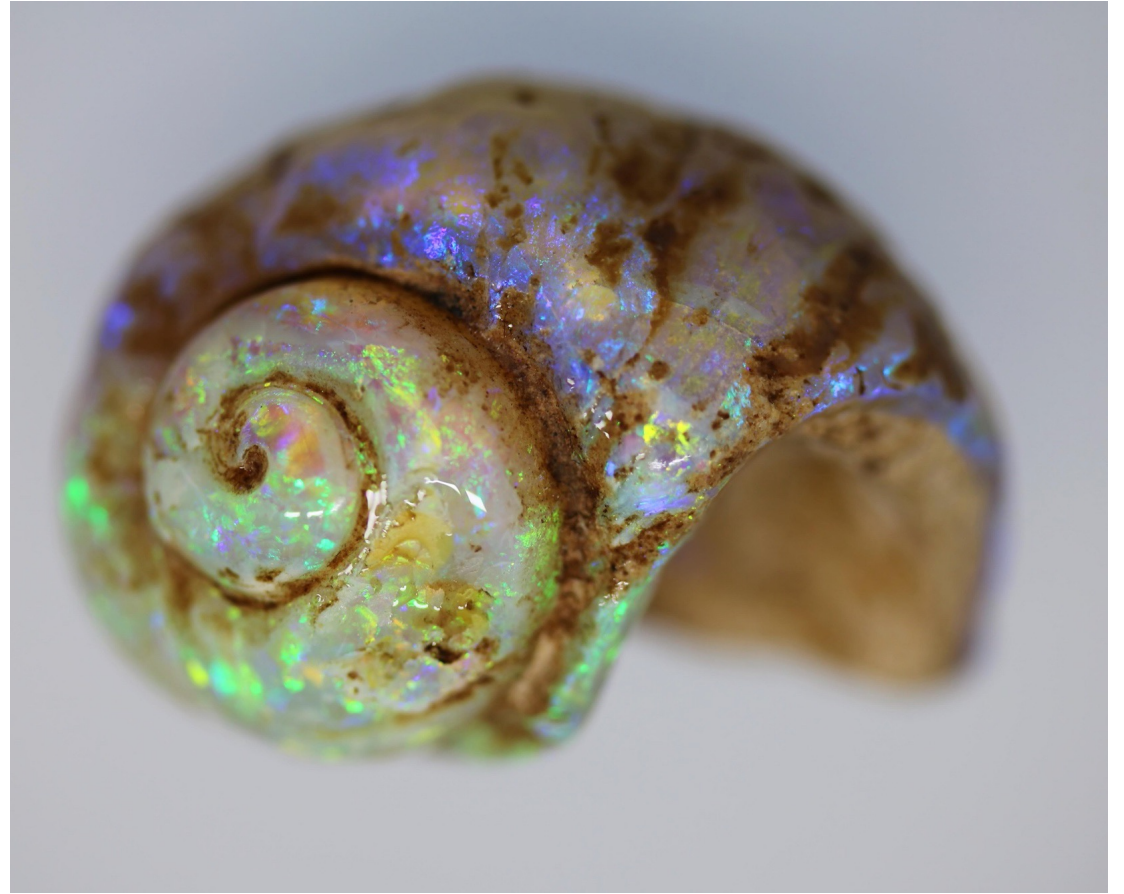


The Australian opal fields of South Australia, New South Wales and Queensland and Australia's orthographic projection CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=6897159>.

11.2.1.1. White Cliffs, New South Wales – Australia's first precious opal field

After more than a century of production ups and downs, White Cliffs still produces quantities of opal making it the longest continuously producing field in Australia. Opal occurs in the Cretaceous sandstone and claystone in horizontal seams or infilling voids resulting from casts of fossil remains. The main type of opal produced on the White Cliffs fields is Light Precious opal, often with bright Play of colour in a translucent to transparent body. Thin seam material is sought after for making doublets. White Cliffs is also especially famous for producing some of the best marine animal opal fossils, and for unique "Opal Pineapples" (Anderson and Jevons 1905; Giops 1895; Kovac 1982; Sanders 1981; Taylor 1971).





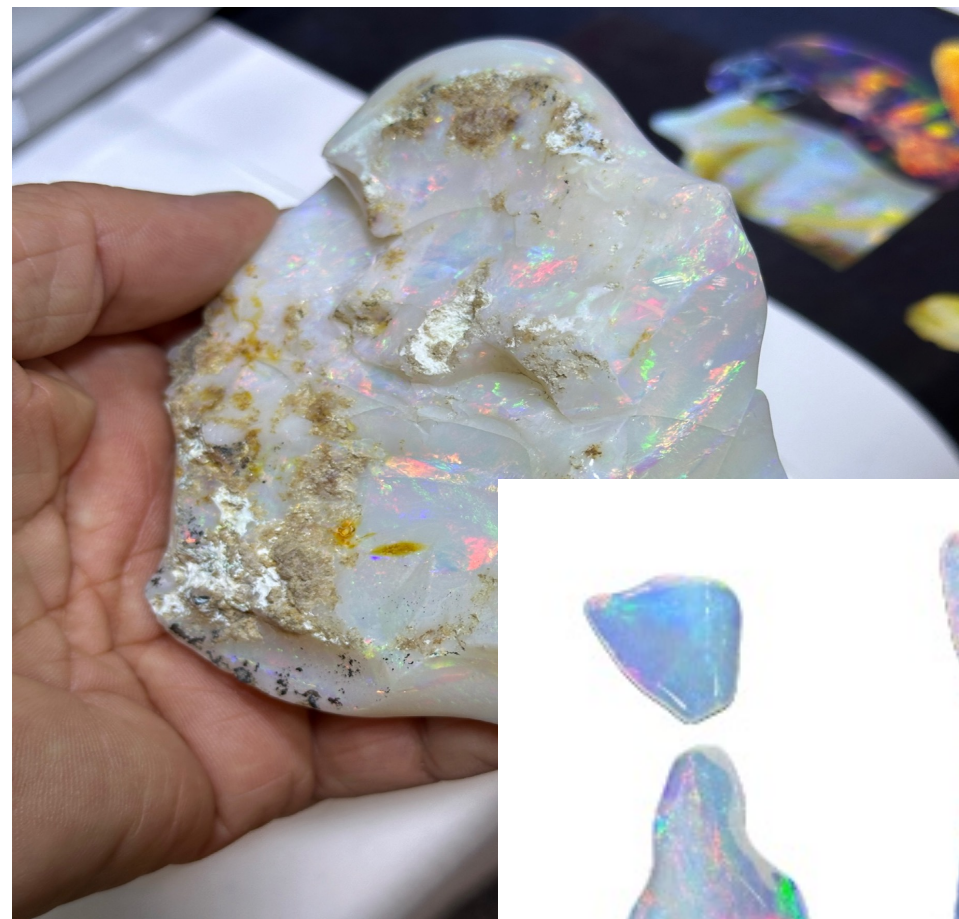
11.2.2. Brazil



An orthographic location of Brazil (inset by David Ayala, CC BY-SA 3.0, https://commons.wikimedia.org/wiki/File:Mapa_mundo_2010.jpg) and the positioning of Brazil relative to some other South American countries



Map of North Eastern Brazil showing the position of Pedro II around which Brazilian opal mining is concentrated. The mines are distributed in an area about 20 km in diameter around the township



11.2.3. Bulgaria



The geographical positioning of Bulgaria and the location of the Rhodope Mts (inset by [ikonact CC BY-SA 3.0](https://commons.wikimedia.org/wiki/index.php?curid=24813125), <https://commons.wikimedia.org/wiki/index.php?curid=24813125>)



The reported positioning of an opal occurrence in the Bulgarian Rhodope Mountains (<https://www.mindat.org/loc-240883.html>)



11.2.4. Ethiopia



The geographic location of Ethiopia and its provinces; Provincial mapping by Varivour CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=27541430>, orthographic projection by Martin23230 <https://commons.wikimedia.org/w/index.php?curid=6641388>

11.2.4.1. Shewa and Wollo



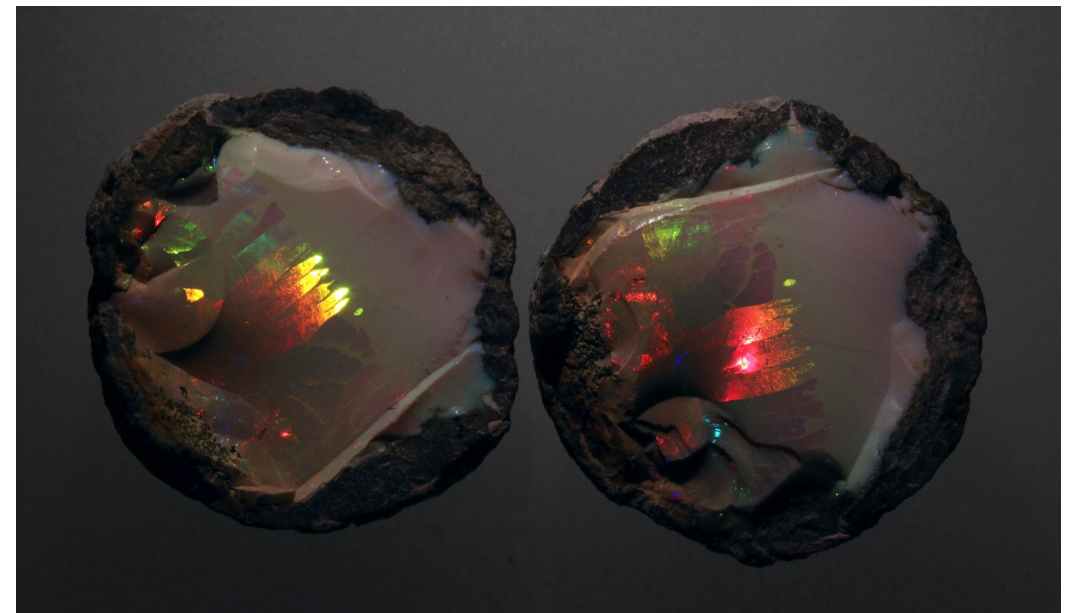
The locations the Wogel Tena and Mezze north of Addis Ababa

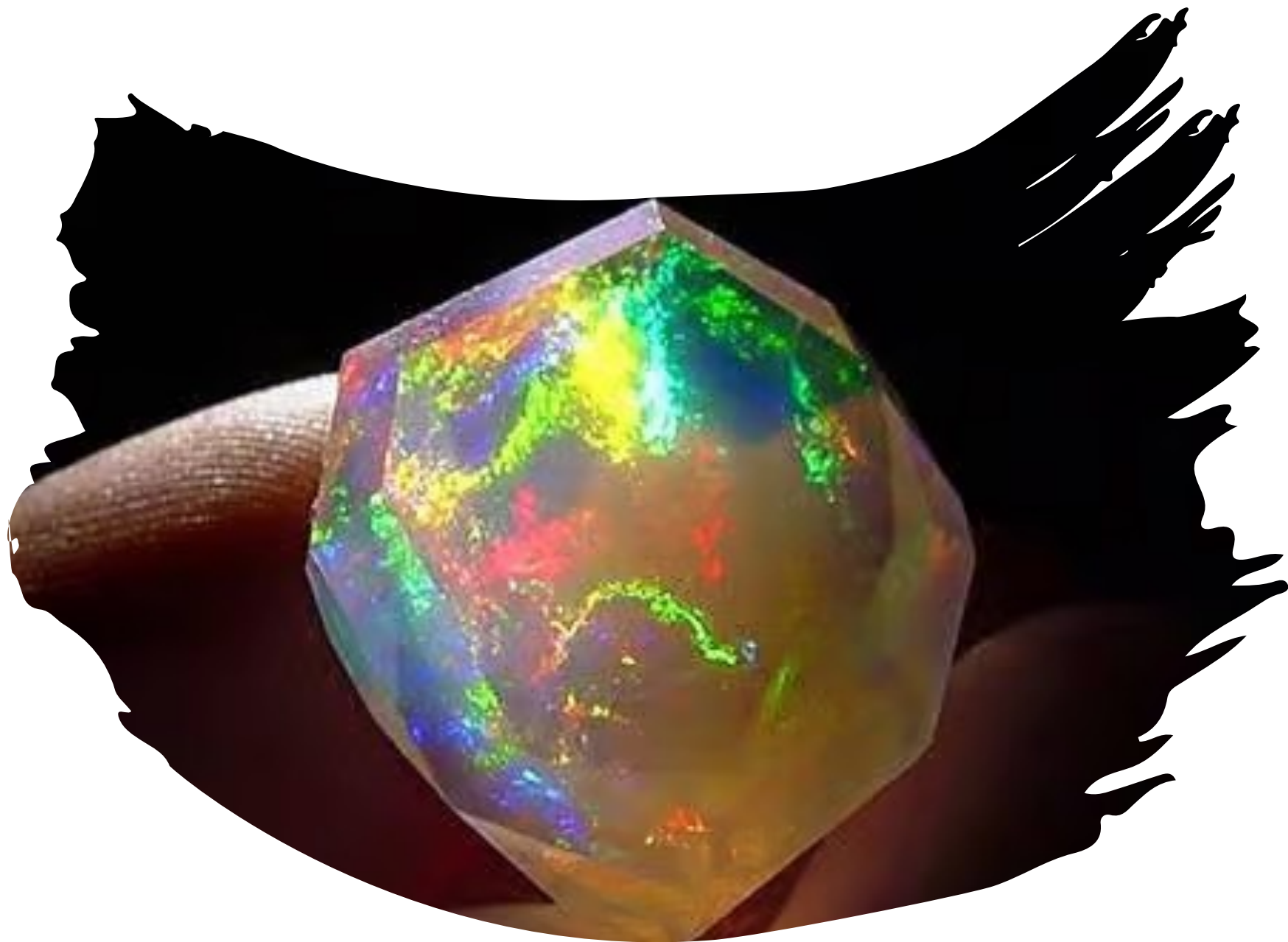


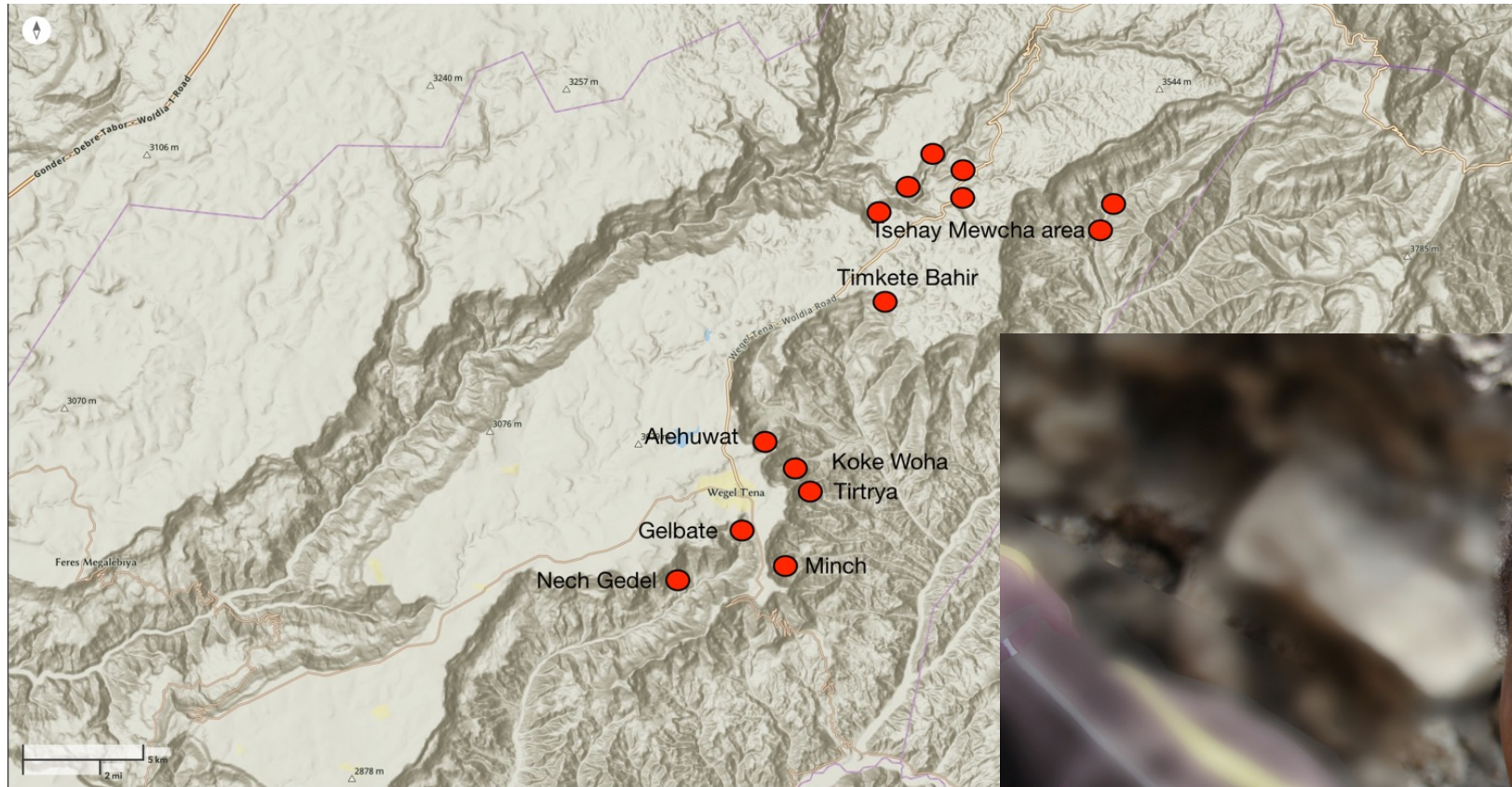
Shale dig site in Mezze, (Image Francesco Mezzero)



Opal nodules rhyolite (granite) at the Shale dig site in Mezze (Image by Benjamin Fendau)









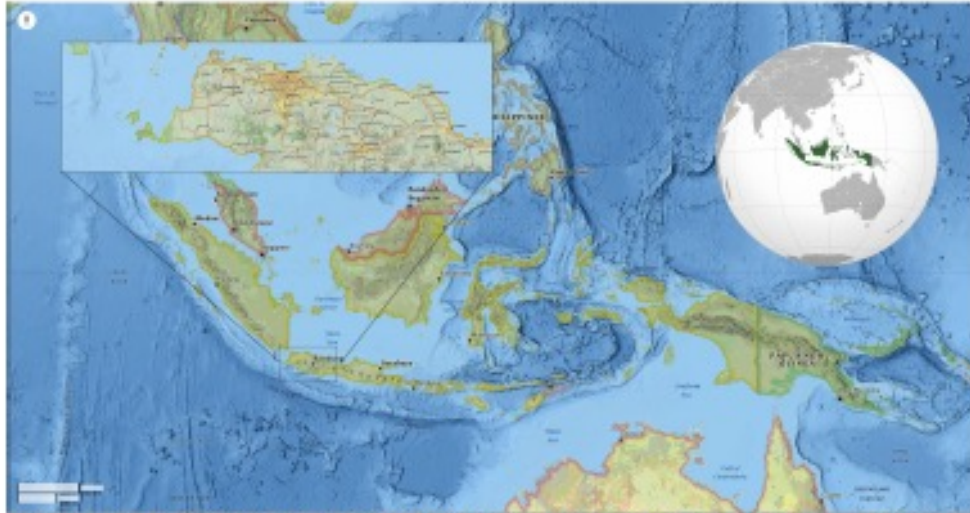
The galleries of the Kokoweha mine. (image Francesco Mazzoni)



the Kokoweha mine kitchen (left) and bar (right) (images Francesco Mazzoni)



11.2.5. Indonesia

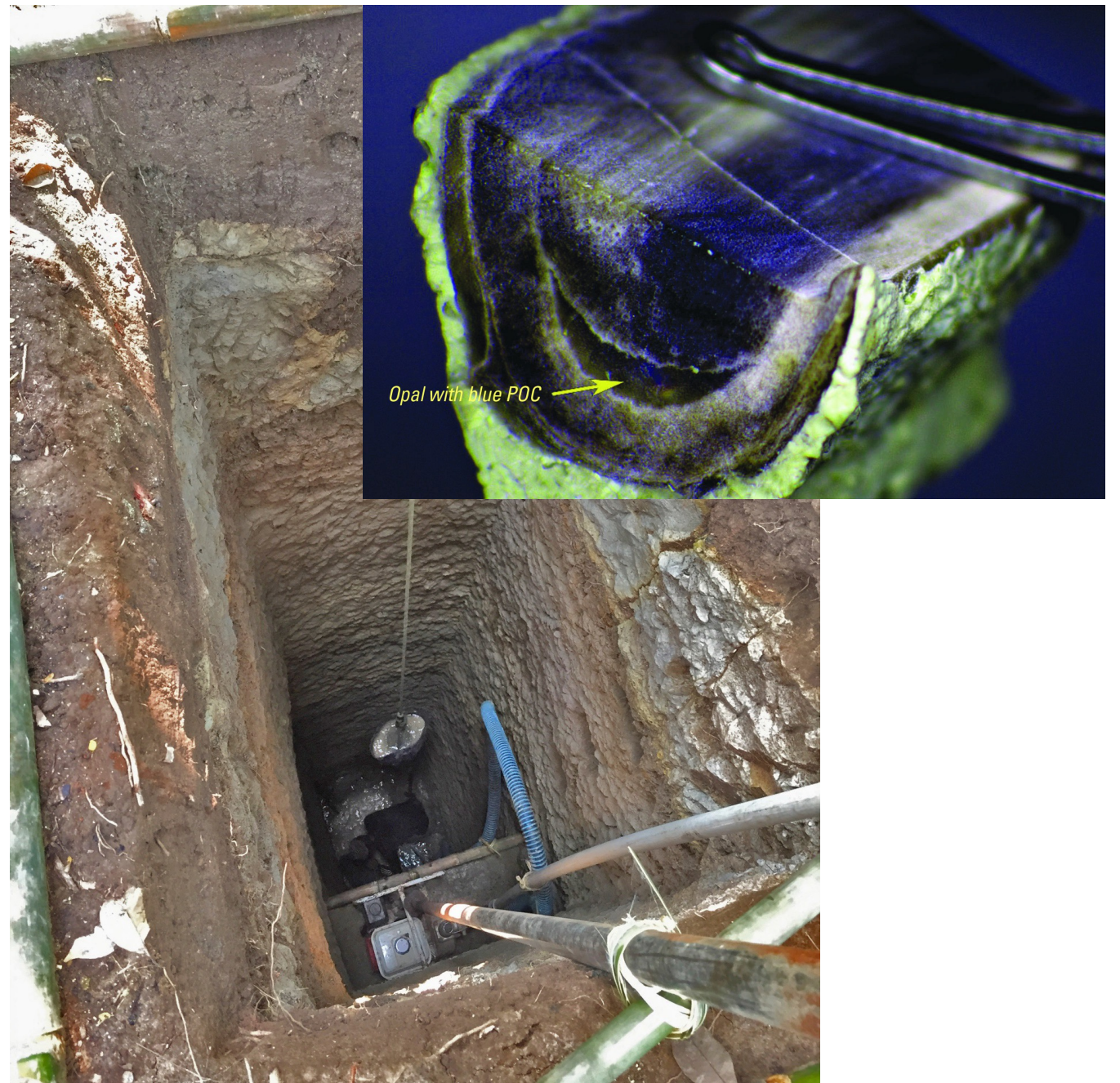


Map showing Banten Province Indonesia where much of the Indonesian opal production is produced. (Goldham 2021) and its global positioning (inset by Addicted04, CC BY-SA 3.0, <https://commons.wikimedia.org/wiki/index.php?curid=6376146>)

Occurrences of precious opal in Java have been known since the 16th. In the 1970's there was some activity and from 1993- 2000 it was mined extensively. Presently production is sporadic. The area is characterised by Tertiary to Quaternary volcanoclastic deposits of weathered vitrified volcanic ash. Opal occurs in voids and cavities resulting from the break down and dissolution of organic matter, in particular vegetation but also such things as snails.

A wide variety of precious opal varieties are recovered ranging from light to black in tone, from transparent to opaque, from absorbent hydrophane to non-absorbent. A commonly encountered material, sometimes referred to as "limb casts" are shaped like branches with a dense black body colour and displaying Play of Colour when placed under a strong light source. Some patterns of POC are unique to Indonesia, a good example being the so called "laser" opal.

Other types of precious opal found are, transparent crystal opal, translucent "tee" coloured opal, light opal, and Potch.





Map showing the location of Querétaro where the fire opal mines are located

Mexico has been producing opal from fields in the State of Querétaro and the Magdalena area since the late 1800's. Production peaked in the 60's and 70's and continuing at a lesser rate to the present time. The opal occurs in a series of thinly bedded rhyolitic lava flows as infillings in vesicles. Mexico produces four main varieties of opal; Fire Opal faceted with a play of colour, Water Opal faceted with a play of colour, Boulder Opal (the so called Cantera Mexican Boulder Opal and leopard opal) and Black opal. (Anonymous 1947; Foshag 1953; Fryer 1961; Gübelin 1985a, 1985c, 1985b, 1986b, 1986c, 1986d, 1986a; Heylman 1983, 1984b, 1984a; Koivula et al. 1983; MacFarland 1911; Mallory 1969; Marshall 1974; Mayers 1947; Zeitner 1979, 1987):

Fire Opal faceted with a play of colour: Common opal with a high degree of transparency and hues of vivid red, reddish orange and orange tones displaying play of colour and may appear as broad spangles, small flecks, or even pinfire.

Water (Crystal) Opal faceted with play of colour: Water opal is the variation with water clear body colour (Sanders 1983).

Mexican Boulder Opal, so called Cantera: Mexican Cantera Fire Opals, while not always, they may have an intense play of colors, ranging from vivid red to yellow. It can also display a range of body colours, including white, Gray, black, and brown. The term "Cantera" is said to refer to a type of quarry, suggesting that these opals may have been initially mined from open-pit excavations or quarries in Mexico.

Leopard Opal: In Zimapán, Hidalgo State a variety of matrix opal known as "Leopard opal" is found in the form of vesicular basalt impregnated with precious opal. The even distribution and small size of the opal-filled vesicles makes the opal attractive when cut or carved and polished. Irregular masses of play-of-colour opal showing various body colours (red, white, and colourless to pale blue) have also been deposited along joints and fractures within the basalt flow. This opal deposit, which may have been worked in pre-Columbian times (Boyd 2009; Coenraads and Zenil 2006; Johnson and Koivula 1996)



11.3. Other opal producing localities (historical and current)

11.3.8. Slovakia

What is now referred to as Slovakian opal has also been in the past called Hungarian or European opal. It has great historical significance and is believed these mines produced the precious opal described by Plato and Pliny before the first century. Historical records show the mines were worked continuously for five centuries until production ceased in 1922.

In 1775, the largest opal in the world (at the time) was found at the bottom of the stream in Červenica, it was known as Harlequin. It reportedly weighed 607 grams and was valued at the time at 700,000 Dutch guilders. Today it is held and displayed in the collection of the Natural History Museum in Vienna where it is described as "an opal from Červenica, Slovakia, exhibiting a fabulous array of colours, which is the largest of its kind, weighing 594 grams".

Another special find is said to have occurred in 1889 which was given the name "Gizela's Chapel" a mass of Poth and precious opal weighing an estimated 200 kgs.

Virtually no mining takes place these days. Before the mines closed precious opal from these mines supplied most of the world's precious opal. Examples of Slovakian opal can be found in many pieces of European jewellery and regalia.

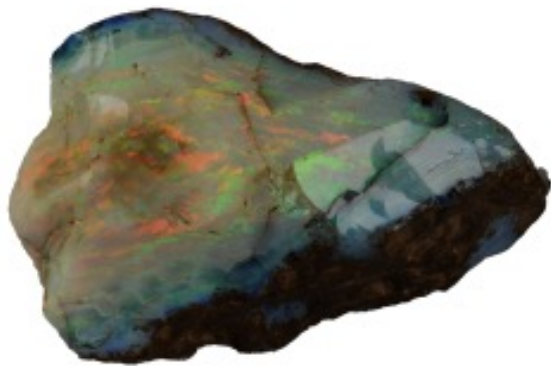


Figure 1 The historical Slovakian "harlequin opal" on display in the Natural History Museum in Vienna.



The geographic location of Slovakia showing the area in which the opal mines are located.



Figure 2 The location of the Slovakian opal mines near Dubnická.

11.3.12. United States of America

In 1893 opal was discovered at Opal Butte Oregon, 1900 in Idaho at panther Creek and then 1905 at Virgin Valley Northern Nevada where in 1926 an extraordinary precious opal of 2585 opal was found. Named the Roebling Opal it is now at the Smithsonian National Museum of Natural History. 1948 the Spencer Mine was found in Idaho. In 1989 blue coloured opal was reported from Arizona and Sandstone matrix opal from Louisiana. In 2023 matrix opal was named Mississippi's Official State Gemstone.

All the US opal deposits are associated with volcanic rocks. In Nevada precious opal is often found replacing organic matter such as wood and rarely pinecones. In Idaho the opal occurs in voids in basalt and rhyolite flows.

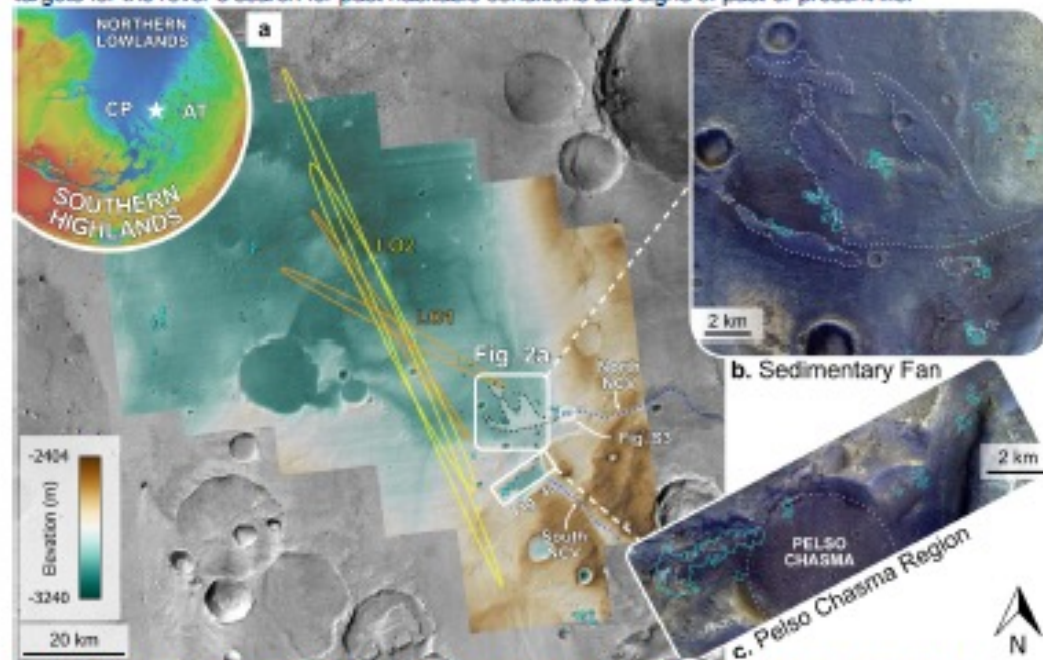
The type of opal varies from location to location. Nevada opal is famous for translucent opal with vibrant POC. It is also known for having a high-water content which causes it to become unstable if allowed to dry out. Idaho produces a more stable milky light opal with muted play of colour and opal from Mississippi is matrix opal.



Multicolored rough opal specimen from Virgin Valley, Nevada, US By Reno Chris at English Wikipedia - Transferred from en.wikipedia to Commons., Public Domain, <https://commons.wikimedia.org/w/index.php?curid=1979625>

11.4. Extraterrestrial opal

McNeil et. Al., (McNeil 2025) used orbital remote sensing data to identify deposits containing hydrated silica (opal) in Oxia Planum, the future landing site of the ExoMars Rosalind Franklin rover. The opal occurs between clay-rich plains and an overlying sedimentary fan, and within topographic lows south of the sedimentary fan. Compositional data indicate that opal is mostly amorphous in structure, resulting from weathering of other rocks. While we cannot rule out that some opal was transported from elsewhere, it most likely formed in place by falling out of solution or through later groundwater or soil-forming activity. We have identified opal in local regions within the fan, as well as possible opal deposits near the center of the Rosalind Franklin landing site, which are prime targets for the rover's search for past habitable conditions and signs of past or present life.



From (McNeil 2025) "Regional geography of Oxia Planum. (a) CTX DTM showing elevation and 3-sigma 2028 landing ellipses for the ExoMars RFR mission (orange: launch opportunity 1 (LO1), yellow: launch opportunity 2 (LO2)). Inset Mars Orbiter Laser Altimeter globe indicates Oxia Planum's location near the dichotomy boundary between Arabia Terra (AT) and Chryse Planitia (CP). The sedimentary fan is outlined in black dots, and the northern and southern Neocoon Vales (NCV) are indicated by blue dotted lines. Mars Orbital Catalog of Aqueous Alteration Signature (MOCAAS) locations of silicate minerals (Carter et al., 2023) shown in cyan correspond to 100 m/pixel detections of hydrous aluminosilicates or hydrated silica (locally in Oxia Planum refined to "hydrated silica = kaolins"). (b) CaSSIS NIR-PAN-BLU (NPB) mosaic of the fan region, with the margins of the fan outlined. MOCAAS hydrous aluminosilicates/hydrated silica shown as cyan outlines. (c) CaSSIS NPB mosaic of Pelso Chasma, south of the fan. The quasi-circular shape of Pelso Chasma is indicated by a dotted line. Geographic nomenclature follows the scheme of Fawdon et al. (2021)".

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Progress continues
and a launch during
the 2026 CIBJO
Congress is expected.

Thank you

