

# AUSTRALIAN OPALS & GEMSTONES



NATURE'S OWN  
FIREWORKS



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Lightning Ridge Gem Black Opal & Diamond ring,  
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# OPALS & GEMSTONES

**A thing of beauty is a joy forever:  
Its loveliness increases; it will never  
Pass into nothingness.**

**John Keats**

Since the dawn of time man has marvelled at the dazzling beauty of Nature's own fireworks — the gems from the depths of the earth. He turned the stone in his hand and contemplated the sparkling lustre; he looked through it and saw his world in a different light; he felt the hard stone, watched the icy shimmer; and he saw mystical powers within the lucid depths of the stone. Gemstones possess a fascination no other precious commodity has. Everything about them is intriguing — not only their appearance and their feel in your hand, their value and their splendour, but also their history of toil and struggle, painstaking deliberation and workmanship.

The enticing lure of a resplendent stone has created a profusion of mystic superstition through the ages. The stones had life and power, soul and might. Some had wicked forces ensconced within; others possessed good-natured powers offering protection from an array of misfortunes and diseases, and giving might, victory, serenity and health.

The flashing light promotes superstition; the elusiveness brings value and esteem; the painstaking extraction from the mother rock deepens the magic and the colourful history of the quest for the beautiful gems has built their enigmatic reputation over thousands of years.

Part of the fascination with gemstones is, of course, the investment potential. Gemstones present one of the most enjoyable, appealing and rewarding ways of investing money. Along with the material value of a stone, there is also the unmatched beauty — each gem a masterpiece in itself.

For the careful investor who starts out in a small way, increased knowledge and greater involvement could turn an investment plan into a most engrossing hobby. The more active gemmologist will find another side of stone collecting — searching for the precious gems yourself! Gem hunting is a simple and enjoyable leisure activity, and can provide many fun-filled weekends for all the family.



Australia is renowned for the world's finest Opal. But opal is not the only gemstone to surface from this ancient, timeless land.

With rich mineral deposits scattered right across the vast continent, Australia's earth bears a wide range of other precious stones, such as Sapphires, Diamonds, Rubies and Emeralds, and from the surrounding seas — natural and cultured Pearls. Semi-precious stones like Nephrite Jade, Chrysoprase, Rhodonite, Agate, Garnet, Topaz, Tourmaline, Zircon, Beryl, Amethyst and Turquoise can be found in many different places across the country.

This book gives a basic introduction to the most generally recognised Australian gemstones. We hope it can be of assistance to prospective buyers and collectors, as well as to those interested in a rewarding family outing on the fields.

Australian Gem Industry Association members are associated with all facets of the industry from mining to overseas marketing. This vast knowledge of the industry is readily available to YOU — do not hesitate to seek their reliable advice. Look for the distinctive A.G.I.A. logo or contact the Association direct.

# OPALS

**“And lo! the beautiful opal -  
That rare and wondrous gem -  
Where the Moon and Sun blend into  
one  
is the child that was born to them”**

**Ella Wheeler Wilcox**

In the first century A.D. Pliny wrote of the Opal, “. . . For in them you shall see the living fire of the ruby, the glorious purple of the amethyst, the sea green of the emerald, all glittering together in an incredible mixture of light”, and later Shakespeare was to describe it as the “Queen of Gems”.

Due to its unique colour play and its own mysterious “life”, the Opal has been subjected to superstition and myth. Opal was said to ward off diseases and for this reason was worn in amulets.

In Roman times it was included in the crown of the Holy Roman Emperor, and was known as “Cupid Paederos” — Child Beautiful of Love. The Roman Senator Nonius preferred exile rather than sell his valuable Opal to Mark Anthony for presentation to Cleopatra.

The Orientals considered the Opal to be an “Anchor of Hope”, whereas Arabians believed Opals to be magical stones which had fallen from the skies. The Medieval English writer, Batman, said that the Opal had many virtues, including the Power of Foresight. A curious belief evolved in Poland, where in 1075, as mentioned in the Lapidarium of Marbodius, the brilliant stone was attributed powers to make a wearer invisible. Opals were thus named “Thief Stones”, as criminals could use the gems to commit their thieving deeds unseen!

These early references date back to 250 B.C. It is probable that these stones came from mines in Hungary (now Eastern Slovakia) at Mt. Simonka and Mt. Libanka near Presov, where production ceased in 1932. The mines could not compete with

the supply and far superior quality of the Australian gems.

Queen Victoria so loved the Australian Opal and made Opal popular by presenting one to each of her children.

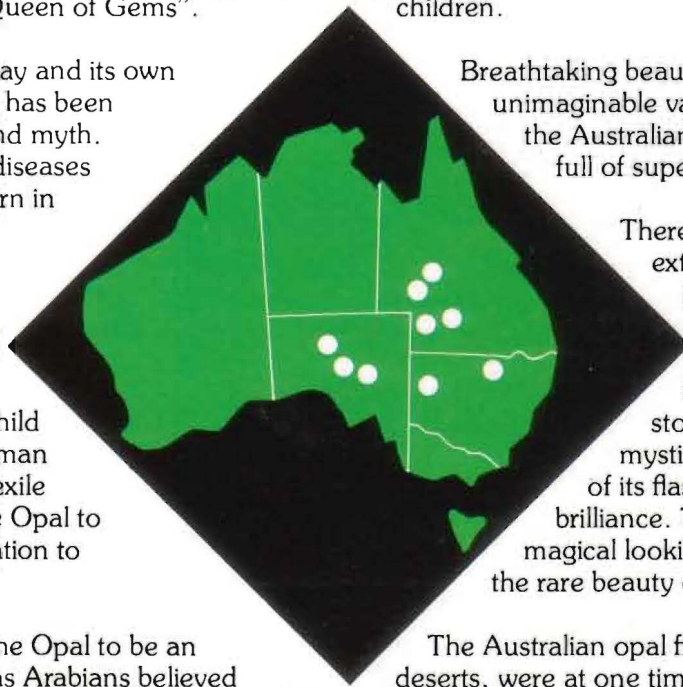
Breathtaking beauty, mysterious glow, unimaginable value — the attributes given the Australian Opal are countless and full of superlatives.

There really is something extraordinary, rare and quite intangible about the Opal — a special feeling no other gemstone can instil in an observer. It is a stone which conjures up mystical images within the depth of its flashing colours and sparkling brilliance. The Opal is a treasure, a magical looking-glass which lets us see the rare beauty of nature’s own fireworks.

The Australian opal fields in what are now semi deserts, were at one time under the sea, so opalised fossils are occasionally unearthed — opalised wood, prehistoric animal bones, sea creatures, full sea-shells, skin shells, sponges, fish skeletons and even stems of plants. Plesiosaurus bones have been mined at Coober Pedy, but all without heads!

## WHAT IS OPAL?

Opal, from the Greek, “Opallos”, meaning ‘to see a change (of colour)’, is a formation of non-crystalline silica gel. Millions of years ago, this gel seeped into crevices and cracks in the sedimentary strata. Through eons of time and through nature’s heating and moulding processes, the gel hardened and can today be found in the form of brilliant opals.



(A) "Olympic Australis", mined at The Eight Mile, Coober Pedy, 1956. Named after the Olympic Games held in Australia in 1956 and the Antarctic phenomenon, Aurora Australis. This valuable opal weighs 17,700 carats (3.54 kg.) and measures 280 x 120 x 115 mm.

(B) A magnificent opal carving from a large piece of Andamooka "crystal" opal.

(C) Uncut Queensland Boulder Opal with vibrant colours showing typical formation.



A



B



C

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The chemical formula for opal is  $\text{SiO}_2 \cdot n\text{H}_2\text{O}$  — an hydrated silica with a varying water content. Opal measures generally 5.5 to 6.5 on Moh's hardness scale. (Quartz measures 7.)

The Opal is set apart from other gemstones, because of its characteristic appearance, displaying sparkling prismatic colours which change and flash as you turn the stone in your hand. No two opals are exactly alike!

It was not until the development of the electron microscope that science could establish the cause of the flashing spectral colours within the Opal.

In 1963 it was discovered that opal is composed of minute particles of silica in closely packed spherical arrangements. In high quality opal, the larger spheres are packed together in a remarkably regular pattern, which results in a regular three dimensional array of unfilled spaces, or voids, between the spheres. Light passing through the transparent spheres is scattered by the array of voids and diffraction splits white light into its various colours at different angles. Thus we can see the amazing play of colour and light in a precious opal. The size of spheres is less than 1/1000mm — the larger spheres provide the red fire, the smaller the green to violet.

#### VARIETIES

Opal is found in many varieties and sub-varieties, but only a very small percentage of all opal found constitutes precious opal. This rarity is much greater than is generally appreciated, as the annual production of precious opal is infinitesimal compared to that of any other precious gemstone. Most opal found has little or no colour play — this type is known as "potch".

**BLACK OPAL** is the rarest and most valuable type. It is generally found as a bar (or bars) of various colours forming natural water horizontals in dark grey to black "potch nobbies" or "nodules". The unique

patterns are as complex as an artist's imagination. Few realise that 99.9% of the world's supply of this radiant, dark lustrous gem is mined at only two tiny pinpoints on the globe — Lightning Ridge and Mintabie. He who possesses a Black Opal is indeed fortunate!

**BOULDER BLACK OPAL** is a special type of opal found mostly in central Queensland. It is a curious formation of silica which has filled the cracks and crevices in light and dark brown ironstone boulders. Invariably stones from Queensland are cut with the natural host rock (ironstone) left on the back. Sometimes, owing to the thinness of the opal seams, the boulders are sawn into baroque shapes, and polished with the brown host rock retained around the precious heart of opal. Small boulders sometimes containing "kernels" of opal are known as "Yowah Nuts" after the nearby town of Yowah. Boulder "matrix" opal is a peculiar opal formation where flecks of rich, flashing colours of opal are scattered throughout the brown ironstone, like twinkling neon lights of a distant city.

**LIGHT OPAL** (sometimes referred to as "White Opal") is not quite as rare as the black varieties, but is nevertheless distinguished by lively colour play. As the name suggests, the stone ranges from transparent, translucent to opaque with a creamy hue, displaying soft pastel shades of colour. The "crystal" translucent type is vibrant with shafts of colour in intricate pattern variations.

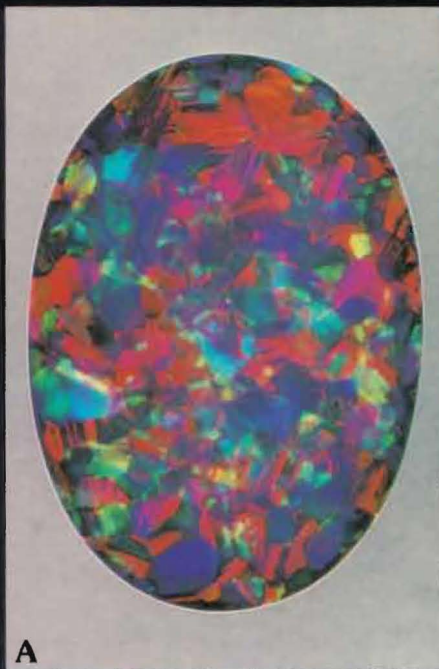
A rare formation of "cloudy white" porous matrix opal from Andamooka can be treated by soaking in a sugar solution and then boiling in sulphuric acid to deposit carbon in the pore spaces. The black body colour thus produced enhances the play of colours, resembling a natural black opal. However, the dividing pattern lines are not as sharply defined as in a natural black opal. The surface penetration rarely exceeds one millimetre.

(A & B) Lightning Ridge Gem Black Opals displaying contrasting colours and patterns.

(C) Top – two translucent Coober Pedy light opals.  
Bottom – Gem “crystal” Andamooka light Opal.

(D) A collection of gem quality “crystal” light opals from S.A., N.S.W. and Qld.

(E) Lustrous Queensland Boulder Black Opal.  
(F) Matching split pair of Queensland Boulder Black Opals.



A



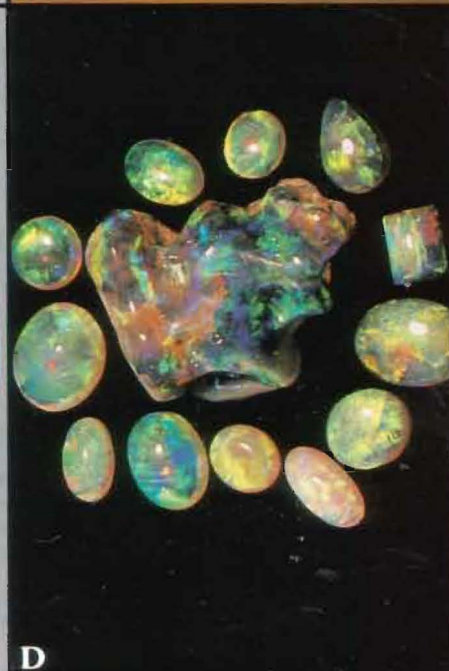
C



E



B



D



F

## AUSTRALIAN OPAL DEPOSITS

Australia is the world's greatest producer of precious opal. Over 95% of the world's commercial opal is dug from the desolate outback, where it was formed during the Tertiary period of some 15 to 30 million years ago.

The history of Australian opals started as late as 1849 at a cattle station called Tarrawilla, near Angaston some 80km outside Adelaide; however, opal was first commercially mined at Listowel Downs, near Adavale, Queensland in 1875. This was followed by the discovery of light opal at White Cliffs, N.S.W. in 1890, where the population exceeded 3000 in its heyday. There is little opal mined there today. The world famous black opal field of Lightning Ridge, N.S.W. was discovered in 1903 and is still producing many beautiful gems. The discovery of light opal in 1915 made famous the name of one of the most hostile and remote places on the Australian continent — Coober Pedy, S.A., the largest opal producing centre.

Coober Pedy was an endurance test for the men who ventured there to try their luck. Their lives were hard and lonesome, the conditions on the fields were almost insufferable. Temperatures averaging over 30°C made the place hardly bearable. Often — and this was the biggest problem — water was more precious than the finest of opals.

Coober Pedy, an Aboriginal name meaning "White man in a hole", adequately describes the mines and miners' dwellings — burrows dug into the scarp, in order to escape the uncomfortable soaring temperatures of the day and the freezing winds at night. These "dugouts" are big and comfortable, often containing four or five rooms.

Coober Pedy is also proud of its unique underground Roman Catholic Church!

Andamooka, south-east of Coober Pedy, was discovered in 1930 — this area produced some of the finest "crystal" light opal ever seen until the late 1970s. Only small quantities are produced today. Beautiful opal-on-quartzite rock specimens (known as "Painted Ladies") were found here.

The only other mining area of consequence is Mintabie, north-west of Coober Pedy. Although first discovered in 1931, the harsh desert country, lack of water and hard, difficult mining country prevented much activity until 1976. With modern mining

equipment and better communications, this area is now producing very attractive light opal and black opal. Here, seam black opal generally occurs on a mid-grey background and therefore, although respected in the black opal markets, commands a lower price than the darker Lightning Ridge black opal.

## CONDITIONS ON THE FIELDS

Opal mining is a dirty, hot, unpleasant occupation. Apart from the brain-hammering heat and the choking, unpredictable dust storms, there are many other causes of inconvenience. Particularly persistent flies buzz in clouds around your head and creep into your ears and nose, mouth and eyes to find moisture. To top it all there are scorpions and many varieties of venomous snakes.

The mining towns are quaint little places with burly nightlife and most of our modern-world facilities. There is always something happening — stones are sold, bought and bargained for — countless tales of bravery, luck and fortune are forever related over the pub counter. Hopes are expressed with burning passion of the "Big Find", the "Great Seam" of precious opal or pocket of "Black Fiery Nobbies" lying buried for millions of years in the sandstone and opal clay.

All miners get the "Opal Bug" — it is the hope of "a find" that keeps you on your feet and your adrenalin pumping. The constant challenge at the end of a weary "colourless" day — "Well, maybe tomorrow"!

Behind every stone lies a history of hardship and endurance, of sweat and hope and stubborn struggle.

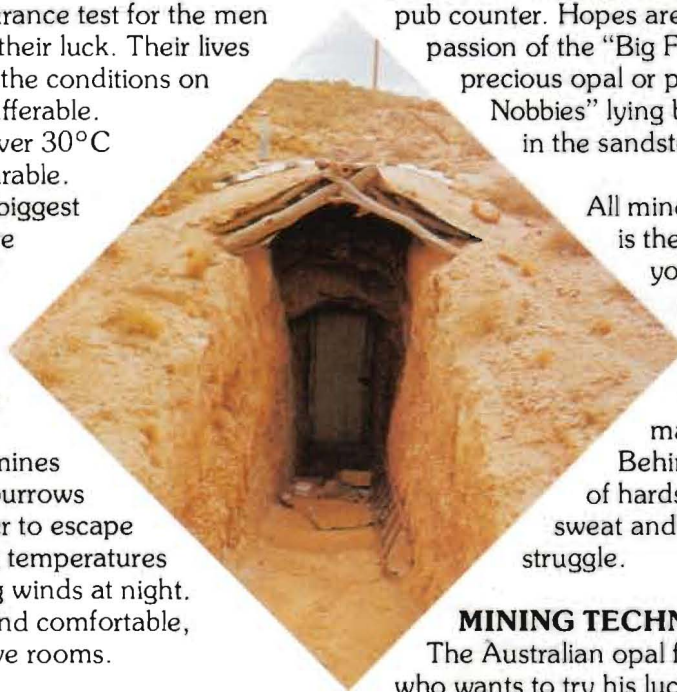
## MINING TECHNIQUES

The Australian opal fields are open to anyone who wants to try his luck, from the serious miner to the amateur treasure-hunter.

If you'd like to gain first-hand experience of opal mining, a weekend on the fields is well worthwhile. You won't need many tools and a travel agent can easily arrange comfortable accommodation in one of the quaint mining towns. There are many mining methods.

### I. Sinking a Shaft

This is one of the most effective ways of finding opal — and also the most laborious. The shaft could be from 3 to 20 metres deep, and it could take several days to reach the opal level, unless you possessed a drilling rig with a 36" bucket auger!





**PAGE 6: Entrance to Coober Pedy dugout home.**

**(A) Rare opalised fossils**

Top row – skin shell, starfish, belemnite, skin snail shell.

Bottom row – Bone (L.R.), full shells, belemnite cigarette holder.

**(B) Andamooka “crystal” light opal and diamond pendant.**

**(C) Lightning Ridge blue/green black opal and diamond ring.**

**(D) Coober Pedy light opal and diamond pendant.**



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You will need an array of miner's tools including a handwindlass or motorised winch over the hole to lift the dirt to the surface, or an expensive vacuum-cleaner apparatus, called a "blower".

After you have reached the "bottom" of the shaft, below the line where the sandstone ends and opal carrying clay (the "opal level") takes over, your working pattern changes. Now you gouge away, along a horizontal drive or tunnel, slowly and carefully, hoping to find a trace, a tiny seam of precious opal, or scattered "nobbies" as at Lightning Ridge.

You're on your own in the dark silence, guided only by a carbide or electric lamp, alone with your thoughts and your hopes.

If you are lucky, you will get your reward. Suddenly your handpick makes a chinking sound as if scraping china! You go slower, more carefully. There! A flash of green! A tiny spot of colour reflected in the light. Is this the beginning of a "big strike" or just a tormenting "trace of colour"?

## **II: Puddling and Rumbling**

Puddling is performed at the specially constructed dams of Lightning Ridge after the opal dirt has been transported from the shaft by trucks.

A puddler is a large mesh-lined drum attached to a motor. As water is pumped into the drum, it rotates and turns the clay into a sludge which escapes through the mesh. Only the hard pieces — rocks, stones and "opal nobbies" are captured in the mesh.

Dry rumbling is a related technique. Utilising a mesh tray on a vibrating base, you can sift through large amounts of opal dirt in a short time.

## **III: Open-Cut Mining**

Some miners prefer this technique to the hit-and-miss method of digging deep shafts. An open-cut

mine is created by running over a large area with a bulldozer, slicing through thin layers of sandstone as you run back and forth until you reach the opal levels. This method is more expensive than shaft mining, but increases your chances of finding opal as you are covering a much larger area.

## **IV: Noodling**

A simple description of a noodler is one who goes over what other miners have discarded as "dud" mullock heaps. All you need is a sieve and a keen eye. Another good spot for a noodler is an abandoned open-cut mine, using a rake and your trusty sieve.

Some disillusioned miners have even taken to large scale machine noodling by letting enormous amounts of opal dirt travel on a conveyor belt under ultra-violet light in order to detect the precious opals.

## **FROM ROUGH TO GEM**

When the tough, laborious extraction of the opal from the mining site is completed, another stage begins — the refinement of the stone. The cutting, polishing and setting are procedures which require great skill, patience and expertise.

Only an experienced eye can determine whether the stone should be orientated and cut as a solid, or be sliced into thin segments for use as doublets or triplets; or from what precise angle the stone should be attacked with the saw to create the most brilliant surfaces without losing valuable patches of gleaming colour.

The process is painstaking and slow, but the reward more than makes up for it — from rough shaping, fine shaping, sanding, and leather polishing, a sparkling gem is born. Through careful fingers and a patient mind, nature's own dazzling fireworks are brought to life from the Stygian depths of Mother Earth.

**(A) Open-cut mining, Mintabie, S.A.**

**(B) Shaft sinking with Calweld 36" bucket auger drill.**

**(C) Petrol-driven Yorke hoist winch to raise dirt from mine shaft.**

**(D) "Blower" – vacuum suction apparatus to extract loose dirt from mine tunnel ("drive").**



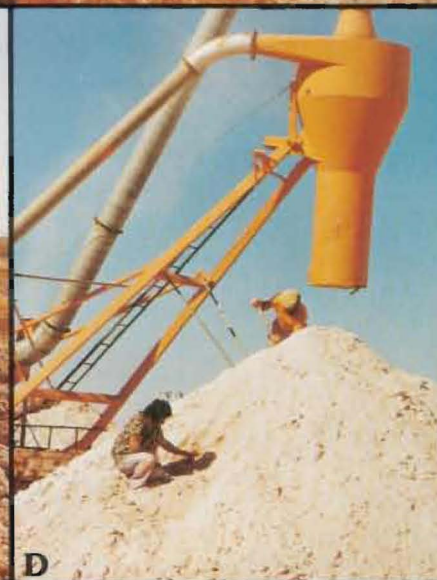
**A**



**B**



**C**



**D**

## PURCHASING OPAL

Australia produces the world's finest quality opal, which has tremendous investment potential. The first step in any investment plan is to visit a reputable opal merchant. Here you will see opals of all varieties. The cut gems are sold as solids, doublets and triplets — the solid stones (Blacks, Lights, Boulders) being the most valuable.

Doublets are generally produced from thin slices of fine quality light opal; however, domed cabochon doublets produced from "crystal" translucent opal are also available with a black "potch", glass, or Queensland ironstone backing — thus resembling natural black opal or natural Queensland boulder black opal!

A Doublet becomes a Triplet when a clear quartz crystal is superimposed on an even thinner slice of fine quality light opal. A magnificent flat, opal doublet, with a greater opal content, is, therefore, more valuable than a similar triplet opal.

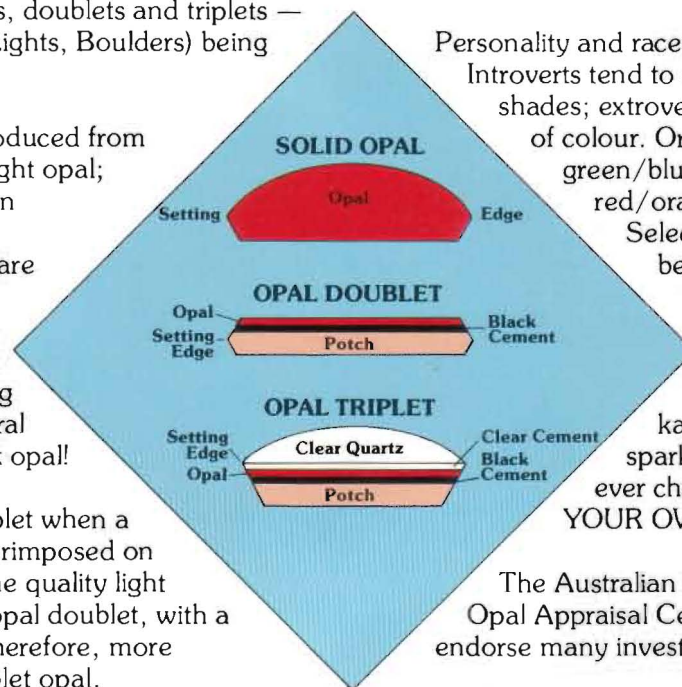
As we have pointed out before, the type of opal determines the price to a large extent. Black opal is more rare, and therefore commands the higher price. The size, shape and colour plays a big role in the popularity and price scales. Red is the rarer colour, followed by green/orange, green/blue to blue. Brilliance and clarity of an open proportioned pattern (in contrast to small pinpoint of fire), however, are the main decision makers — a brilliant blue/green can cost more than a dull red, bright twinkling stars of a "pinfire" pattern can cost more than a cloudy open pattern of similar colouration, or a brilliant, lustrous light opal can cost more than a lacklustre black opal. The value is determined by considering

the combination of all the above factors, and this expertise requires years of experience. However, the choice of type, shape, size, colour, pattern and price is a personal decision, as is the purchase of a fine painting, a work of art or a beautiful ball gown.

Personality and race often determine choice! Introverts tend to select soft, delicate, pastel shades; extroverts the bold, flashing shafts of colour. Orientals have an affinity with green/blues; Westerners the vibrant red/orange colours.

Select the opals of your choice, be they moderate purchases or investment gems, and embrace all the luxury of the talismanic glory, the mystique and the kaleidoscopic, lustrous, sparkling, spectrum colours in ever changing patterns — in YOUR OWN truly unique gem!

The Australian Gem Industry Association Opal Appraisal Certificates are available and endorse many investment opals.



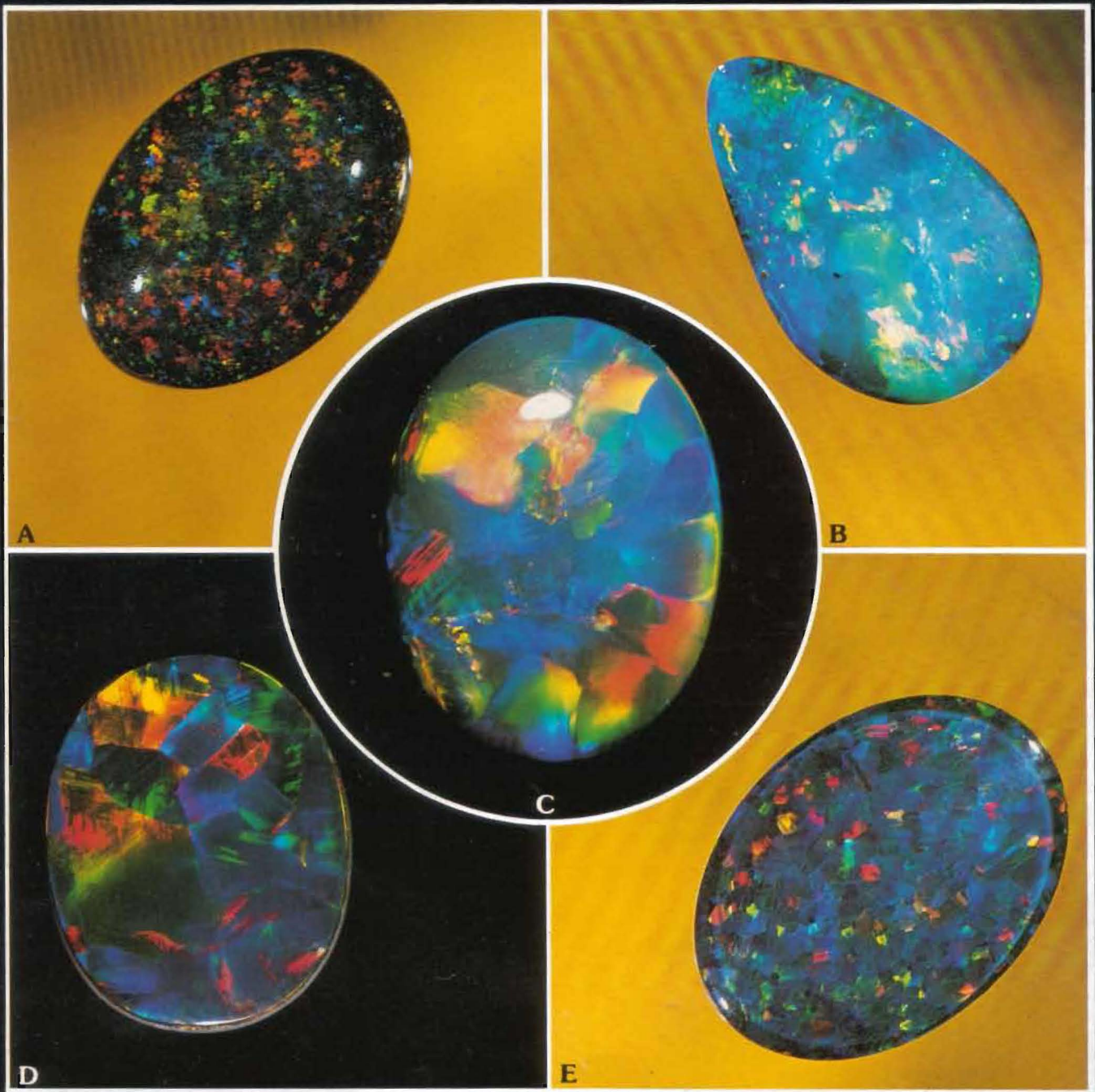
## TAKING CARE OF YOUR OPAL JEWELLERY

Opal will give more than a lifetime of pleasure. No special care is required under normal circumstances — treat your opal as you would any other piece of valuable jewellery. Doublet and triplet opals should never be immersed in water, detergents, alcohol or an ultrasonic cleaner, as they are laminated and bonded with a cement. Any solid opal jewellery can be easily cleaned by immersing in alcohol and brushing with a toothbrush.

A stone whose surface may have dulled by years of wear can easily be repolished by a competent polisher.

(A) Andamooka treated matrix opal.  
(B) Queensland Boulder Black Opal.  
(C) Rare Lightning Ridge Gem Black Opal.

(D) Lightning Ridge "crystal" opal doublet.  
(E) Coober Pedy "crystal" opal triplet.



# SAPPHIRES

**“When the breath of twilight  
blows to flame the misty skies,  
All its vaporous sapphire,  
violet glow and silver gleam,  
With their magic flood me through  
the gateway of the eyes;  
I am one with the twilight’s dream”**

**George W. Russell**

**S**apphire comes from the Greek, “Sappheiros”, meaning “blue”. Sapphire is, in its purest form, colourless aluminium oxide. However, when it includes minute traces of various metal ions it becomes coloured — titanium will produce blue, iron, green and/or yellow. Sapphire can occur in many colours, but most of the Australian production is blue and the shades vary from deep royal blue through to light sky blue. The other important colours produced are green, yellow, gold and parti colour (a mixture of more than one colour in a stone). The blue material is the most sought after; however, many people feel the other colours are equally desirable.

Australia is famous for the quality of its yellow and golden sapphires. Probably the most beautiful of all are the uniquely different green and parti sapphires. The parti sapphires are particularly interesting as they vary from gold with a touch of green through to green with a touch of gold, and have lately been termed “wattle” sapphires as they reflect the distinctive range of colours found in our native flower of the same name.

All along the eastern part of the Australian continent there are remnant basalt flows and volcanic pipes. In the gravel bed deposits of ancient and present rivers and streams flowing from these areas, sapphires are often found. These gemstones are found in alluvial deposits from as far north as Cooktown to as far south as Tasmania; however, they are only mined commercially in two localities.

The first area mined was central Queensland near the township of Emerald — rumour has it that Emerald was so named because the green sapphires found in

that area were originally thought to be emeralds! Mining operations started to the west of Emerald in the 1890s and two small townships, Rubyvale and Sapphire, were established to service the miners on what became known as the Anakie sapphire fields.



The extensive Anakie sapphire deposits were discovered by pure chance. Working the area, a surveyor named Richardson happened upon some red stones which he thought were rubies. He gathered some gravel containing the stones and sent it to a laboratory for testing.

Disappointingly, the stones were identified as zircons, but contained in the gravel sample were several blue sapphires. Mr. Richardson, disheartened at first, later became a partner in one of Australia’s most prolific sapphire fields.

In the early days most of the production went to the European market, particularly Czarist Russia. After the Russian revolution the demand declined and for many years mining was spasmodic. In the early 1960s large scale mechanical mining commenced and reached a peak in the 1970s.

The second area to be mined was the New England district of northern N.S.W. where commercial mining began in 1919 near Inverell on Frazers Creek. By 1930 several miners were working the alluvial deposits in streams in the Glen Innes and Inverell area. This initial period of activity was followed by fifteen years of minimal production until the late 1950s. The period since 1960 has seen a continuous rapid growth in mechanical mining similar to that experienced in Queensland.

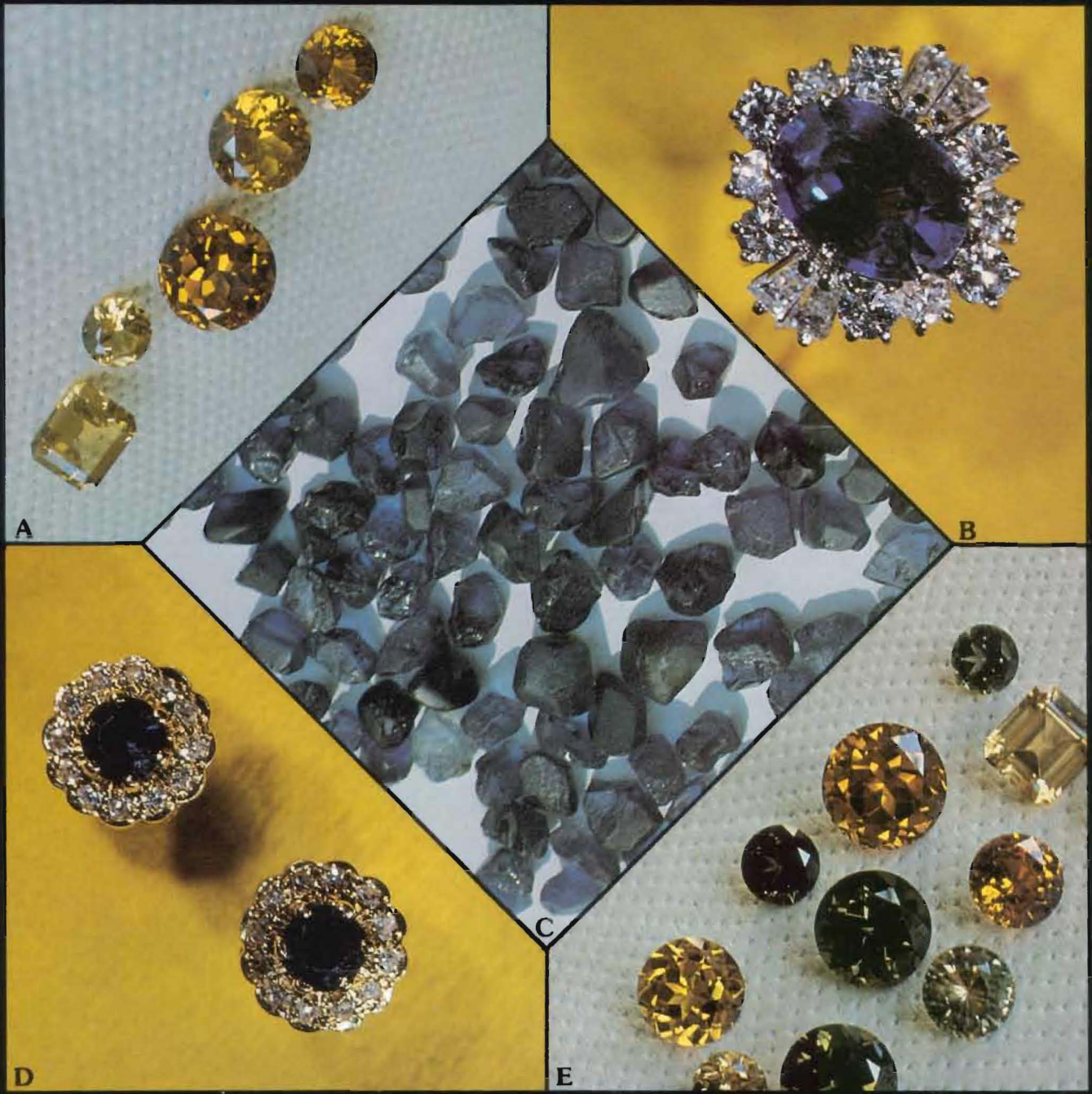
(A) Yellow and Golden Sapphires.

(B) Beautiful blue sapphire and diamond ring.

(C) Rough Blue sapphire.

(D) Blue Sapphire and diamond earrings.

(E) Golden and particolour sapphire.



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Australian sapphires come in a very large range of sizes, from sand grain sized particles through to pieces that have literally been used as door stops!

Many stories surround the Australian sapphires — tragic as well as comic tales abound. Perhaps the most burlesque event is the finding of one of the largest star sapphires in the world, the huge 1156 carat “Queensland”. A little boy by the name of Roy Spencer was sauntering across the hot sapphire fields in 1934, when he picked up a big rock he considered worthy of use as a door stop.

The sapphire served on his porch for several years before a Sydney gem buyer chanced upon the boulder and saw what it really was. Roy was offered a few pounds (currency before dollars) for the stone, but refused to sell. Later, the sapphire was sold to an American lapidarist who cut it into a 733 carat black star sapphire. Roy, not surprisingly, became one of Australia’s most reputable gem dealers.

According to the “Guinness Book of Records”, the largest sapphire ever found was discovered circa 1935 at the Anakie fields.

The sapphire weighed 2302 carats and was the heaviest stone in a group of four Anakie sapphires, carved into the busts of four American Presidents — George Washington, Thomas Jefferson, Abraham Lincoln, and Ike Eisenhower.

The greatest bulk of production, however, is of pieces less than 10 carats in the rough. Over the past two decades Australia has produced approximately 80% of the world supply of blue sapphire in terms of carat

volume. Mining is by large scale mechanical operations that may process hundreds of cubic yards of material weekly — each cubic yard yielding only a few carats of rough cuttable stone.

As bulldozing is an expensive procedure, miners who do not possess a machine will often hire the service from nearby sites or from independent earth moving companies.

The sapphire wash is transported by trucks to the separation plant, where a high pressure hose breaks up the clay and gravel, before the wash enters a rotating mesh drum (a trommel). The heavier waste material is carted away by trucks and the smaller gemmiferous residue moves on to vibro-trays, under a constant water flow. Sand and pebbles are washed away and heavier minerals, including sapphires, zircons and sometimes rubies, are trapped behind riffles.

As the great bulk of our rough sapphire is exported to Asia, where it is cut and polished, Australia has not gained the public reputation it deserves as one of the world’s largest sapphire producers. Much of the better quality cut Australian blue sapphire is sold as the product of other countries such as Cambodia, Thailand and Sri Lanka, and the poorer quality as Australian. However, there is an awakening worldwide awareness of the quantity and quality of sapphire Australia produces.

The importance and extent of Australian sapphire production can only be appreciated when it is realised that almost every jewellery store in the world displaying sapphire set jewellery more than likely has Australian sapphire somewhere amongst its stock.





**PAGE 14: Magnificent gem-quality blue sapphire.**

**(A) Fossicking: One of the most enjoyable and, with luck, profitable ways to spend a holiday or a weekend in the sapphire-mining areas.**

**(B) Blue sapphire in the rough – and the end result of the cutter's craftsmanship.**

**(C) A selection of sapphires showing the wide variety of colours available.**



# PEARLS

**“Some asked how pearls did grow, and  
Where?”**

**Then spoke I to my girl  
To part her lips, and showed them  
there**

**The quarelets of pearl”.**

**Robert Herrick**

**P**earls held the centre stage amongst the world's most precious gems until five or six hundred years ago, when the diamond and ruby gained an edge, due to improved cutting techniques. Not only was it desired for its beauty, but was highly sought after as a talisman to bring good fortune, to ward off evil spirits and to cure illnesses — even today small pearls are ground into powder in a number of Asian countries to be used as a medicine.

There are many legendary stories about pearls and their existence and usage can be traced as far back as 4000 B.C. The ladies of Rome developed such a fondness for pearls that the Caesars issued an edict to the effect that no woman under the age of fifty-five who was unmarried or childless could wear pearl jewellery!

Early Australian records suggest that whilst shells (the prime objective for buttons and ornaments) and pearls (a valuable bonus) were discovered in reasonable quantities around 1850, it was not until 1861 that Mr. F. T. Gregory led a Government sponsored party to Nickol Bay, W.A. to search for these commodities.

Shortly after their return, to Fremantle, a second expedition collected 910 shells and 150 pearls, but interest in pearling ventures temporarily collapsed.

In October 1866 it was announced that fine pearls and a good quantity of shell were obtained from the Nickol Bay area. The search continued, and by the end of 1867 indications were that there was an abundance of pearlshell along the North West coast.

Early in 1869 a large round pearl from Western Australia was sold in England for 260 pounds, which made it as valuable as a 64 ounce nugget of gold, and the rush, so to speak, started.

For several years after 1870, pearlers fished the Eighty Mile Beach, using Cossack in the south as their base, venturing out to sea for many weeks at a time, gradually fishing further north until in 1879 they started to use Roebuck Bay for anchorage.

A settlement at Roebuck Bay was formed in 1881 and the town of Broome declared in 1883. Broome, which has a 27 foot tide, had a fleet of 300 luggers and a population of 4000 in the early 1900s.

Together with Thursday Island in the Torres Strait, these towns boomed and became bustling, colourful and boisterous places of many nationalities and the results of this intermixture of races and cultures can still be seen to this day.

Devastating cyclones, which create havoc with the pearl industry, are common along the North West coast — the first recorded cyclone, on 24th December, 1875, at Exmouth Gulf, resulted in the loss of 59 lives and many luggers were lost or damaged.

In 1922 the Western Australian Pearling Act prohibited the cultivation or sale of cultured pearls, and it was even an offence for anyone to have in their custody a pearl which had been cultivated. This section of the Act was repealed in 1949, so it then became lawful for cultured pearl activities to take place.





When Mr. K. Mikimoto discovered the secret of how to induce an oyster to produce a pearl, and sent some of his early products to London in 1919, the whole pearl world changed. The jewellery trade labelled the cultured pearl a fake until the late 1920s, when a famous naturalist pronounced cultured pearls as being genuine products of the pearl oyster and not imitations by man. It was then agreed to use the term "cultured" to distinguish a man-induced pearl as against one induced by nature. It must be remembered that all man can do to help make a pearl, is to insert into the oyster a nucleus or irritant the same as nature does, but usually much larger, so that a bigger pearl is produced in a minimal period of time. The shape, colour and lustre of the resulting pearl is completely controlled by the oyster, as is the final size.

In the late 1930s experiments were conducted in the Micronesia area to produce as a "cultured" pearl which was, and is still, known as the South Sea pearl. The best and largest natural pearls were those produced by the "Pinctada Maxima" species of pearl oyster, commonly known as the "Mother of Pearl". The habitat of this large shell is limited to an area roughly running down the edge of Burma and Thailand, through Indonesia and across the top of Australia, with the largest known concentration of the bivalve around the northwest of Western Australia and through the Arafura Sea into the Torres Strait.

In the early 1950s an adventurous group of businessmen from Japan, America and Australia decided to continue with the culturing of the South Sea pearl, but this time in Australian waters where there was an abundance of suitable oysters and the experience to collect them. By 1956 an embryo culture pearl farm was established at Kuri Bay, in the wilderness of Western Australia some 400 km north of Broome. Some ten years later this farm, together with other smaller farms established by them, and others in the Torres Strait, were producing over 60% of the world's annual supply of South Sea pearls.

As though nature was telling man that he could not run roughshod over her and produce as many pearls as he wished, an unknown virus swept through the oyster beds in the early 1970s, commencing in the Torres Strait and eventually affecting the west coast of Australia and the major oyster fishing areas. The result was an extremely high mortality rate amongst both the newly collected oysters and those already producing pearls.

The nucleus used in the culturing of full pearls is made out of the pigtoe mussel shell from the Mississippi and Tennessee Rivers, and which has a specific gravity close to that of a natural pearl. The size of the nucleus used ranges from 6mm up to a maximum of 8mm for oysters operated on for the first time, and up to 9mm for oysters operated on twice.

The largest round pearl produced in Australia, at Kuri Bay in 1976, was 18mm in diameter, and is believed to be the largest cultured round pearl in the world. Larger pearls in drop and baroque shape have been produced, including a baroque measuring 30mm × 34mm × 41mm. The growing period extends from 20 to 24 months.

Oysters which have produced twice, and those which have rejected the nucleus inserted, are returned to the sea for a six-month rest period, and are then operated on for half or "mabe" pearls. In this operation the oyster is not cut, but half spheres of soapstone, or plastic, are stuck to the inside of the shell and the oyster through its mantle covers these protrusions with nacre. After a nine-month period, the oyster is finally killed and the "mabe" pearls drilled from the shell. The original nucleus is removed from the nacre coating, leaving a half sphere of pearl nacre. This cap, as it is termed, is carefully cleaned and painted on the inside, and filled with resin and a discarded round pearl nucleus. A button of mother of pearl shell is finally cemented to the base — thus the "mabe" is ready for mounting.

# JADE

**In the second month,  
The plants in the mountains receive  
a bright lustre,  
when their leaves fall  
they change into Jade.  
The spirit of Jade is like a beautiful  
woman.**

**Chinese Poem**

**J**ade, prized for centuries by the Chinese as the toughest and one of the most durable of all gem materials, is now mined in Australia. The South Australian Nephrite jade deposit was discovered in 1965 in the Minbrie Range near Cowell, by a local farmer, Mr. H. A. Schiller, who, while prospecting on his property, noticed the extreme toughness and colour of the boulders. The deposits are confined to an area of approximately nine square kilometres, and as such have been designated by the South Australian Department of Mines and Energy as the Cowell Jade Province. The jade occurs in some of the oldest rocks of South Australia, and is believed to have formed during intense movements and recrystallisation within the earth's crust around 1700 million years ago.

True Nephrite jade, which is the toughest known mineral, has been a challenge to craftsmen through the centuries. It is this important physical property of toughness which allows jade to be carved so very thin and with intricate detail.

The early development of the South Australian jade deposits saw a number of individuals, groups and companies involved. However, in 1977 a rationalisation of the industry commenced, and today most of the leases are being developed by one company.

The jade occurs as lenses or pods, and over 100 outcrops have been identified to date within the province. Mining of the jade is undertaken with open-cut techniques. The rock surrounding the jade pod is removed by drilling and blasting, leaving the pod exposed. This enables it to be mined without using explosives on the jade itself. The jade boulders, some in excess of one tonne, are then transported from the mine site to be cut with large diamond saws to allow evaluation. After cutting, the jade boulders are ready for export or for further processing in Australia to produce fine quality jewellery.

The colour of the Cowell Jade varies through many shades from pale green-yellow, dark green to black. Nephrite jade is basically an iron magnesium silicate with a variable iron and magnesium content. The pale green-yellow jade which has little iron, on weathering develops a white surface coating of magnesite. In contrast the black jade with increased iron content develops a red-brown rind.

The dark green jade is the most prolific, while the fine-grained black jade is the highest quality material available from the province. This rare and beautiful black jade is recognised by jade enthusiasts from many countries for its fine working qualities and the beautiful polish which can be obtained.



# RUBIES

**“Some asked me where the rubies grew,  
And nothing did I say;  
But with my finger pointed to  
The lips of Julia”.**

**Robert Herrick**

**R**uby as a name stems from the Latin “Rubeus”, meaning “red”. It belongs to the same group of minerals as Sapphire, the Corundum group, and ranks amongst the most precious stones in the world, sometimes exceeding the value of the finest diamonds.

The red colour, caused by chromium oxide, may vary in intensity and hue — rubies are found in rose colour, through carmine and pink to a darker crimson, called “pigeon blood”, which is the most valuable.

Rubies are found in basically the same locations as Sapphires, albeit in much smaller quantities. It was once believed that Australia was to become the largest ruby source in the world. In 1885 an Australian explorer happened upon a handful of brilliant red stones when he was searching for water in a dry creek. His discovery triggered a veritable Ruby Rush, when hundreds of men traversed thousands of miles to collect the shining red stones. Sackfuls of stones were found and sent to lapidarists in England, who at first praised them as being the most brilliant, high quality rubies. The Ruby Rush

continued at an even higher and more feverish rate, until one day a message was received from London, disclaiming all that had been said about “rubies”, and explaining that the stones were really garnets of little value. Many a lost hope lies buried in the gravel of the remote Australian dry river beds.

Australian rubies are quite rare, but a recent deposit was discovered by a prospector, ‘Bluey’ Bruce, in 1978. He found a piece of bright, red rock in the Harts Range in outback central Australia. When he returned to Alice Springs and showed his rock to various people, the consensus was that it was only garnet, which is commonly found in the area.

Placing his faith in the intuition of the outback prospector, he sent the stone to Melbourne for cutting and polishing. After the cutter had broken three saws on the supposed “garnet”, it was sent to Thailand and America, where it was certified that this was the first real discovery of Australian ruby.

These rubies are cabochon cut (a popular style for rubies today) and mount into very attractive articles of jewellery.



# EMERALDS & DIAMONDS

**E**merald is the rarest and most valuable form of Beryl. The characteristic deep green colour has given the stone its name — the word emerald is derived from the Greek, “Smaragdos”, which means “Green Stone”. Emerald is aluminium beryllium silicate — the green colour is caused by the presence of small amounts of chromium or sometimes vanadium.

Emerald rivals ruby and diamond as the most precious gemstone found in spite of its tendency to carry flaws and inclusions of foreign materials within its crystalline structure. Colour is more important in evaluating a gem — a good “grass” green emerald is worth more, even with flaws, than a paler stone.

In Australia, emeralds are found in very small quantities today. Up until the turn of the century, the stones were mined in northern N.S.W. and in Western Australia.

Emeralds are part of the West Australian mining legend. They were first discovered by tin prospectors early this century. Several small mines were worked in the 1920s, until they were forced to close in the Depression. They were all around Poona, near Cue, on the Murchison Goldfields. Discovered in 1909, production from the Aga Khan mine is believed to have started in the mid 1920s by the then Aga Khan of India. The ore was shipped back to India in drums simply marked “beryl”, according to old-time miners. At the Aga Khan mine emerald is found close to the surface, near pegmatite dykes in soft black schists glittering with silver mica flakes.

The mine closed down at the outbreak of World War II and has since been worked intermittently, until late 1979. Since then trial production runs and development work have produced several thousand cuttable stones.



**D**iamond is a stone of great beauty, much mystery, and remarkable physical qualities. The stone is made up of pure carbon, its chemical symbol C. Pure carbon, paradoxically, occurs naturally in two widely differing forms: diamond, the hardest substance known to man; and graphite, one of the softest minerals on earth.

The name diamond comes from the Greek word, “Adamas”, meaning “invincible”, a well-suited attribute to the icy, hard mineral.

Diamonds are found virtually all over the world, although large deposits are few and far between. South Africa is currently the world’s largest supplier of diamonds. Australia was a significant source in the latter half of the last and the beginning of this century, the biggest finds being made in northern N.S.W. at Bingara and Copetown. For the adventurous and hopeful gem hunter, these areas would be the most likely to make a find. Other possible areas include Cudjiegong north-west of Mudgee, Anakie and Stanthorpe in Queensland, Eldorado in Victoria, Echunga in South Australia and Nullagine in Western Australia.

One of the world’s most significant finds of diamonds in recent years is the Argyle find at Smoke Creek, Western Australia. Here, gem-quality stones constitute some 5–10% of the total production, the rest being industrial-quality diamonds.

The Australian diamond business is very enthusiastic about the Argyle project, not only because of its estimated high yield, but also because of another aspect of the project — the curious “speciality” of Argyle — Pink Diamonds. The pink stones are particularly rare in other mines around the world, and fetch extremely high prices among dealers and collectors.





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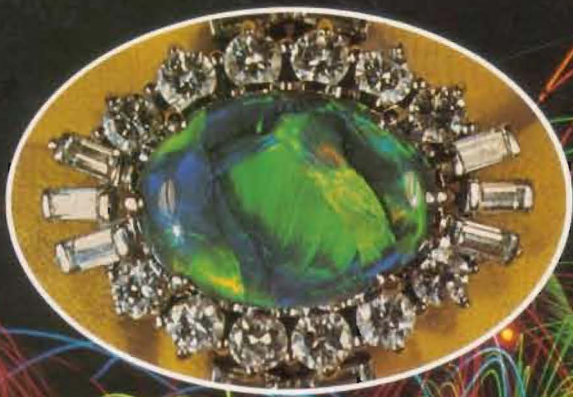
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# AUSTRALIAN OPALS & GEMSTONES



## NATURES OWN FIREWORKS

