

## **Amethyst**

Purple has long been considered a royal color so it is not surprising that amethyst has been so much in demand during history. Fine amethysts are featured in the British Crown Jewels and were also a favorite of Catherine the Great and Egyptian royalty. Amethyst, transparent purple quartz, is the most important quartz variety used in jewelry.

Leonardo Da Vinci wrote that amethyst was able to dissipate evil thoughts and quicken the intelligence.

Because amethyst was thought to encourage celibacy and symbolize piety, amethyst was very important in the ornamentation of Catholic and other churches in the Middle Ages. It was, in particular, considered to be the stone of bishops and they still often wear amethyst rings. Rosaries are often fashioned from Amethyst.

In Tibet, amethyst is considered to be sacred to Buddha.

The Greek work "amethystos" basically can be translated as "not drunken." Amethyst was considered to be a strong antidote against drunkenness, which is why wine goblets were often carved from it! The gemstone still symbolizes sobriety.

The legend of the origin of amethyst comes from Greek myths. Dionysius, the god of intoxication, was angered one day by an insult from a mere mortal and swore revenge on the next mortal that crossed his path, creating fierce tigers to carry out his wish. Along came unsuspecting Amethyst, a beautiful young maiden on her way to pay tribute to the goddess Diana. Diana turned Amethyst into a statue of pure crystalline quartz to protect her from the brutal claws. Dionysus wept tears of wine in remorse for his action at the sight of the beautiful statue. The god's tears stained the quartz purple, creating the gem we know today.

Amethyst ranges in color from pale lilac to deep purple. The pale colors are sometimes called "Rose de France" and can be seen set in Victorian jewelry. The deep colors are the most valuable, particularly a rich purple with rose flashes.

Amethyst is mined in Brazil, Uruguay, Bolivia and Argentina, as well as in Zambia, Namibia and other African countries.

Generally, amethyst from South America tends to be available in larger sizes than African amethyst but amethyst from Africa has the reputation for

having better, more saturated, color in small sizes. Very dark amethyst, mostly in small sizes, is also mined in Australia.

Amethyst is available in a wide range of calibrated sizes and shapes, including many fancy shapes. Large fine stones may be sold in free sizes but generally amethyst is cut in standardized dimensions.

This description was taken from the International Colored Gemstone Association.

## **Ametrine**

Do you love both the purple of amethyst and the sunny gold of citrine? Sometimes amethyst and citrine colors are found in the same crystal of quartz. These bicolor yellow and purple quartz gemstones are called ametrine.

With ametrine, you can have both gem colors for the price of one! Ametrine is especially inexpensive when you consider that it comes from only one mine in the world.

The Anahi Mine in Bolivia is the major world producer of ametrine. The mine first became famous in the seventeenth century when a Spanish conquistador received it as a dowry when he married a princess from the Ayoreos tribe named Anahi. Ametrine was introduced to Europe through the conquistador's gifts to the Spanish queen.

Ametrine is most typically faceted in a rectangular shape with a 50/50 pairing of amethyst and citrine. Sometimes a checkerboard pattern of facets is added to the top to increase light reflection. Ametrine can also be cut to blend the two colors so that the resulting stone is a mix of yellow, purple, and peach tones throughout the stone. Ametrine is also popular among artistic cutters and carvers who play with the colors, creating landscapes in the stone.

Ametrine is a very durable gemstone suited for a variety of jewelry uses. Most sizes and shapes are available but the color contrast is most pronounced in sizes over seven carats.

So why compromise when you can have two varieties of quartz for the price of one!

This description was taken from the International Colored Gemstone Association.

## **Aquamarine**

Aquamarine, the "gem of the sea", derives its name from "sea water". The reference is obvious: aqua sparkles like the sea and its color is pale to medium blue, sometimes with a slight hint of green. Aquamarine is the birthstone for March.

Legends say that it is the treasure of mermaids, with the power to keep sailors safe at sea. Aquamarine is said to be a particularly strong charm when immersed in water (which is a good thing, since that is when sailors need its power most!)

Aquamarine was also said to have a soothing influence on land, especially on married couples. Its power to help husbands and wives work out their differences and ensure a long and happy marriage makes it a good anniversary gift. Aquamarine also protects against the wiles of the devil. A dream of aquamarine means that you will meet new friends.

Aquamarine is found in Brazil, Zambia, Mozambique, Angola, Nigeria, and other countries.

Aquamarine is always a pastel blue but the darker the color, the more valued it is. Connoisseurs also prefer a pure blue, with no green in it. If you prefer a greenish tinge, you will find that these stones are less expensive.

Because the color is generally pale, aquamarine should have a good clarity. These stones are often cut in ovals and emerald cuts. More saturated colors are unusual in small sizes: usually it takes some size for the color to hold in a darker shade.

Aquamarine is a durable and lively gemstone that is appropriate for all jewelry uses. Its pale fire is flattering to most skin tones.

This description was taken from the International Colored Gemstone Association.

## **Citrine**

Citrine is one of the most affordable gemstones, thanks to the durability and availability of this golden quartz. Named from the French name for lemon, "citron," many citrines have a juicy lemon color.

Citrine includes yellow to gold to orange brown shades of transparent quartz. Sunny and affordable, citrine can brighten almost any jewelry style, blending especially well with the yellow gleam of polished gold.

In ancient times, citrine was carried as a protection against snake venom and evil thoughts.

Although the darker, orange colors of citrine, sometimes called Madeira citrine after the color of the wine, has generally been the most valued color, in modern times, many people prefer the bright lemony shades which mix better with pastel colors. Citrine is generally more inexpensive than amethyst and is also available in a wide range of calibrated sizes and shapes, including very large sizes.

Most citrine is mined in Brazil. Supply of citrine is good from the Brazilian state of Rio Grande do Sul, particularly from the Serra mine, which is producing 300 kilos a month of hammered goods. The Ira' mine produces an additional 100 kilos a month of hammered goods.

Sometimes you will hear citrine referred to as topaz quartz, which is incorrect. This name was used in the past in reference to the color, which is sometimes similar to the color of topaz. Since topaz is a separate mineral, this type of name can be confusing and should not be used. However, citrine is considered an alternative to topaz as the birthstone for November.

Since most citrine on the market started its life as amethyst which was heated to turn its color to gold, citrine jewelry, as well as amethyst jewelry, should be kept away from prolonged exposure to strong light or heat. With this precaution, citrine jewelry will last for many generations.

This description was taken from the International Colored Gemstone Association.

## **Diamonds**

Diamonds are the hardest of all gemstones and the hardest transparent substance. Natural diamonds are found in kimberlite or lamproite pipes produced by volcanic magma millions of years ago. Diamonds are a simple crystalline structure of carbon produced by extremely high pressure and temperature. The melting point of a diamond is 4,000 degree C or about 2.5 times higher than the melting point of steel. Gem quality diamonds are rare; this helps to account for their value.



A rough diamond resembles a common pebble; but when properly cut and polished by a skilled diamond cutter, its "fire" or brilliance comes to life. Fire can be seen as a flash, spark, sparkle, or animation of light and color caused by the proportioning, angles and positioning of facets that reflect and refract light inside the diamond. Facets must be precisely cut so that light bounces freely inside the diamond, and then exits through the crown or top, directly to the eye of the viewer. The table, top or crown facet is the largest and most important facet on a diamond.

It takes from several hours to several months to cut and polish a diamond, depending on the size, shape and style of the final product. During cutting and polishing, a rough diamond will lose approximately 50% of its original weight.

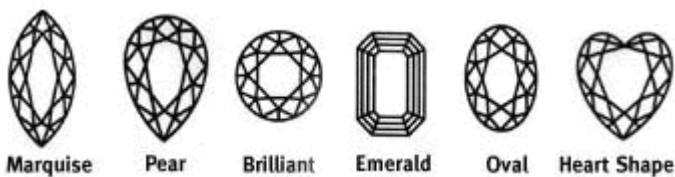
The most popular shape for cut diamonds is the round or round brilliant . Other popular shapes are the oval, square, marquise, pear, emerald, heart and princess.

People attribute a variety of qualities to diamonds: strength, character, wealth, success, beauty, purity, eternity ("a diamond is forever"), endurance, milestones, romance, engagement and love.

## **Diamond Cutting**

The cut gives each diamond its unique sparkle and brilliance by allowing the maximum amount of light to enter and reflect back out of the diamond. A well-cut diamond will be considerably more beautiful and valuable than a poorly cut stone of the same size, clarity, and color.

There are six diamond shapes: round brilliant-cut, marquise, emerald-cut, pear-shaped, oval and heart-shaped. More than 75% of all diamonds sold are round stones. The solitaire, a single round diamond prong-set in platinum or gold, epitomizes the American engagement ring.



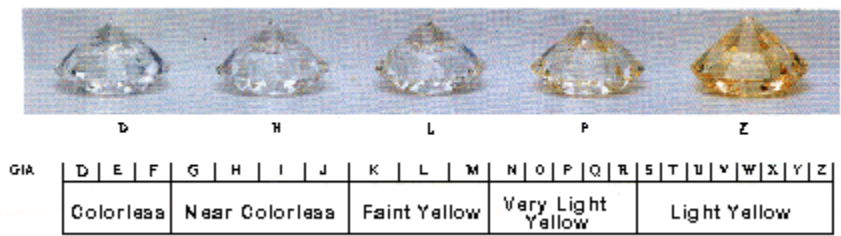
## **How Quality is Determined**

Four factors are used to evaluate diamonds:

**Carat weight** - one carat equals 0.2 grams. One carat equals 100 points. A 50 point diamond is described as .50 carats.

**Cut** - The arrangement of a diamond's facets. This is the only one of the four factors under the direct control of man. Facets are planned and proportioned so that ambient light is reflected from one facet to another until the light exits from the top or crown of the diamond. "Symmetry" refers to how well the facets line up with each other. Grading standards used by the Gemological Institute of America (GIA) for "cut" are: *Excellent, Very Good, Good, Fair and Poor.*

**Clarity** - The degree to which a diamond is free from natural phenomena known as inclusions: impurities, non-crystallized carbon, cracks or scratches. Most inclusions can only be seen under magnification. GIA grading standards for clarity are:



- **Flawless (FI):** Flawless diamonds show no blemishes or inclusions when examined under 10x magnification
- **Internally Flawless (IF):** Stones show no inclusions and only insignificant blemishes under 10x magnification.
- **Very Very Slightly Included (VVS<sub>1</sub> and VVS<sub>2</sub>):** VVS diamonds contain minute inclusions that are difficult for even a skilled grader to locate under 10x magnification. In VVS<sub>1</sub>, they are extremely difficult to see, visible only from the pavilion, or small and shallow enough to be removed by minor repolishing. In VVS<sub>2</sub>, they are very difficult to see.
- **Very Slightly Included (VS<sub>1</sub> and VS<sub>2</sub>):** VS diamonds contain minor inclusions ranging from difficult (VS<sub>1</sub>) to somewhat easy (VS<sub>2</sub>) to see under 10x magnification.
- **Slightly Included (SI<sub>1</sub> and SI<sub>2</sub>):** SI stones contain noticeable inclusions which are easy (SI<sub>1</sub>) or very easy (SI<sub>2</sub>) to see under 10x magnification. These diamonds are sometimes called "eye clean" because they appear flawless to the naked eye.
- **Imperfect (I<sub>1</sub>, I<sub>2</sub>, and I<sub>3</sub>):** I-grade diamonds contain inclusions which are obvious under 10x magnification, and can usually be seen with the unaided eye. These flaws can seriously affect the stone's

potential durability, or are so numerous they affect the transparency and brilliance of the stone.

<b>Diamond Clarity Scale</b>	<b>FL</b>	<b>IF</b>	<b>VVS<sup>1</sup></b>	<b>VVS<sup>2</sup></b>	<b>VS<sup>1</sup></b>	<b>VS<sup>2</sup></b>	<b>SI<sup>1</sup></b>	<b>SI<sup>2</sup></b>	<b>I<sup>1</sup></b>	<b>I<sup>2</sup></b>	<b>I<sup>3</sup></b>
	<b>Flawless-Internally Flawless</b>		<b>Very Slightly Imperfect</b>		<b>Very Slightly Imperfect</b>		<b>Slightly Imperfect</b>		<b>Imperfect</b>		

**Color**

If you are looking for a diamond for an engagement ring, earrings or pendant, find one that is the whitest white. Of the Four Cs of diamond valuation, many experts name color as the number one consideration. Diamond colors are graded on a simple system, beginning with "D" for colorless and move down the alphabet to stones with traces of color to stones with visible shadings. Stones with poor color can be found towards the end of the alphabet.

A diamond's ability to reflect and refract light is dependent on its whiteness. When white light enters the diamond, part of the ray is reflected back to the observer's eye, but the rest of the light penetrates the stone. Refraction occurs when the ray is deflected toward the center of the stone, then bounced back to the surface. The whiter the color, the greater the reaction.

Since color differences can be so subtle, they are impossible to determine by the untrained eye. To grade a diamond, gemologists often place it on a white background next to another diamond that has been previously graded.

GIA's grading standards begin with D (colorless) and go to Z (light yellow). The value of a diamond decreases as the scale moves from D to Z. Grades of D to H are preferred for fine jewelry.

<b>Diamond Color Scale</b>	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	<b>Fancy Colors</b>
	Colorless			Near Colorless			Faint Yellow		Very Light Yellow		Light Yellow													

**Carat**

The term carat is the unit of weight for diamonds, where one carat equals 0.2 gram. One carat is divided into 100 points. A half carat stone is 50 points, a

quarter carat 25 points, and so on. Total Carat Weight (tcw.) is the total weight of both diamonds in diamond stud earrings, or all of the diamonds in other jewelry items. Since a larger stone is rarer than a smaller stone, the price per carat is higher for the larger stone. There is a significant difference between the price of one carat total weight (1 tcw.) and a one carat stone. A one carat diamond is much more valuable than a grouping of smaller diamonds that add up to one carat.

<b>Carats to Millimeters Conversion Chart for Round Diamonds (approximate)</b>			
<b>CTS</b>	<b>MM</b>	<b>CTS</b>	<b>MM</b>
0.005	1.0	0.25	4.1
0.01	1.3	0.30	4.2
0.015	1.5	0.33	4.5
0.02	1.7	0.35	4.5
0.025	1.8	0.38	4.6
0.03	2.0	0.40	4.8
0.04	2.2	0.50	5.2
0.05	2.4	0.60	5.4
0.06	2.5	0.63	5.5
0.07	2.7	0.65	5.6
0.08	2.8	0.75	5.8
0.09	2.9	0.80	6.0
0.10	3.0	0.85	6.2
0.15	3.4	0.95	6.4
0.20	3.8	1.00	6.5

**Summary:**

The market value of a diamond is linked to a combination of these four factors. Hundreds of combinations are possible. The current trend of consumers is to give **high priority** to **color** , then to **clarity**, next to **cut** and finally to **carat** weight. Some demand is also being created for naturally occurring "fancy" color diamonds.

**Emeralds**

Emerald has one of the longest histories of all gemstones. The first known emerald mines were in southern Egypt and were operated from before 1000BC into the 1700's. This is a testament to the high value people have

placed on emeralds for many centuries as the work was hard and dangerous and the stones small and poor by today's standards.

To the ancient Egyptians, emerald's green stood for fertility and rebirth. In many cultures emeralds were used to treat eye diseases, and until the eighteenth century, European gem engravers kept emeralds to look at when their eyes tired. They were also used as an antidote for poisons and to prevent epilepsy in children.

People once believed that holding an emerald under your tongue would let you see the future. Others thought that wearing one would strengthen your memory, make you more eloquent, help you avoid evil spells, and reveal the truth of your lover's statement.

The world has seen some very large emerald crystals. The Los Angeles County Museum of Natural History has a 1,965-carat crystal, ranging from about 200 carats to 1,796 carats, is in the Banco de la Republica in Bogota, Colombia.

In contrast to other beryl gemstones, emerald is typically heavily flawed with cracks and inclusions of fluid and minerals. These inclusions are called "jardin" (or garden) as they typically resemble leaves and branches. These characteristics are not looked upon as negative aspects for emerald as they would be for other gemstones. Indeed, these inclusions are considered part of the character of the stone and are used to assure the purchaser that the stone is genuine.

Faceted emeralds used in jewelry generally range from melee sizes up to about four carats, but they can be much larger. Remarkable gems include a 136 carat step cut stone at the Diamond Fund in Moscow and a 117 carat stone at the Smithsonian Institution.

One of the most spectacular pieces of emerald set jewelry is the Crown of the Andes, carved from a block of pure gold in 1593 for a statue of the Virgin Mary. Now part of a private collection, it is set with 453 stones, including the 45-carat Atahualpa emerald, totaling 1,521 carats.

Treasured for 6,000 years, emeralds were already much sought-after items in the gem markets of Babylon. The ancient Egyptians were mining emeralds long before other gems as far back as 2000 BC in the desert of Upper Egypt near the Red Sea. They buried the mummies of their notables with an emerald attached around the necks. It was carved with the hieroglyphic symbol for verdant foliage as the gem symbolized eternal youth and rebirth by virtue of its luxuriant spring-like greens. Cleopatra valued her lustrous

emeralds so greatly that the ancient mines in Egypt are now called Cleopatra's Mines. In India, moguls inscribed sacred texts on emeralds and wore them as talismans. The ancient Romans dedicated the emerald to Venus, the Goddess of Love and Beauty, and Emperor Nero reportedly wore emerald sunglasses to watch the gladiators fight in the Coliseum.

Symbolically, it's the gem of eternal spring; prosaically, the emerald is simply a variety of the mineral beryl. Primarily green, emeralds often display tints of yellow and blue. Too much blue, however, and a beryl is classified as an aquamarine. Not green enough, and it's known as a green beryl. That's why the greener an emerald, the more valuable (and eye-pleasing) it is. With color and clarity being their defining features, the most desired emeralds come in shades of lustrous green and with as few inclusions as possible (although rare are emeralds that are completely "clean," or inclusion-free).

High-quality emeralds come from the mines of Zambia, Brazil, Pakistan, Zimbabwe and Russia. Interestingly, emeralds' color and inclusions betray their country of origin. Most of the world's finest emeralds are still mined in the jungles of Colombia. Already in the sixteenth century, the Spanish Conquistadors, grasping for gold, were stupefied to find, in the lands now constituting Colombia, massive loads of beautiful emeralds unrivalled by any they had ever seen. The natives had mined emeralds there a millennium before the arrival of the Europeans, and the Inca and the Aztec peoples liberally used emeralds in their symbols and decorations.

To this day, people who believe in the transcendental powers of crystals attribute to emeralds the virtue of increasing cleverness and preserving love. And all can agree with the first-century Roman historian Pliny the Elder that "nothing greens greener than emeralds."

Because the rich green color of the emerald is the color of spring, the ancients prized it as the gemstone symbolizing love and rebirth. Treasured for at least 4,000 years by different cultures all around the world, the emerald is said to quicken the intelligence and enliven the heart.

Cleopatra prized her emeralds more than any other gem. She may have dropped her pearls in her wine for Mark Anthony, but she certainly kept her emeralds for herself! The ancient emerald mines of Cleopatra, long a mystery, were rediscovered a hundred years ago near the Red Sea. Some tools found in the mine were dated at 1650 BC, but no quality emeralds were found. The mines were exhausted thousands of years ago. Mummies in ancient Egypt were often buried with an emerald around their necks to symbolize eternal youth.

The Romans also loved emeralds because, as ancient scholar Pliny said, "nothing greens greener." Pliny said that emerald was the only gem which delighted the eye without fatiguing it. Emperor Nero wore emerald sunglasses to watch the gladiators.

One legend says that Satan lost the emerald from his crown when he fell. The emerald was shaped into a bowl which the Queen of Sheba sent to Nicodemus. Christ used the bowl at the last supper and Joseph of Arimathea used the bowl to catch blood from the cross, founding the order of the Holy Grail.

The Moguls of India, including Shah Jahan, the builder of the Taj Mahal, loved emeralds so much they inscribed them with sacred text and wore them as talismans. Some of these sacred stones, called "Mogul emeralds", can still be seen in museums and collections today.

Emerald is the birthstone for May, the month of springtime romance, and the anniversary gemstone for the twentieth year of marriage, the perfect emblem of an enduring love.

### **How Green is Your Garden?**

What is the source of the timeless appeal of emerald? Today scientists tell us that the human eye is more sensitive to the color green than to any other. Perhaps that is why green is so soothing to the eye, and why the color green seems to complement every other color.

Think of the beauty of a garden.

Spring can also be seen in the network of inclusions that exist in the depths of the emerald. The French call it the "jardin," or "garden," because it resembles foliage. The inclusions are like a fingerprint, giving each emerald a distinct personality. The extreme rarity of transparent emerald is why emeralds can be more valuable than diamonds.

Emerald is a beryl, a mineral that is normally colorless. Its rich green color is caused by minute traces of chromium. Chromium is the rare element of gemstones. Its presence also gives rubies their fiery redness. Crystals of emerald grew (long before human history) in metamorphic rocks, which usually restricts the size of emerald crystals, making them even rarer in large sizes. Other beryls such as pale blue aquamarine, pink morganite, golden heliodor and pale green beryl, grow in pegmatites which allow larger crystals to form. There is even a bright red beryl found in Utah in the United States.

## The Treasures of the Incas and Aztecs

Ancient emeralds were produced from mines in Egypt and perhaps what is now considered Afghanistan. But, the Spanish, arriving on the continent of South America were stunned to see emeralds finer and larger than any ever seen before. They spent years searching for the source of the fantastic green stones favored by the Incas, finally unearthing it in what is today known as Colombia. Chivor, also known as Somondoco or "God of the green gems" - then later Muzo and Cosquez - are the richest emerald mines in the planet and still the source of the finest stones today.

Hernando Cortes, the conqueror of Mexico, carried carved emeralds taken from the Aztecs in the shapes of fish and flowers as well as a carved emerald bell when he was shipwrecked. Many of the finest stones were lost forever. The Incas had an emerald goddess, a fabulous emerald the size of an ostrich egg. Treasure hunters seeking wrecks of Spanish galleons are occasionally rewarded with the ultimate treasure: emeralds lost by the conquistadors long ago.

### **Choosing an Emerald**

Today, emeralds from Colombia are easier to obtain for they are as close as the nearest jewelry store. They are prized for a vivid saturated green like a lawn of new grass after a rain. This color is so prized that visible inclusions are accepted in these emeralds in return for the incomparable color.

Emerald connoisseurs today are lucky because a relatively new find in Zambia (Africa) has made emeralds much more available on the market today. Zambian emeralds have captured a large portion of the market because they have a deep rich color and sometimes have very few inclusions. Zambian emeralds tend to be a slightly darker green than emeralds from Colombia and some have a bluish tone. Fine specimens have a clear true green which are truly unequaled.

Long thought of as a producer of a lower quality emerald, Brazil today produces fine emeralds that rival those of its famous neighbor. A mine called Nova Era has produced some top quality emeralds that are changing Brazil's reputation. Brazil now produces more emeralds than any other country in the world.

Zimbabwe's famous Sandawana mine is known for producing top quality emeralds in small sizes. Other potentially important producers of emerald are Pakistan, Afghanistan, Madagascar, Nigeria and Russia.

Emeralds are cut in Jaipur, India and Tel-Aviv, Israel as well as in the mining countries. They are one of the most difficult gemstones to cut because of the high value of the rough stone and the many inclusions found in the crystals. Small changes in orientation can make a large difference in the final appearance of the gem. Skilled craftsmen who specialize in cutting emeralds can be found in cities around the world for jewelers who insist on having stones perfected for optimum brilliance and vibrancy.

When choosing an emerald, the most important value factor to consider is color. The more vivid the green, the more valuable the emerald. There are also attractive bright stones with a lighter green color that often make a spectacular piece of jewelry. Darker green emeralds may also make up in rich color what they lose in brightness.

Because emeralds are so rare without inclusions, some inclusions are expected and do not detract from the value of the stone. However, you should look to make sure that fissures and inclusions do not go too deep into the stone so that it might be weakened enough to break if it were hit accidentally. The fissures and fractures that are characteristic of emerald are traditionally filled with oil to minimize their impact. You should avoid cleaning emerald with hot soapy water or steam and never clean an emerald in an ultrasonic cleaner because this oil could be damaged, making the fissures more apparent.

Although many people consider Colombia to be the source of the best emeralds, country of origin is never a guarantee of quality. Even the best mines produce low quality gemstones because good quality emeralds are very rare! Fine emeralds also come from Zambia, Brazil, Zimbabwe, Pakistan, Russia and other countries, so don't be afraid to choose the emerald that looks better to you.

Emeralds are most often cut in a rectangular step-cut, which is now popularly known as the "emerald cut." Smaller sizes are also found in rounds, ovals, pear shapes and marquise cuts. You may have to look a while for an unusual shape in a larger size. Due to their rich color, emeralds are also spectacular when shaped into a smooth-domed cabochon cut.

As you might expect from gems that have spent centuries at the bottom of the ocean and then return to sell for hundreds of thousands of dollars at auctions, emeralds are durable gemstones with a hardness of 7.5 to 8. However, emeralds with many inclusions should be treated with some care and be protected from blows. With a little care, your emerald will no doubt be treasured by your descendants for millennia!

## **Iolite**

When Leif Eriksson and the other legendary Viking explorers ventured far out into the Atlantic Ocean, away from any coastline that could help them determine position, they had a secret gem weapon: iolite. The Viking mariners used thin pieces of iolite as the world's first polarizing filter. Looking through an iolite lens, they could determine the exact position of the sun, and navigate safely to the new world and back.

The property that made iolite so valuable to the Vikings is extreme pleochroism. Iolite has different colors in different directions in the crystal. A cube cut from iolite will look a violetish blue almost like sapphire from one side, clear as water from the other, and a honey yellow from the top. This property led some people to call iolite "water sapphire" in the past, a name that is now obsolete.

Pleochroism may have been helpful in navigation but it makes things difficult for a gem cutter. If iolite is not cut from exactly the right direction, no matter the shape of the rough, its color will not show to its best advantage.

The name iolite comes from the Greek ios, which means violet. Iolite is usually a purplish blue when cut properly, with a softness to the color that can be quite attractive.

Iolite is readily available and surprisingly affordable. The better and richer the blue, the better. It is mined in India, Sri Lanka, Mozambique, Zimbabwe, and Brazil. The Vikings probably mined iolite from deposits in Norway and Greenland.

Iolite is relatively hard but should be protected from blows. With its attractive color and reasonable price, it may become a jewelry staple in the future.

This description was taken from the International Colored Gemstone Association.

## **Jade**

Since at least 2950 BC, jade has been treasured in China as the royal gemstone, yu. The character for jade resembles a capital I with a line across the middle: the top represents the heavens, the bottom the earth, and the

center section, mankind. The word *yu* is used in Chinese to call something precious, as in English we use gold. Jade was thought to preserve the body after death and can be found in emperors' tombs from thousands of years ago. One tomb contained an entire suit made out of jade, to assure the physical immortality of its owner. For thousands of years, jade was a symbol of love and virtue as well as a status symbol.

In Central America, the Olmecs, the Mayans, the Toltecs all also treasured jade and used it for carvings and masks. The Aztecs instituted a tax in jade, which unfortunately led to the recycling of earlier artworks.

The history of jade in Europe is not quite as distinguished. Although prehistoric axes and blades carved from jade have been found by archaeologist, most Europeans were unfamiliar with jade as a gemstone for jewelry use until the sixteenth century when jade objects were imported from China and, later, Central America. The Portuguese, who brought home jade pieces from their settlement in Canton, China, called jade *pedre de ilharga*, or stone of the loins, because they believed it to be strong medicine for kidney ailments. Jade objects brought back to Spain from the new world were called by the Spanish version of this phrase *pedra de hijada*. This became the French *ejade* and then, finally, jade.

The ancient jade carved in China was what we today call nephrite jade: an amphibolite mineral. (Interestingly enough, the word nephrite comes from the Greek word for kidney, *nephros*, a bit more scholarly version of the same thing.) In the 19th Century, it was discovered that the material from the new world was not the same mineral as the jade from China. The mineral from Central America, a pyroxene, was called jadeite to distinguish it from the original nephrite.

The Chinese knew about jadeite, travellers had brought back some jadeite from Burma as early as the thirteenth century. But China was turning inward at that time and this foreign Kingfisher Stone, as they called it, referring to the brightly coloured feathers of the bird, was not considered to be real jade. It only became popular in the eighteenth and nineteenth century when trade with Burma opened up again.

Today it is jadeite jade that is considered the real jade, commanding prices much higher than nephrite because it comes in much more vivid green colours and finer translucency than nephrite jade. Jadeite jade is produced in Burma, which is now known as Myanmar. Every year, the state-owned Myanmar Gems Enterprise holds the Myanma Gems, Jade, and Pearl Emporium where boulders are sold by tender to the top jade dealers from around the world.

Jadeite dealers must be some of the world's biggest gamblers because of the way they buy. Boulders are sold intact, with only a tiny window cut in the side to expose a small section of the interior. The buyer has no idea what lies inside: valuable green jadeite or perhaps only white or brown-stained inexpensive material. He has only his instinct, and on that basis he pays hundreds of thousands of dollars for what may turn out to be the deal of the year or a huge loss.

The top jadeite jade is usually cut into smooth dome shapes called cabochons. Jadeite bangles are also very popular in Asian countries. Beads are also very beautiful and some important jadeite necklaces made during the art deco period have fetched hundreds of thousands of dollars in auctions in the past few years.

Because of its smooth even texture, jade has long been a preferred material for carving. The most common shape is the flat donut-shaped disc called a pi, which is commonly worn as a necklace.

The Emerald Buddha, the sacred image that is enshrined at Wat Phra Kaeo in Bangkok, Thailand, is actually beautiful green jadeite.

Jadeite jade is most treasured for its vivid greens, but it also comes in lavender, pink, yellow, and white. Nephrite is found in less intense dark spinach greens, white, browns, and black.

While jadeite is mined today primarily in Myanmar, small quantities can be found in Guatemala. Although neolithic jadeite axes were found in Europe, it is not known where this prehistoric jadeite was mined, although it is possible that the material came from a deposit in the Alps. Nephrite is mined in Canada, Australia, the United States, and Taiwan.

Jade is most often sold by the piece rather than per carat. Although the overall colour is the most important value factor, attention is also paid to translucency, texture, and also to pattern. Certain patterns, including moss in snow, are highly valued.

Both jadeite and nephrite are very durable and tough, although jadeite is slightly harder than nephrite due to its microcrystalline structure.

This description was taken from the International Colored Gemstone Association.

## **Opal**

Mysterious opals contain the wonders of the skies - sparking rainbows, fireworks, and lightning - shifting and moving in their depths. Opal has been treasured throughout history around the world. Archaeologist Louis Leakey found six-thousand year old opal artifacts in a cave in Kenya!

Roman historian Pliny described the beauty of opal as the combination of the beauty of all other gems: "There is in them a softer fire than the ruby, there is the brilliant purple of the amethyst, and the sea green of the emerald - all shining together in incredible union. Some by their splendor rival the colors of the painters, others the flame of burning sulphur or of fire quickened by oil." Opal was much loved and valued highly by the Romans, who called it opalus.

At the same time, opal was also sought in what would become the Americas. The Aztecs mined opal in South and Central America.

Opal was also treasured in the Middle Ages and was called ophthalmios, or eye stone, due to a widespread belief that it was beneficial to eyesight. Blonde women wore opal necklaces to protect their hair from losing its color. Some thought the opal's effect on sight could render the wearer invisible. They were recommended for thieves!

### **Opal as Muse**

A beautiful opal called the orphanus was set in the crown of the Holy Roman Emperor. It was described as follows: "as though pure white snow flashed and sparkled with the color of bright ruddy wine, and was overcome by this radiance." This opal was said to guard the regal honor.

Opals are also set in the crown jewels of France. Napoleon gave Josephine a beautiful opal with brilliant red flashes called "The burning of Troy," making her his Helen.

Shakespeare found in the opal a symbol of shifting inconstancy, likening play of color to play of mind in one of the most apt uses of gemstone symbolism in literature. In Twelfth Night, he writes: "Now the melancholy God protect thee, and the tailor make thy garments of changeable taffeta, for thy mind is opal."

In the nineteenth century, opal was considered unlucky due to the plot of a popular Sir Walter Scott novel of the time. The heroine of the novel has her life force caught in the beautiful opal she wears in her hair and she dies when the fire in the opal is extinguished.

Queen Victoria loved opals and often gave them as wedding presents. She and her daughters created a fashion for wearing opal. Queen Victoria was one of the first to appreciate opals from an exciting new source: Australia.

Ancient opal came from the mines near Cervenica, Hungary, in what is now Eastern Slovakia, where hundreds of men mined the stone. Ancient opal fanciers never had the chance to see the opal of Australia, where the opal of today was born, which far surpasses the beauty of Hungarian opal in fire and brilliance.

### **A Gem of Water, Born in the Desert**

The story of opal in Australia begins more than 100 million years ago when the deserts of central Australia were a great inland sea, with silica-laden sediment deposited around its shoreline. After the sea receded and disappeared to become the great Artesian basin, weathering 30 million years ago released a lot of the silica into a solution which filled cracks in the rocks, layers in clay, and even some fossils. Some of this silica became precious opal. Opal is one of the few gemstones that is sedimentary in origin. Opal still contains 6 to 10 percent water, a remnant of that ancient sea.

Gold panners in Australia found the first few pieces of precious opal in 1863. Mines at White Cliffs began producing in 1890.

Only opal with a perfectly aligned grid of silica spheres will show play of color, which is created through diffraction. The size of the spheres determine the wavelengths and therefore the colors seen. The brilliance of the colors are determined by the regularity of the grid.

The strength of the colors seen in opal also depend on the background body color and the transparency of the stone. The body color determines the variety of opal and has a large impact on the value.

Black opal, opal with a black to dark gray body color, has the most brilliant colors and is the most valuable. Crystal opal, the next most costly type of opal, is transparent with flashes and is highly valued due to the brilliance of its colors and the fact that many layers of color within the stone can also be seen. White and milky opals tend to have more diffused colors due to the light background color. This is the most affordable type of opal.

Another more unusual type of opal is boulder opal, which has opal with an ironstone host rock matrix which creates a natural dark background to view its fire. These sometimes occur in "splits" a matched pair of opals created

when a piece of boulder opal is split along the opal vein. These are particularly favored for earrings, since they are mirror images of each other.

## **Choosing an Opal**

Within each opal variety, the brilliance of the play of color is the most important value factor. After this consideration, the colors seen and the pattern of the colors will also influence value. Generally, opal with red fire is the most valued because opal that shows red will also show other colors when rolled back and forth: it contains the whole spectrum. The pattern of the play of color also influences value. Generally large flashes and broad patterns are more rare and valuable than small pinfire patterns.

Black opal is found only in Australia in Lightning Ridge, the most famous opal deposit in the world since it was discovered in 1903, and in Mintabie, which also produces large quantities of light opal.

Another large opal producing area in Australia is Coober Pedy, which produces light opal. The name Coober Pedy is an Aboriginal name meaning "white man in a hole." If you visit Coober Pedy, you will understand how it got its name: many houses - and even a church! - are burrows dug into the ground called dugouts. This type of dwelling is quite practical and cool as temperatures soar in the daytime.

Andamooka is known for producing crystal opal and light opal. Boulder opal is produced in several areas in western Queensland.

In addition to Australia, a small quantity of precious opal is produced in Brazil. Mexico and the state of Oregon in the United States produce a volcanic opal called fire opal. Fire opal is transparent opal ranging in color from colorless to yellow, orange, and red. Sometimes it also shows play of color in addition to its bright orange body color. Low quality opal was recently discovered in Ethiopia.

Opal is cut in Australia, Hong Kong, Mexico, Germany, and other places. Calibrated sizes are widely available in light opal, which is very popular with jewelry manufacturers around the world due to the beauty even of inexpensive pieces. Black opal is cut in free sizes due to its rarity and high value. Boulder opal is often available in the natural shape of the rough. Fire opal can be found in both faceted and cabochon cuts, including many interesting fancy shapes.

A green translucent opal that resembles chrysoprase or jade, which is called prase opal, is found in Tanzania. A beautiful blue-green opal is found in Peru in the Andes Mountains. These types of opal do not display play of color.

The hardness of opal ranges from 5.5 to 6.5 on the Mohs scale. It should be protected from heat and strong light, which can dry it out, causing cracks. Ultrasonic cleaners, metal polish, acids, and any strong solvents should be avoided. Exposed corners or points on pear or marquise shape opals may chip if hit while they are being worn. Opal is best set in a protected mounting.

This description was taken from the International Colored Gemstone Association.

## **Pearls**

A pearl is unique, it is the only gemstone to be created from a living creature.

Pearls are characterised by their translucence and lustre and by a delicate play of surface colour. The most perfect shapes are round, or tear drop and their value increases with their size and lustre.

### **How a Pearl is formed**

Pearls are formed when a foreign particle penetrates the body of a mollusk. The particle acts as an irritant, in order to protect itself, the mollusc coats the object in concentric layers of nacre, a natural substance commonly called mother-of-pearl. Only mollusks capable of producing mother-of-pearl are able to create a quality pearl, most notable examples being freshwater clams and saltwater oysters. Irregular shaped pearls are referred to as Baroque and Blister pearls.

### **Color**

The colour of a pearls is dependant upon the type of mollusc and the environment in which it grows. Pearls range from black to white, the most prized is the Indian Rose Pearl. Other colours include cream, grey, blue, yellow, lavender, green, mauve, champagne.

### **Size**

One easy way to check if a pearl is genuine is to gently rub one against the teeth, only a real pearl will feel rough to the touch. Pearls are weighed by

carats (1 pearl grain = 50 milligrams = 1/4 carat) and those weighing less than 1/4 grain are called seed pearls. The largest naturally occurring pearls are the baroque pearls; one such pearl is known to have weighed 1,860 grains.

## **Types of Pearl**

### **Natural Pearls**

Are born by chance when a foreign particle squeezes into the shell of an oyster, far below the surface of the sea. The irritated oyster tries to rid itself of the intruder, and when it can't, it coats the foreign object with layer upon layer of a smooth, hard substance called nacre. Gradually over the years this tiny 'bead' grows and is formed into an iridescent and lustrous pearl.

### **Cultured Pearls**

Are created by man, the oyster shell is opened with and an irritant (usually a Mother of pearl bead) is placed inside to encourage the oyster to produce its precious nacre. Then it's up to mother nature and time to produce the pearl. The most popular Cultured Pearls are Freshwater, Japanese Akoya and South Sea Pearls.

### **Imitation Pearls**

Are made of glass, wax and/or fish scale. They are not created by a mollusc. Despite advanced techniques, these copies never capture the beauty and deep seated luster of Natural and Cultivated Pearls.

This description was taken from the International Colored Gemstone Association.

## **Ruby**

Throughout history, ruby has been considered the king of gems. In Sanskrit, ruby was called ratnaraj, which means "king of gems". Wearing ruby was thought to bring health, wealth, wisdom, and success in love. Worn in a ring on the left hand or in a brooch on the left side, it gave the magical ability to live in peace among enemies. The Burmese thought a ruby inserted in a warrior's flesh made him invincible.

The Union of Myanmar (Burma) and Sri Lanka are the oldest ruby sources. Myanmar's production has fluctuated since World War II, but the Burmese rubies from this country include stones connoisseurs consider the world's best. The Mogok region in Burma has produced rubies with the finest red color. Rubies are still found in Sri Lanka but in very small quantities and the stones are often pale, almost pink. Thailand is today the main source of rubies. Thai rubies are generally a bit darker than the Burmese rubies with a

violet tinge and fewer inclusions. Other sources of ruby include Afghanistan, India, Kenya, Pakistan, Tanzania, and Cambodia.

The rubies used in jewelry today normally range from melee sizes up to about five carats. Large, high quality rubies are among the rarest of gems.

The British Museum collection includes a crystal that weighs 3,450 carats and there is a 196.1-carat crystal in the LA County Museum of Natural History. The Edwardes Ruby, part of the British Crown Jewels, weighs 167 carats.

Ruby's color varies from orangey red to violet red, but because the gem is pleochroic, different colors can be found in the same stone. The color is also accompanied by marked fluorescence that is stimulated by ordinary artificial light and above all, by the ultraviolet rays of direct sunlight. Thus reddish rubies turn brighter red under such light and the purplish ones look "redder".

If the color of the gemstone is too pale, it may be considered pink sapphire instead of ruby; if the color is more violet than red it is considered a violet sapphire.

Medieval alchemists in Europe deemed rubies to be of immense value, believing them to possess unsurpassed magical powers to increase wealth. Their contemporaries in India concurred: rubies attracted other precious gems like magnets to their owners. Rubies were also important talismans: stones of Mars, they bestowed invincibility and curative powers on their bearers. They also conferred wisdom. "The price of wisdom is above rubies," explains Job in the Bible.

Freedom fighters and revolutionaries considered them tokens of liberty and justice. The Burmese, whose land continues to produce the world's best rubies, used to believe that the beautiful minerals ripened like so many fruits on earth: the redder, the riper. Several people still maintain the idea that rubies have the power to cleanse your thoughts and replenish energy. Placed under your pillow, rubies are said to guarantee undisturbed sleep and sweet dreams. And of course, lovers have always esteemed them beyond mere material value.

A variety of the mineral family that also includes sapphires and is known as corundum, the crystal form of aluminum oxide, rubies are the world's most prized gems. Their stunning beauty, exceptional hardness (close second to diamonds), and great rarity (the rarest of precious gems) all make rubies the peerless Queen of Gemstones coveted by gem lovers worldwide. Fine gem-grade rubies carry the greatest commercial value.

The mines of Myanmar (formerly Burma) produce the world's largest yield of top-quality rubies, prized for their distinctive crystal-clear deep-red hues. Neighboring Thailand and Cambodia are famous for their dark to brownish-red gems. Ceylon rubies (from Sri Lanka), in turn, sparkle in medium to light tones, while Africa provides the world with its small purplish-red stones. While rubies are often mined elsewhere, Thailand remains the unrivalled world-center for the gem, along with sapphires, with an estimated 80 percent of all the globe's rubies and sapphires processed in Bangkok.

The Ruby has been the world's most valued gemstone for thousands of years. The ruby was said to be the most precious of the twelve stones God created when he created all things. This "lord of gems" was placed on Aaron's neck by God's command. The bible says that "wisdom is more precious than rubies," that is to say: very valuable indeed. In the ancient language of Sanskrit, ruby is called ratnaraj, or "king of precious stones."

In fact, rubies today are still more valuable and rare than even top-quality colorless diamonds. A 16 carat ruby sold for US \$227,301 per carat at Sotheby's in 1988. A 27.37 carat Burmese ruby ring sold for US \$4 million at Sotheby's in Geneva in May 1995. That is \$146,145 per carat!

In contrast, eight D-color internally flawless diamonds were sold in the past 9 years and the largest, a pear-shape of 102 carats, fetched a mere US \$125,000 per carat. Top rubies are so rare even the world's top gem dealers must incessantly comb estate sales and auctions to find them. Sizes above five carats are particularly scarce.

Ruby is derived from the mineral corundum, one of the most durable minerals in existence and a crystalline form of aluminum oxide. Corundum has a hardness of 9 on the Mohs scale and is also extremely tough. In its common form, it is used as an abrasive.

### **Choosing a Ruby**

The most important factor in the value of a ruby is color. Rubies are red. The truer the red, the more precious the stone. The top quality rubies are as red as you can imagine: a saturated pure spectral hue without any overtones of brown or blue. The word red is derived from the Latin for ruby, "ruber", which is thus derived from similar words in Persian, Hebrew, and Sanskrit. The intensity of color in a fine ruby is like a glowing coal, probably the most intensely colored substance our ancestors ever saw. It is no wonder they ascribed magical powers to these perpetually burning firestones....

All colors of corundum -except red - are known as sapphires, which has created controversy about where ruby ends and sapphire begins. This confusion is most particular in pink shades of corundum. In 1991, the International Colored Gemstone Association ruled that the lighter shades of the reddish hues of corundum should be included in the category of ruby.

After color, the other factors which influence the value of a ruby are clarity, cut and size. Rubies that are perfectly transparent, with no tiny flaws, are more valuable than those with inclusions which are visible to the eye. Cut can make a big difference in how attractive and lively a ruby appears to the eye. A well-cut stone should reflect back light evenly across the surface without a dark or washed-out area in the center that can result from a stone that is too deep or shallow. The shape should also be symmetrical and there should not be any nicks or scratches in the polish.

Rubies and other gemstones are sold per carat, a unit of weight equal to one-fifth of a gram. Larger rubies, because they are more rare, will cost more per carat than smaller stones of the same quality.

Rubies sometimes come in a three-ray, six-point star. These star rubies are cut in a smooth domed-cabochon cut to display the effect. The star is best visible when illuminated with a single light source: it moves across the stone as the light moves. This effect, called asterism, is caused by light reflecting off tiny rutile needles called "silk," which are oriented along the crystal faces.

The value of star rubies and sapphires are influenced by two things: the intensity/attractiveness of the body color and the strength/sharpness of the star. All six legs should be straight and equally prominent. Star rubies rarely have the combination of a fine translucent or transparent color and a sharp prominent star. These gems are valuable and expensive.

### **Where Rubies are Born**

The most famous source of fine rubies is Burma, which is now called Myanmar. The ruby mines of Myanmar are older than history: stone age and bronze age mining tools have been found in the mines of Mogok. Rubies from this mine have a pure red color, which is often described as "pigeon's-blood." Myanmar also produces intense pinkish red rubies which are also vivid and extremely beautiful. Many of the rubies from Burma have a strong fluorescence when exposed to ultraviolet rays like those in sunlight. They also have a reputation of holding their vivid color under all lighting conditions.

Since demand for fine rubies is limited by the tiny supply available, new sources are always treated as exciting news in the trade. An important new mining area in Burma is called Mong Hsu.

The Mong Hsu ruby deposit is producing considerable quantities of commercial-quality Burma Ruby and also significant quantities of fine quality Burma Ruby, particularly in sizes up to one carat. Burma Ruby is now more readily available than Thai Ruby, due to the new ruby rush in the area.

The new deposit has also affected the world capital of the ruby business: Thailand. Many of the ruby traders and cutters from Chanthaburi and Bo Rai have moved to Mae Sai in Thailand. In Tachilek in Myanmar, across the border from Mae Sai, a flourishing trade in Mong Hsu ruby has transformed a village into a prosperous town. Most Mong Hsu ruby is cut and marketed in Thailand.

Thailand is the world's most important ruby trading center. Perhaps 80 percent of the world's ruby goes through Thailand at some point in the trading cycle. The largest ruby cutting factories are in the Chanthaburi area of Thailand. Bangkok is generally where the world's buyers come to purchase this phenomenal red gem.

In 1992, a new ruby mine was discovered in Vietnam that produces rubies which are very similar to rubies from Burma. In fact, the geology of the new mine may be a continuation of the same formation that produced the Burma deposits. Some of the new Vietnamese rubies have been praised by experts as being virtually indistinguishable from top quality Burmese stones.

Fine rubies are also found in Thailand. Thai rubies tend to be darker red in tone: a real red, tending toward burgundy rather than pink, as Burma rubies do. This makes them very popular in the United States where consumers generally prefer their rubies to be a darker red rather than pink. Some Thai rubies have black reflections, a phenomenon called extinction, which can make their color look darker than it really is. But, Thai rubies also can have a rich vivid red that rivals the Burmese in intensity.

Sri Lankan rubies can also be very beautiful. Sri Lankan stones are often pinkish in hue and many are pastel in tone. Some, however, resemble the vivid pinkish red hues from Burma.

Rubies from Kenya and Tanzania surprised the world when they were discovered in the sixties because their color rivals the world's best. Unfortunately, most of the ruby production from these countries have many inclusions - tiny flaws which diminish transparency. Rubies from the African

mines are rarely transparent enough to facet. However, their fantastic color is displayed to full advantage when cut cabochon style.

Occasionally a few fine top-quality rubies appear on the market from Afghanistan, Pakistan, or the Pamir Mountains of the Commonwealth of Independent States. The terrain in these areas has made exploration for gemstones very difficult but someday they may produce significant quantities for the world market.

This description was taken from the International Colored Gemstone Association.

## **Sapphire**

Like other gems that have been prized for a long time, sapphire has suffered from identity confusion. In Roman times, the word sapphires meant lapis lazuli, while green sapphires were "emeralds", blue sapphires were "hyacinths", and purple sapphires were "amethysts".

Many connoisseurs say the most beautiful blue sapphires came from Kashmir, India. Sadly, this source has produced little since World War II. The most important current sapphire sources are Australia, Sri Lanka, and Thailand. Other producers include the Union of Myanmar (Burma), Colombia, Kampuchea, Kenya and Tanzania. In the United States deposits at Yogo Gulch, Montana, have been mined sporadically.

You can see beautiful large sapphires in many museums. The Smithsonian Institution has the Logan sapphire, the dark blue 98.6-carat Bismarck sapphire, and a 92.6-carat yellow Burmese sapphire. The Royal Ontario Museum in Toronto has a 179.4-carat yellow stone from Sri Lanka. The American Museum of Natural History in New York City has a 100-carat yellow, a 100-carat orange, and a 163-carat blue, all from Sri Lanka.

Some of today's celebrities also own magnificent sapphires. Britain's Princesses Ann and Diana both received engagement rings set with sapphires, and Liz Taylor's collection includes a 20-carat sapphire engagement ring and a 77-carat Burmese sapphire pendant.

The name Sapphire derives from the Latin sapphirus, which in turn came from the Greek sappherios, both words meaning "blue." Whereas sapphires come in the full palette of colors (except red) from light pink to brownish orange to black, it is blue sapphires that have exercised people's imagination throughout history. The ancient Persians believed that the earth perched

atop a giant sapphire and the sky mirrored the gem's radiant azure. Other peoples saw the blue sapphire as the Gem of Heavens. Understandably so: blue sapphires range in hue from dark midnight blue to the lucid blue of a summer sky, all the way to the tinged violet of twilight.

In gem lore, blue sapphires denoted honesty and fidelity. Lovers have long cherished them, especially sapphires of the royal blue variety, which remain most prized by connoisseurs. It was such a stone that Prince Charles gave Princess Diana for their engagement. Sapphires have also symbolized truth. Jewish tradition holds that Moses received the Ten Commandments on tablets of beautiful blue sapphire.

A member of the corundum family and a close gemological relative of the ruby, sapphires are resilient stones, second only to diamonds in their toughness. They are hard to break or scratch. The finest gems are mined in **Sri Lanka** (known as Ceylon sapphires), **Thailand, Australia, Cambodia, Kenya, Tanzania,** and **Madagascar. Kashmir** in **India** and **Myanmar** (formerly Burma) produce their special velvety blue stones highly valued by experts. Sadly, though, these have been over-mined almost to the point of extinction.

The finest sapphires retain their brilliance and consistency of color when viewed from any angle and under all kinds of lighting. (Black, green or gray tints mixed in with the blue will reduce a stone's aesthetic and material value.) As with other gemstones, visible, usually needle-like inclusions and other tiny flaws will render a gem "unclean" and so less valuable. However, expert cutters can take advantage of such blemishes. In their hands, needle-like inclusions can be brought to reveal a whirling six-rayed star in cabochon-shaped stones. These are especially popular in rings for men.

The ancients viewed star sapphires as powerful talismans, which guided and protected travelers and seekers on their quests. They were said to protect their original owner even after they changed into other hands. What can be a better gift than that?

Sapphire, the celestial gemstone, has been treasured for thousands of years. The ancient Persians believed that the earth rested on a giant sapphire and its reflection colored the sky. Sapphire is found in all the colors of the heavens: from midnight blue to the bright azure of the noon sky in the Mediterranean; golden sunrise, fiery reddish-orange sunsets, and the delicate violet of twilight. However, the most famous and valuable sapphires are a rich intense blue, a truly royal hue.

The Truest Blue

Sapphire has long symbolized truth, sincerity, and faithfulness. Tradition holds that Moses was given the ten commandments on tablets of sapphire, making it one of the most sacred of stones. Because sapphires represent divine favor, they were the gemstone of choice for kings and high priests. The British Crown Jewels are replete with enormous blue sapphires, a symbol for pure and wise rulers.

Since sapphire symbolizes sincerity and faithfulness, it is an excellent choice for an engagement ring. When Prince Charles chose a sapphire engagement ring for Princess Diana, couples all over the world were inspired to revive this venerable tradition.

Sapphire is also the birthstone for September. Ancient texts also name sapphire as a birthstone for April and the gemstone for the sign of Taurus.

"Fine blue sapphires are tremendously undervalued," says David Federman, United States author of Consumer Guide to Colored Gemstones and other gem books. "Fine Kashmir and Burma sapphires are much rarer than Burma rubies and yet they are available for much less. Even fine Sri Lankan sapphires are rare to see these days. There is nothing more restful to the soul than a fine sapphire."

### **Choosing a Sapphire**

Sapphires come from **Sri Lanka, Thailand, Australia,** and **Cambodia, Nigeria, Kenya, Tanzania, China, Vietnam, Madagascar,** and **the United States** also produce some sapphire. The deposits in Montana in the United States produce a range of fancy colors, mostly from alluvial deposits in the rivers. Deep blue sapphires come from one of the world's largest deposits at Yogo Gulch. The sapphires from Yogo Gulch are small in size but they have a beautiful blue hue. Unfortunately they are found in adamantine rock which makes mining difficult, limiting production.

The most famous sources for sapphire are in Kashmir and Burma. Kashmir sapphire, which was discovered in 1881 when a landslide in the Himalayas uncovered beautiful blue pebbles, has a rich velvety color prized by connoisseurs. Burma sapphires, from the same region that produces fabulous rubies, are also ravishing. However, today, these two sources account only for a very small percentage of the sapphire on the market.

Most of the fine sapphire on the market today comes from Sri Lanka, which produces a wide range of beautiful blues. Kanchanaburi in Thailand and Pailin in Cambodia are renowned for producing deep, even colors. Two

relatively new mining localities are showing promise: Madagascar - which has produced some exceptionally fine stones in small sizes but, as of yet, has no organized mining facility - and Tanzania, which has long produced sapphire in other colors and is now starting to uncover brilliant blues.

The most valuable sapphires have a intense, vivid blue color. The best sapphires hold the brightness of their color under all different types of lighting. Any black, gray, or green overtones mixed in with the blue will reduce a stone's value. In general, a more pastel blue would be less preferred than a deep blue but would be priced higher than an dark, blackish-blue color. As with all gemstones, sapphires which have few visible inclusions or flaws are the most valuable. However some very fine sapphires, in particular those from Kashmir, have a velvety mist-like texture which enhances the richness of its tone.

Sapphires are most often cut in a cushion shape - a rounded rectangle - or an oval. You can also find smaller sapphires in round, brilliant cuts and a wide variety of fancy shapes including: triangles, squares, emerald cuts, marquises, pear shapes, baguette shapes, and cabochon cuts, or smooth domes.

### **Beyond the Blues**

Some sapphires with unusual, tiny needle-like inclusions can be cut in a cabochon shape to display a dancing six-rayed white star. Star sapphires, which are becoming more rare, are very popular for men's rings. Star sapphires are judged by the sharpness of the star, the evenness of the rays and the body-color of the stone. It is extremely rare to find a star-sapphire with a sharp star and a bright blue body-color. The ancients regarded the star sapphire as a very powerful talisman, a guiding star for travelers and seekers of all kinds. They were so potent, they were said to continue to protect the wearer even after being passed on to someone else.

In addition to blue, sapphires are available in every color but red - simply because a red sapphire would thus be called a ruby! Both of these gemstones are a gem variety of the mineral corundum: the only difference is the trace elements that give them their rich colors. Pink shades of corundum are known either as pink ruby or pink sapphire. Sapphire in colors other than blue is often referred to as "fancy sapphire."

Sapphires have become more available in the past twenty years because light, cloudy, or over-dark sapphires can now be heated at very high temperatures to improve its color or clarity. This process, which dissolves trace elements already present in the sapphire, is completely stable. There is

usually no difference in price between heated and non-heated material except at the very top of the market, where the country of origin also comes into play. About 90 percent of the sapphire on the market today has been heated to make sure it has reached the best possible color and clarity.

Knowing how the additions will affect the metal greatly enhances the possibility of a superior final product. In deep drawing of metals, it is important to have a metal which will elongate or stretch a great deal before fracturing, thus high ductility. The requirement for an earring post would be a high tensile strength (a great deal of force needed to get the material to permanently deform, bend). It is imperative to select the proper karated composition for the desired application.

## **Tanzanite**

The gemstone discoveries in East Africa in the 1960s transformed the jewelry world: new varieties, new colors, and new variations on existing species made that decade the most exciting time in the gemstone industry in our lifetimes.

But no gemstone discovered in East Africa has had more of an impact on the world gemstone market than tanzanite, a velvety blue variety of the mineral zoisite that was found for the first time in 1967 and named after the country of its birth by Tiffany & Co in New York, who introduced the gemstone to the world market in 1969.

Tanzanite is the ultimate prize of a gem safari. Its rich purples and blues often have a depth comparable to the finest sapphire. Paler tanzanite has a delicate periwinkle color like the eyes of Elizabeth Taylor. It is supremely rare, coming from only one place in the world, the Merelani Hills of Tanzania, in the shadow of Mount Kilimanjaro.

New mining techniques and the liberalization of the Tanzanian economy has helped to boost production in the past few years to make tanzanite more available than ever before in the history of the gemstone.

The source of its mesmerizing color is that tanzanite is trichroic: that is, it shows different colors when viewed in different directions. One direction is blue, another purple, and another bronze, adding subtle depths to the color. When tanzanite is found in the ground, the bronze color dominates. However, with gentle heating, the cutter can watch the blue color bloom and deepen in the stone.

Legend has it that the affect of heat was first discovered when some brown zoisite crystals laying on the ground with other rocks were caught in a fire set by lightning that swept through the grass covered Merelani hills northeast of Arusha. The Masai herders who drive cattle in the area noticed the beautiful blue color and picked the crystals up, becoming the first tanzanite collectors.

### **Choosing a Tanzanite**

The color of tanzanite is most intense in sizes above ten carats. Smaller tanzanites are usually paler in color. Tanzanites which are more blue rather than purple tend to be more expensive because the crystals tend to form with the blue color axis oriented along the width of the crystal instead of the length. That means that if the cutter chooses to maximize the purity of the blue color, the stone cut from the rough will be smaller and will cost more per carat. The blue color, however, is so beautiful, that the sacrifice is often worth it.

Tanzanite jewelry is a little more delicate than other gemstone jewelry and should not be set in a ring that will be worn during strenuous activity. Never clean tanzanite in an ultrasonic cleaner or resize or repair a ring set with tanzanite because the stone could shatter in the heat of a torch. It is available in a variety of shapes and sometimes in large sizes that are perfect for an important necklace.

This description was taken from the International Colored Gemstone Association.

### **Topaz**

The Egyptians said that topaz was colored with the golden glow of the mighty sun god Ra. This made topaz a very powerful amulet that protected the faithful against harm. The Romans associated topaz with Jupiter, who also is the god of the sun. Topaz sometimes has the amber gold of fine cognac or the blush of a peach and all the beautiful warm browns and oranges in-between. Some rare and exceptional topaz are pale pink to a sherry red.

Wear topaz only if you wish to be clear-sighted: legend has it that it dispels all enchantment and helps to improve eyesight as well! The ancient Greeks believed that it had the power to increase strength and make its wearer invisible in times of emergency. Topaz was also said to change color in the presence of poisoned food or drink. Its mystical curative powers waxed and

waned with the phases of the moon: it was said to cure insomnia, asthma, and hemorrhages.

Perhaps the most famous topaz is a giant specimen set in the Portuguese Crown, the Braganza, which was first thought to be a diamond. There is also a beautiful topaz set in the Green Vault in Dresden, one of the world's important gem collections.

Brown, yellow, orange, sherry, red and pink topaz is found in Brazil and Sri Lanka. Pink topaz is found in Pakistan and Russia.

Today we also have blue topaz, which has a pale to medium blue color created by irradiation. Pale topaz which is enhanced to become blue is found in Brazil, Sri Lanka, Nigeria, and China. In early 1998, a new type of enhanced topaz made its appearance, the surface-enhanced topaz, with colors described as blue to greenish-blue or emerald green.

Topaz is a very hard gemstone but it can be split with a single blow, a trait it shares with diamond. As a result it should be protected from hard knocks.

This description was taken from the International Colored Gemstone Association.

## **Tourmaline**

Tourmaline's name comes from the Sinhalese word "turмали," which means "mixed." Bright rainbow collections of gemstone varieties were called "turмали" parcels. Tourmaline, occurring in more colors and combinations of colors than any other gemstone variety, lives up to its name. There is a tourmaline that looks like almost any other gemstone! Many stones in the Russian Crown jewels from the 17th Century once thought to be rubies are actually tourmalines.

Perhaps this is why this gemstone is said to encourage artistic intuition: it has many faces and expresses every mood.

The Empress Dowager Tz'u Hsi, the last Empress of China, loved pink tourmaline and bought almost a ton of it from the new Himalaya Mine, located a long way from the Middle Country in California. The Himalaya Mine is still producing tourmaline today but the Dowager went to rest eternally on a carved tourmaline pillow.

Tourmaline is also of interest to scientists because it changes its electrical charge when heated. It becomes a polarized crystalline magnet and can attract light objects. This property was noticed long ago before science could explain it: in the Netherlands, tourmalines were called "aschentrekkers" because they attracted ashes and could be used to clean pipes!

Tourmaline occurs in every color of the rainbow and combinations of two or three colors. Bicolor and tricolor tourmalines, with bands of colors are very popular. Sometimes the colors are at different ends of the crystal and sometimes there is one color in the heart of the crystal and another around the outside. One color combination, pink center with a green rind, is called "watermelon tourmaline" (seedless, of course!) Sometimes designers set slices of the crystal instead of faceted stones to show off this phenomenon.

Almost every color of tourmaline can be found in Brazil, especially in Minas Gerais and Bahia. Pink and green colors are particularly popular. In 1989, miners discovered tourmaline unlike any that had ever been seen before. The new type of tourmaline, which soon became known as Paraiba tourmaline, came in incredibly vivid blues and greens. The demand and excitement for this new material, which soon fetched more than \$10,000 per carat, earned more respect for the other colors of tourmaline.

Pink and green tourmaline are now widely available and are especially popular in designer jewelry. Blue tourmalines are also very much in demand but the supply is more limited.

Tourmalines are most often cut in long rectangular shapes because of their long and narrow crystal shape. Tourmaline crystals are beautiful, pencil thin and ridged, and they are also sometimes set in jewelry. Some designers also set rainbows of tourmaline in each color of the spectrum. Tourmaline is strongly pleochroic: the darkest color is always seen looking down the axis of the crystal.

In addition to Brazil, tourmaline is also mined in Tanzania, Kenya, Madagascar, Mozambique, Namibia, Afghanistan, Pakistan, Sri Lanka, and California and Maine in the United States. Maine produces beautiful sherbet colors of tourmaline and spectacular minty greens. California is known for perfect pinks, as well as beautiful bicolors.

One particularly beautiful variety is chrome tourmaline, a rare type of tourmaline from Tanzania which occurs in a very rich green color caused by chromium, the same element which causes the green in emerald.

Tourmaline is a hard and durable gemstone which can withstand years of wear. You might want to avoid steam cleaning or heat.

This description was taken from the International Colored Gemstone Association.

### **Frequently Asked Questions about Gold, Platinum & Silver**

**Pure gold** (fine gold) is softer than pure silver but harder than tin. Its beauty and luster are unmatched by any alloyed gold. The extreme malleability, ductility, and softness of pure gold make it practically useless for jewelry applications.

The addition of alloying elements (other metals) to gold are used to increase the toughness and hardness of the metal. While almost any metal can be alloyed (melted) with gold, only a select group of metals will not dramatically change the color or make the metal brittle. For example, we never mix indium with gold because it turns gold purple and gives gold the workability of glass.

#### **What is a Karat?**

Over time, certain percentages of gold have become legally recognized "karats." The karat indicates the amount of gold as a percentage of the total, i.e. 24 karat is 100 percent gold. In karated gold, there is a balance of metals in the non-gold percentage called alloys. These metals provide the various colors and hardness of karated gold. 18 karat gold is 18 parts gold and 6 parts alloys such as copper, nickel, silver or zinc. 14 karat gold is 14 parts gold and 10 parts alloy. Gold standards vary around the world. In the United States, 18, 14, and 10 karat gold are the only karats allowed to be sold as karated gold.

#### **What is the difference between 14 karat and 18 karat gold?**

18 karat gold means that the metal is 18 parts out of 24 pure gold, or in other words, 75% pure gold. 18 karat gold is the standard for European jewelry. 14 karat gold is 14 parts gold, or 58.5% pure gold. It is the standard for American jewelry.

#### **What is used to change the color of gold?**

The addition of alloying elements (other metals) to gold are used to increase the toughness and hardness of the metal, as well as change the color. Adjusting the proportions of coloring agents provides the array of colors on the market. Additional metals enhance properties such as castability, grain size, hardness, corrosion resistance, color, workability, ultimate strength,

and others. These additions can dramatically change the properties of the karated metal for better or worse.

For example: 18 karat rose gold is 75%, or 18 parts fine gold and 25%, or 6 parts copper. It is the rich red copper combined with the pure yellow gold that creates a warm rosy tone. 14 karat white gold is 14 parts gold and 10 parts white metal, either nickel or palladium. These white metals dominate the color, creating a warm gray tone.

**Typical alloying elements and their color effect:**

Copper	-	Reddening
Silver	-	Greening
Zinc	-	Bleaching
Nickel	-	Whitening
Palladium	-	Whitening

**Examples of the compositions of different colors are:**

Yellow	Gold:	copper,	silver,	zinc
White	Gold:	copper,	nickel,	zinc
Red	(Rose)	Gold:	Gold:	copper
Green		Gold:		silver

**What is the difference between a carat and a karat?**

A **carat** is a unit of weight for gemstones, where one carat equals 1/5 of a gram, or 200 milligrams. 142 carats equals one ounce. Carats are divided into 100 units, called points. For example, a half-carat gemstone would weigh .50 carats or 50 points. The important thing to note is that carat is a unit of weight, not a unit of size. A one carat stone that is dense will be smaller than a one carat stone that is less dense. For example, sapphires are denser than diamonds, so a one carat sapphire will be smaller than a one carat diamond.

A **karat** is not a unit of weight. The word karat refers to the amount of gold in a particular item. Karats are measured in units of 24, where 24 karat gold is pure gold. 18 karat gold is 18 parts gold and 6 parts alloys such as copper, nickel, silver or zinc. 14 karat gold is 14 parts gold and 10 parts alloy.

**What is the difference between Platinum & White Gold?**

Platinum is a precious metal that costs more than gold. It usually is mixed with other similar metals, known as the platinum group metals: iridium,

palladium, ruthenium, rhodium and osmium. All of the platinum jewelry sold by Goldspeed.com is the highest grade platinum, which is 95% platinum. Platinum is extremely dense, and is much heavier than gold or silver. Platinum has a remarkably high level of durability so it does not wear or tarnish like other metals. White gold is rhodium plated to give it the same white look as platinum, but eventually the rhodium wears off and the white gold takes on a yellow cast. White gold jewelry should be rhodium plated every few years to maintain its whiteness. Platinum does not yellow or tarnish and maintains its white appearance with little maintenance.

Platinum is not susceptible to problems like stress cracking or corrosion as can be the case with white gold. Though platinum can scratch, it is more durable than white gold and does not wear down or abrade like gold. Scratches can easily be removed by buffing, and all that is required to maintain platinum is to soak it in a mild solution of soap and warm water followed by a gently rubbing with a soft bristled brush.

### **What kind of metal is platinum?**

Platinum is considered to be the "most precious" of the precious metals. Platinum is your metal of choice, when only the best will do. Rarer than gold, stronger and more enduring - platinum is also the choice of jewelry designers for fine heirloom quality jewelry.

**Platinum History:** Platinum evokes the future through the cool gray color and technological uses, but it also recalls the past. In the 1890's the world renowned Louis Cartier introduced the metal as a setting, and made it part of his most exquisite creations for kings and millionaires. During the first 40 years of the twentieth century, platinum was the preferred metal for wedding and engagement rings and was almost always used to enhance the beauty of diamonds and other gemstones. However, for the duration of World War II, platinum was declared a strategic material and its use in most non-military applications was prohibited.

### **Platinum Statistics:**

1. Due to the unusual characteristics of this metal, a platinum smith must have a different set of tools than a goldsmith. For instance, platinum melts at 3225 degrees Fahrenheit, compared to fine gold which melts at 1945.
2. Platinum is more scarce than gold - The annual supply of platinum is only about 130 tons - which is only 6% (by weight) of the total Western World's annual mine production of gold.
3. Approximately 10 tons of ore must be mined to produce one pure ounce of platinum. Furthermore, the total extraction process takes six long

months.

4. All the platinum ever mined throughout history would fill a room of less than 25 cubic feet.

5. Platinum is even heavier than gold, 11% more dense. One cubic foot weighs around 1,330 pounds.

6. Platinum has many more industrial uses than either silver or gold. In fact more than 50% of the yearly production is consumed (read destroyed) by industrial uses.

7. Also unlike gold, there are no large inventories of above-ground platinum. Therefore, any breakdown in the two major supply sources would catapult the price into orbit.

**Palladium** is one of six metals in the platinum family. It has similar characteristics of platinum, such as high melting temperature, cool gray color, durability and rarity, however, it is much less dense (lower specific gravity). Palladium is the metal of choice to mix with pure gold to create the finest white gold. The color of palladium white gold contrasts nicely with the white of sterling silver.

### **Gemstone Enhancement**

Colored gemstones are customarily treated to enhance their color and durability. The following two treatments and enhancements are expected and accepted by the jewelry industry.

**Heating:** This is a widely accepted enhancement process used on most gemstones to improve transparency and color. Heating is considered a permanent treatment, and heated stones do not normally require any special care.

**Oiling:** Oiling is an old and still widely accepted enhancement process used on most emeralds to enhance clarity and hardness. Ultrasonic machines, steaming and harsh jewelry cleaners should be avoided. Almost all emeralds today have been oiled.