

Gem & Jewelry POCKET GUIDE

A traveler's guide to buying diamonds,
colored gems, pearls, gold and
platinum jewelry

Renée Newman GG



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pearls, gold and platinum jewelry**



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1/Colored Stone Price Factors in a Nutshell

The following factors can affect the prices of colored gems: **Color**
Cut quality (proportions and finish) **Stone shape and cutting style**
Carat weight or stone size

Clarity (degree to which a stone is free from flaws) **Transparency** (degree to which a stone is clear, hazy, cloudy or opaque) **Treatment status** (untreated or treated? type and extent of the treatment) **Distinctness of phenomena** if present (e.g., stars, cat's-eyes, alexandrite's color change, opal's play-of-color) The pricing of colored gems is also determined by market factors such as demand, form of payment, buyer's credit rating, amount purchased and competitors' prices. Sometimes you can find the same dealer selling a stone of higher quality for less than one of lower quality. This is because the rough for the higher quality stone may have cost less. Or, the rate of currency exchange could have been more favorable at the time the dealer purchased it. Therefore, you should not assume that higher price necessarily means higher quality. Conversely, lower price is not necessarily indicative of a deal.

Why the 4 C's isn't an Adequate Pricing System

You may be surprised that there are more than four price factors if you've heard about the 4 C's of color, cut, clarity and carat weight. The 4 C's system of valuing gems is a clever, convenient way to explain gem pricing. The problem is that it causes consumers to overlook the importance of cut quality, transparency and treatment status.

If you see a mini gem-lab report stating that the shape/cut of a gemstone is round brilliant, you may assume that this tells you everything about the cut of stone when in fact it doesn't. The quality of the cut is important and it's a separate price factor from shape and cutting style.

If you're not informed about gem treatments, you may assume, for example, that two equally attractive jade stones should be priced alike. However, if one is dyed or bleached and the other is of natural color, their prices should be quite different. [Chapter 2](#) describes the ways in which gems are treated.

If you're comparing a cloudy stone to a transparent one, be aware that transparency can have a significant impact on each stone's value. Transparency and clarity are often interconnected, but they're not the same. A stone can be transparent like crystal yet have a low clarity. Likewise a stone may be flawless, yet be cloudy and milky in appearance.

Price Factors Explained

COLOR: It can be broken into three components:

Hue: Basic spectral colors like those in a rainbow such as blue, green and bluish green. Brown, black, gray and white aren't hues because they're not part of the color spectrum.

Tone: Amount of color, the degree of lightness or darkness

Saturation: Amount of grey or brown masking the hue. This component is also called "intensity" and "chroma" depending upon the color system you're using. Stones with a high color saturation have hardly any grey or brown masking the hue.

Gem dealers often disagree on what is the best hue and tone for a given gemstone such as sapphire or emerald. They agree, however, that for most gem varieties, the less brown or gray that is present, the more valuable the stone. For example, the center ruby in [figure 1.1](#) is worth much more than the brownish rubies on each side.

If you're buying a gemstone for yourself, it doesn't matter what color you choose as long as you like it and the color looks good on you. However, when buying gems for resale or as gifts, find out what hues and tones gem dealers prefer. Chapter Four describes the preferred colors for various gem varieties. Usually the strongest and richest colors are the most valuable. Very light and very dark stones typically cost less.

When judging color:

- Clean the gemstone with a soft cloth if it's dirty.
- Rotate the stone and examine it from various angles, keeping in mind,

however, that color is judged in the face-up position.

- Look at the stone under different types of light such as an incandescent light-bulb, fluorescent light and daylight. Top quality stones look good under all types of light. Daylight equivalent light is the standard used for gem grading.
- Examine the stone against a variety of backgrounds—white, black and against your skin.
- Examine the stone for color zoning—the uneven distribution of color. When the color is uneven or concentrated in one spot, this can sometimes decrease the stone's value. Obvious color zoning is most serious when visible in the face-up view of a stone.
- Compare the stone side by side with other stones of the same variety. Color nuances will be more apparent.



Fig. 1.1 A ruby with good red color flanked by two rubies which have a much less valuable color—brownish red. *Rubies from Andrew Sarosi; photo © Renée Newman.*



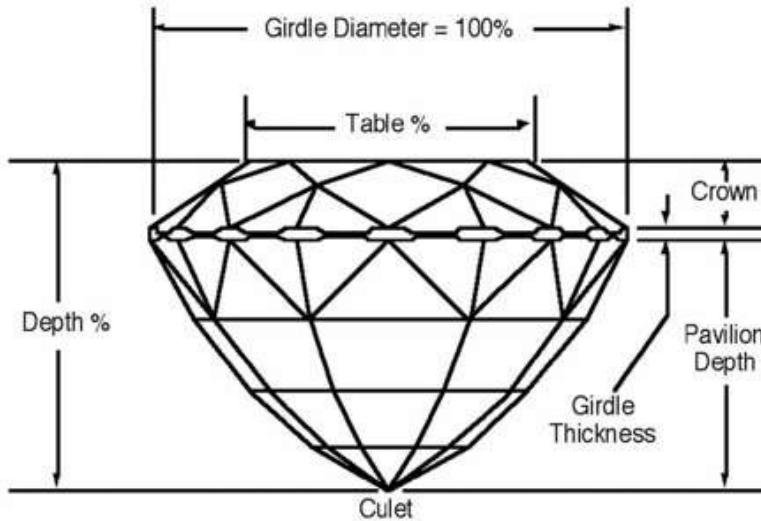
Fig. 1.2 Tanzanite without a window. **Fig 1.3** Tanzanite with a window. Photos © Renée Newman.

CUT QUALITY: A well-cut gemstone displays brilliance and color throughout the stone ([figure 1.2](#)). It shouldn't have an obvious **window**—a pale, washed out area in the middle of the stone that allows you to see right through it (fig. 1.3). In general, the larger the window, the poorer the cut.

To look for windows, hold the stone about an inch or two (2–5 cm) above a contrasting background such as your hand or a printed page. Then try to look straight through the top of the stone without tilting it. The stone has a window if you can see your hand, the print or the background through the center of it.

When buying a gemstone, be sure to look at its profile. The side view will show you if the stone is too deep for the mounting, too shallow or too bulky. Diagram 1.1 shows you the profile of a well-cut colored gemstone and defines terminology related to gemstone cut. [Figure 1.4](#) is another example.

[Figure 1.5](#) illustrates a poorly proportioned tanzanite. This stone was cut to maximize weight from the rough at the expense of beauty. The shallow pavilion (bottom) reduces brilliance and creates a large window. The high crown (top) and thick girdle (rim around stone) add unnecessary weight, which increases the price of the stone. Faceted gems are usually priced by weight.



Cutting / Proportions

Diagram 1.1 Profile of a mixed-cut colored gemstone.

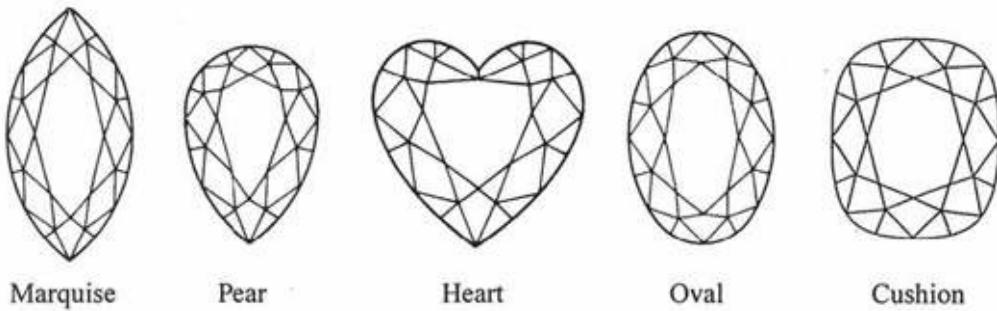
Copyright 1978 by American Gemological Laboratories.



Fig. 1.4 Profile of a well-cut tanzanite. **Fig. 1.5** Tanzanite with a crown that is too high, a pavilion that is too shallow and a girdle that's too thick. *Photos © Renée Newman.*

When judging cut, consider, too, the quality, complexity and originality of the faceting (arrangement of small polished surfaces called facets). Some of the best faceting is done on low-and medium-priced gem material such as aquamarine, garnet, quartz, tanzanite, topaz and tourmaline. The faceting and proportioning of more expensive gems like emeralds, rubies and alexandrites is often less precise because the higher cost of the rough leads many cutters to be more interested in retaining weight than in maximizing beauty. For a fuller discussion of cut evaluation, consult the *Gemstone Buying Guide* by Renée Newman.

SHAPE & CUTTING STYLE: A gem's **shape** is its face-up outline. The most common gemstone shapes include the round, oval, square, triangle, pear, marquise, heart and **cushion**, a squarish or rectangular shape with curved sides and rounded corners. Gems can be any geometric shape or they may resemble objects such as animals, bells, stars, the moon, etc.

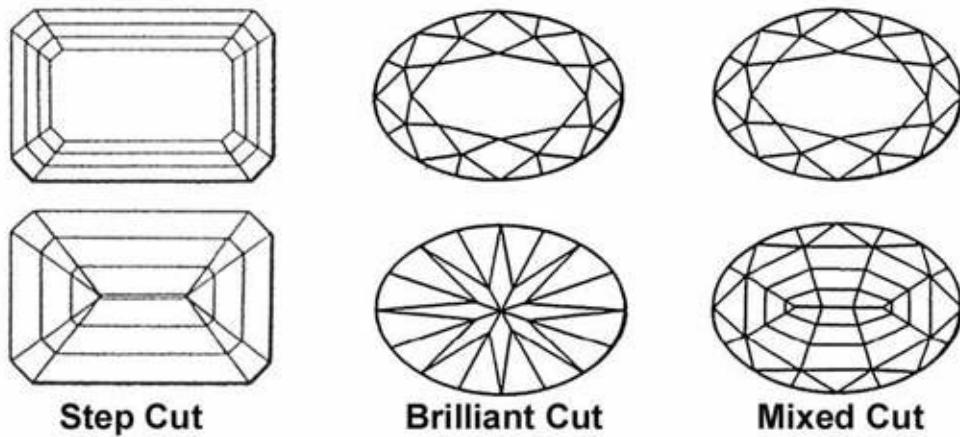


Gems can also be cut as abstract freeforms. Cutters try to select shapes and cutting styles which allow them to emphasize preferred colors and brilliance, minimize undesirable flaws, and/or get the maximum weight yield from the rough. In small calibrated sizes, there is a tendency to cut what jewelry manufacturers want, even when some shapes cause a greater weight loss. Standard sizes and shapes are required for mass-produced jewelry.

The effect of shape on price varies depending on the seller, the gem variety, the stone weight, the stone quality and the demand for the shape. A high-quality, one-carat round ruby, for example, may cost 15% to 20% more than one with a cushion shape. In small sizes and low qualities, the shape may have no effect on the price. The subject of shape pricing is too complicated for this book. Simply remember to compare gemstones of the same shape and cutting style when evaluating gem prices.

Cutting style refers to the way in which a stone is cut or faceted. An oval-shaped stone, for example, may just be rounded as a **cabochon** (unfaceted stone with a dome-shaped top and either a flat or rounded bottom) or it may have **facets** (polished surfaces with varying shapes) that are arranged in different

styles. There are three traditional faceting styles:



Step cut: Has rows of facets that resemble the steps of a staircase. The facets are usually four-sided and elongated, and parallel to the girdle. Step-cuts with cut-off corners creating an octagonal shape are called emerald cuts since emeralds are often cut this way.

Brilliant cut: Has mostly 3-sided facets which radiate outward. Kite-or lozenge-shaped facets may also be present.

Mixed cut: Has both step-and brilliant-cut facets. This is a popular faceting style for colored stones.

Many new faceting styles have appeared on the market and gemstones are also carved. Well-proportioned, designer cuts typically cost more than traditional cuts. The cabochon is the lowest priced cutting style.

CARAT WEIGHT OR STONE SIZE: A **carat** is a unit of weight equaling a fifth of a gram. In most cases, the higher the carat weight category, the greater the per-carat price. However, a one-carat untreated natural ruby, for example, is worth far more than several small rubies of similar quality with a total weight of one carat. This is because the supply of large rubies is more limited. So when you compare jewelry prices, besides noting the quality, you should pay attention

to individual stone weights and notice the difference between the labels **1 ct TW** (one carat total weight) and **1 ct** (the weight of one stone).

When comparing the cost of transparent gems, you should also note the per-carat cost instead of concentrating on the total cost of the stone. This makes it easier to compare prices more accurately, which is why dealers buy and sell most gems using per-carat prices. The following equations will help you calculate the per-carat cost and total cost of gemstones.

Per-carat cost = stone cost ÷ carat weight

Total cost of a stone = carat weight × per-carat cost

Many translucent to opaque stones such as jade, malachite and chalcedony are sold by the piece or stone size, not by weight. Designer cuts may also be priced per piece, and colored stones under about a half carat are often priced by millimeter size.

CLARITY: Clarity is the degree to which a stone is free from flaws (clarity features). Flaws inside the stone (e.g., cracks, crystals, fluid-filled spaces) are called **inclusions**. Flaws on a stone's surface (e.g., scratches, pits, abrasions) are **blemishes**. When gems have no eye-visible flaws, they're said to be **eye clean**.



Fig. 1.6 A high-clarity tanzanite. **Fig 1.7** A low-clarity tanzanite. *Photos © Renée Newman.*



Fig. 1.8 Emerald with a high transparency and noticeable flaws. **Fig. 1.9** Less transparent emerald than the one in figure 1.8. *Photos © Renée Newman.*

Some gems are more likely to have inclusions than others. Emeralds, for example, typically have some eye-visible flaws. Aquamarine, on the other hand, is normally eye clean. As a result, there is a greater tolerance for noticeable inclusions in emerald than in aquamarine.

Two other gems that usually have eye-visible flaws are ruby and alexandrite. Some stones that often have a high clarity like aquamarine are blue zircon, citrine, green tourmaline, kunzite, topaz and tanzanite. Some colored gems that fall between these high-and low-clarity groups include amethyst, blue tourmaline, garnet, iolite, peridot, sapphire, spinel and zircon that is green, orange or red.

Since clarity can vary from one gem variety to another, compare stones of the same type when judging clarity. The higher the clarity, the more valuable the gemstone. Judge clarity first with the naked eye. Then use a 10-power magnifier to help you spot inclusions such as cracks, which create durability problems. Magnification may also help you detect dye and other treatments.

Although clarity grading systems have been developed for colored stones, there's no one standardized system. Even when a single system is used, there can be a wide variation in how grades are assigned by appraisers. Therefore, it's best

for you to ask appraisers and jewelers what their clarity grades mean when they use grades.

TRANSPARENCY: Gemstones that look cloudy or translucent have finely divided particles that interrupt the passage of light. Some gem labs refer to these fine particles as **texture**. Large particles may also create texture and diminish the transparency of a gemstone. The presence of a lot of texture also affects the color, making it look more grayish and dull.

Transparency can have a major impact on the value of a gemstone, For example, a \$10 sapphire that's nearly opaque could possibly sell for hundreds of dollars if it were transparent. (An opaque material does not allow light to pass through.)

Normally the higher the transparency the more valuable the stone. There are a couple of exceptions. Rubies and sapphires with a **slight** amount of texture, which disperses the color, may be valued the same or sometimes a bit more than stones with a diamond-like transparency. Opaque black opals tend to be more highly valued than those with a higher transparency.

TREATMENT STATUS: Most colored stones are treated in some way to improve their color, clarity and/or brilliance. High quality untreated gems are usually the most highly valued. Not all treatments are equal. Some treatments such as dyeing and fracture filling have a more negative impact on value than others such as heat treatment. The next chapter discusses the various types of gem treatments.



Fig. 1.10 Distinct star in a sapphire. *Ring from Lang Antiques & Estate Jewelry; photo by Cole Bybee.* **Fig. 1.11** Low play-of-color in an opal with fractures. *Photo © Renée Newman.*



Figs. 1.12 & 1.13 Lightning Ridge black opals with an excellent play-of-color. *Rings & photos courtesy Cary Harris.*

DISTINCTION OF PHENOMENA: **Phenomena** are unusual optical effects. For example, some gem varieties such as ruby, sapphire, garnet, spinel and rose quartz may show a star effect. A cat's-eye effect may be seen on some quartz, emerald, aquamarine, chrysoberyl and tourmaline. The sharper and more obvious the star or cat's-eye, the more valuable the stone, all other factors being equal. However, don't expect the phenomena of natural stones to be as distinct as those on man-made stones.

Gems display other kinds of phenomena too, but the most familiar type is the play-of-color found in opal. See the section on opal for more information about evaluating play-of-color. In general, the more prominent the phenomenal effect

the more valuable the gem.

2/Gemstone Treatments

If the supply of gems were limited to those specimens that are naturally attractive, they'd be so expensive that most of us could never own them. Therefore, many gems are treated. A **treatment** is any human-controlled process other than cutting or polishing that alters the original appearance of a gem, e.g., heating, oiling, irradiation, waxing, dying, *etc.*

Gem Treatments

HEAT TREATMENT: For centuries, gems have been heated to improve their color. However, in the past 40 years, heat treatment has been conducted on a wider scale and at much higher temperatures—1600°C (2900°F) and above. Besides lightening or darkening the color of a stone, heat can improve its clarity. Unless a receipt or lab document states otherwise, assume that the following gemstones have probably been heat-treated: aquamarine, carnelian, citrine, ruby, sapphire, tanzanite, pink topaz, blue and red zircon, and green tourmaline. The color is usually stable.



Figs. 2.1 & 2.2 (Left) typical color of Sri Lankan sapphire rough prior to heat treatment; (right) results of heating sapphires in figure 2.1. *Photos by C. R. Beesley.*

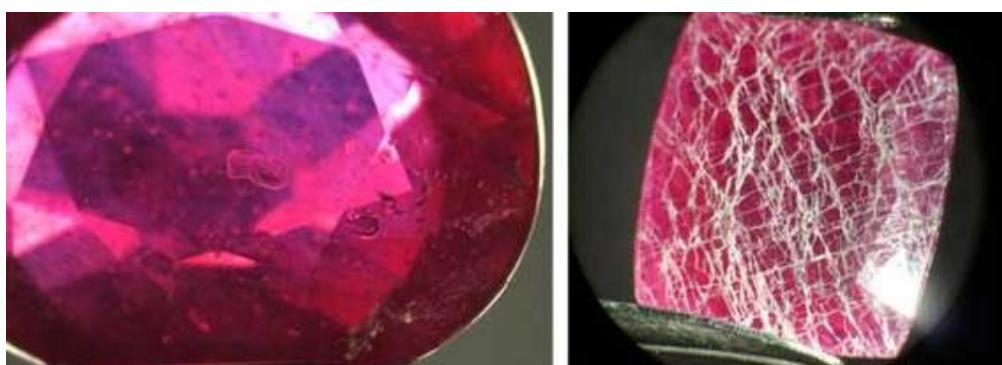


Fig. 2.3 Lead glass-filled ruby viewed under 10-power magnification. *Photo © Renée Newman.* **Fig. 2.4** White spider-web-like fracture lines in lead glass-filled ruby after contact with an acidic substance; *photo by Dr. Lore Kiefert of the Gubelin Gem Lab.*

HPHT TREATMENT (High pressure, high temperature heat treatment): This is a diamond treatment. It's used to turn a special class of brown diamonds colorless as well as greenish yellow, blue, pink, red or orange. The color is stable.

FRACTURE & CAVITY FILLING: If surface fractures in gems are filled with an appropriate substance, the fractures are less noticeable and the overall color and transparency may improve. Oil, wax, glass, resins or epoxy-like substances are used as fillers. Some fillings can evaporate over time and leave a white or brown residue. Most fillers are affected by the heat of a jeweler's torch. The less filling present, the better the stone. Fracture fillings are more stable than cavity fillings

Almost all emeralds are fracture-filled with oil, wax, resins or epoxy like substances. Some diamonds are fracture-filled with a glass-like film. Rubies and sapphires may have oil, epoxy or glass fillings, and the fillings may be in fractures or cavities.

Lead glass-filled rubies were first reported by the Gemmological Association of All Japan (GAAJ) in March 2004. Large quantities of these stones have become available worldwide since then. Often very poor quality, heavily fractured **corundum** (the mineral name for ruby and sapphire) is treated with acid to remove impurities and then impregnated with a large amount of colored lead glass.

Contact with a jeweler's torch during repair may cause lead glass-filled stones to crumble into pieces. Acid substances like lemon juice and household cleaners can cause white spider-web-like lines to form on the stone where the filling is.

Some labs call lead glass-filled rubies **composite ruby**, **hybrid ruby**, or **manufactured product** because they contain so much glass and do not have the durability of normal gemstones. At gem shows, lead glass-filled rubies may sell

for as little as \$5-\$20/carat. Many soldiers and consumers have paid large sums of money for these stones thinking they have bought highly valuable rubies when in fact they have purchased a stone composed primarily of glass.

Most lead glass-filled rubies are relatively easy for gemologists to identify because they usually display a blue to purple flash effect in fractures or internal cavities when examined with oblique light under magnification. Spherical gas bubbles are typically present.

COLORLESS IMPREGNATION: Some gems are impregnated with melted wax, resin or plastic to fill pores, hide cracks and to make the surface look shiny. Impregnation can also improve durability and color. Examples of stones undergoing this treatment are amazonite, coral, jade, lapis, malachite and turquoise.

IMPREGNATION WITH COLORED SUBSTANCES: Lead glass-filled rubies are a good example of this treatment process. In his book *Ruby & Sapphire: A Collector's Guide* (p 312), Richard Hughes identifies the lead glass filling process of rubies as "heat + colored glass impregnation," which involves removing impurities from fractures with acid and then impregnating the gem with a colored glass to improve clarity and color.

BLEACHING: Chemicals may be used to lighten or remove color. Pearls, coral and ivory are commonly bleached. Jadeite is often bleached and then impregnated with a synthetic material.

DYEING: Rubies, emeralds, jade and other stones that may have small surface fractures may be dyed with colored oils, epoxies or dyes, especially if they're of low quality. Some gems like lapis lazuli, turquoise, chalcedony and agate don't need surface cracks to accept dye. They're naturally porous and are often dyed. Black onyx is just dyed chalcedony. Pearls and matrix opal may also be dyed.

Magnification, immersion and fluorescence can reveal color concentrations in the fractures of dyed stones.

IRRADIATION: Only certain gem varieties can be enhanced with irradiation. They include:

“Black” or dark-color pearls: from off-color bleached pearls; stable, after a slight fading just after treatment.

Blue topaz: from colorless topaz; irradiation turns it brown and then heat treatment makes it a stable blue color.

Diamonds that are green, blue, yellow, or brown: from light yellow or brown diamond; stable.

Smoky quartz: from colorless quartz (rock crystal); stable.

Pink and red tourmaline: from light pink tourmaline; relatively stable, but strong heat from lights, for example, may sometimes cause it to fade.

Yellow beryl: from colorless beryl; some fades in light or heat.

Yellow or orange sapphire: from colorless and light yellow sapphire; fades quickly. Most yellow sapphire is heat treated.

DIFFUSION OF FOREIGN COLORING ELEMENTS: Initially this treatment was done to make the surface area of near colorless sapphires look blue and sometimes red, orange or yellow or to create a star formation. Around 1988, it was also being used on colored sapphires to improve their color. In 1992, reports of red and pink diffusion-treated corundum began to increase. The surface-diffused sapphires and rubies had been heated in the presence of titanium or chromium— coloring elements that were too large to penetrate far below the surface of the stone. The color is permanent, but remains only on the surface. Consequently, the color can be polished or scraped off, leaving the grey or white interior exposed.

Blue-to-green topaz surface-treated with cobalt has been sold as an alternative to

irradiated blue topaz. Some feldspar has been heated with copper to produce red or green andesine-labradorite.



Fig. 2.5 & 2.6 (Left) Songea, Tanzania sapphires before beryllium treatment using flux and chrysobeyrl powders; (right) same sapphires after heat treatment with beryllium. *Photos by Vincent Pardieu, © AIGS Gemstone Laboratory.*



Figs. 2.7 & 2.8 Face-up and side view of a diamond with laser drill holes. *Photos © Renee Newman.*

Possibly starting in the late 1990s, some sapphires were heated with beryllium, a small element which allowed the coloration to penetrate the entire stone. Names that have been used for this deeper reaching coloring treatment include **lattice diffusion**, **bulk diffusion**, and **beryllium treatment**. Beryllium treatment has been mainly done to produce pink-orange and yellow sapphires, but it has also been done to make dark sapphires lighter and rubies a more intense red.

Gemologists detect diffusion of heavy elements such as titanium by examining stones under magnification over diffused light (covered with a frosted glass or

plastic plate) and by immersing them in glycerin or methylene iodide. (The immersion method is the most reliable technique.)

Stones that have been diffusion-treated with titanium or chromium will show some of the following characteristics: strong concentrations of color along cracks, facet edges, or the girdle; colorless areas; a blotchy color; and a high relief (untreated stones tend to fade into the background when immersed).

Beryllium diffusion can be difficult to detect, especially when the color is diffused throughout the stone. Unlike surface-diffused stones, the facet junctions and girdle of beryllium treated stones show no highlighting. Immersion is a key method of identification. Rims around the stone have a different color than the core. Chemical analysis may be required for positive identification. Corundums showing signs of long-term high-temperature heat treatment generally require advanced testing before beryllium diffusion can be ruled out.

LASER DRILLING: This treatment is done to get rid of dark inclusions in diamonds. A focused laser beam is used to drill a narrow hole to the dark area in the diamond. If the inclusion (which is often a crystal) is not vaporized by the laser itself, then it's dissolved or bleached with acid. After the treatment, the hole looks like a white dot face-up and like a thin white line from the side view, unless it has been glass-filled to help conceal the line.

Why Some Treatments are More Accepted than Others

Not all treatments are regarded as equal. Consider these factors when determining the acceptability of a treated gemstone:

- Is the treatment permanent?
- Has the internal character of the gemstone been changed by the treatment?
- Does the treatment decrease durability?
- Has the treatment added foreign material to the gemstone?
- Does the treated gem compete with a natural gem?
- How available are attractive untreated gems of the same type?

PERMANENCE: Irradiated yellow sapphires may fade within minutes of being treated so they're not accepted. However, the heat treatment of sapphires is accepted because a stable color is usually produced.

The color of irradiated pearls is stable and does not rub off on your skin like the dye of some dyed pearls. This is one reason irradiated pearls may be preferred to dyed pearls.

Laser drilling is a more accepted diamond treatment than fracture filling because lasering produces permanent results. Fracture filling is subject to change if the filled diamonds come in contact with a jeweler's torch or if they're subjected to prolonged or multiple ultrasonic cleanings. Some fillings cloud or discolor when exposed to light for long periods.

INTERNAL CHANGE: Heat treatment done at 1600°C (2900°F) and above can melt inclusions, create tiny stress cracks, produce a hazy appearance and change the overall internal character of a gemstone. This is one reason why low-

temperature heat treatment is preferred to high temperature heating.

DURABILITY: Treatments can have a negative effect on durability. Dr. Kurt Nassau writes in his book, *Gemstone Enhancement* (pg.43), “High temperature heat treatments may cause some materials to become more brittle and show more wear.”

The *GIA Gem Reference Guide* notes on page 262 in the section on zircon, “Toughness: heat-treated stones—poor to fair; untreated stones—fair to good.” According to Dr. Horst Krupp, a heat treater and physicist, high temperature heat treatment can cause rubies and sapphires to become brittle and abrade if they’re not properly cooled during the heat treatment process (personal communication).

Burmese jade is sometimes soaked and bleached in chemicals to remove brown or yellow impurities. This weakens the jade.

Lead glass-filled rubies (also called composite rubies or manufacture products) may fall into pieces if they come into contact with a torch during jewelry repair.

Occasionally treatments can improve durability. Most natural turquoise can crack or crumble. When it’s impregnated with a plastic material, it becomes more durable.

ADDITION OF FOREIGN MATERIAL: Stones that are heated in the presence of chemicals such as borax, beryllium, cobalt, copper and titanium are less accepted than those that are simply heated. Similarly, stones that are treated with dyes, lead glass, plastic, and epoxy substances are less valued than those that are only heated or laser drilled. The addition of artificial substances makes gems less natural. One exception is that the waxing of jade is a well-accepted treatment.

COMPETITION: Small Japanese pearls (akoya pearls) that have been

darkened by irradiation and/or dyes are accepted by the trade because the treatments provide consumers with an option not available from natural-color akoya pearls.

Artificially colored South Sea pearls are not well accepted. In fact they're banned in Tahiti because they compete with Tahiti's naturally colored black pearls, and they confuse buyers.

There have been strong objections to HPHT-treated diamonds because they compete with high-quality untreated diamonds and they complicate buying, selling and identification. Nevertheless, HPHT diamond treatment is increasing.

AVAILABILITY: Oiling emeralds is a well-accepted trade practice because emeralds typically have cracks and need to be fracture filled to improve their clarity. Therefore when buying expensive emeralds, assume they've been fracture-filled with oil or some other substance. Your main concern should be to what extent has the treatment affected the appearance. This information is now provided on many emerald lab reports.

Unoiled rubies are more available, so ruby oiling isn't well accepted although it's often done when surface fractures are present.

Precautions to Take When Buying Expensive Gems

When you spend a few hundred dollars on a gem, the treatment status is usually not a major issue (one exception is lead glass-filled rubies). In fact, you can just assume that the rubies, sapphires, aquamarines and tanzanites you see have been heat treated and the emeralds have been fracture-filled, unless otherwise stated. Enjoy wearing these gems and appreciate that fact that treatments allow you to buy more attractive stones at lower prices.

However, when you spend a few thousand dollars or more on a gemstone, the type and extent of the treatment is an important buying factor. Take these precautions:

- Deal with sellers who can explain treatments in frank simple language rather than with euphemisms and vague terms.

- Deal with sellers who will tell you both the bad and good points about treatments.
- **Ask if and how stones have been treated.** The answer will give you insight into the seller's ethics.
- Have the salesperson include treatment information on the receipt. If the stone is untreated, have this written.
- For expensive gems, get a report from a lab that automatically includes treatment information on their documents.

3/Synthetic & Imitation Gems

A **natural gemstone** comes from the ground and is a product of nature, not of man. The word **synthetic** is used to describe a man-made gemstone that has the same basic chemical composition as its natural counterpart. For example, synthetic ruby has the same chemical composition as natural ruby. It also has similar chemical, optical and physical properties.

Imitations, on the other hand, do not have the same chemical composition as the stones they resemble, and they may be made by nature or by man. Red glass, for example, can be a man-made imitation of ruby. Garnets used to mimic rubies would be natural imitations.

Since consumers tend to interpret the word “synthetic” differently than jewelers, people who sell synthetic stones usually prefer to describe them with terms such as “created,” “lab-grown” or “man-made.” Gemologists and natural stone dealers usually identify lab-grown stones as synthetic stones.

Cultured is sometimes used incorrectly as a synonym for “lab-grown.” The two terms, however, are not equivalent. Culturing pearls is a more natural process than growing gems.



Fig. 3.1 Synthetic sapphire. *Ring and photo courtesy of Varna Platinum.* **Fig. 3.2** Bottom of a glass imitation emerald that has lost most of its foil backing. *Photo © Renée Newman.*



Figs. 3.3 & 3.4 (Left) side view of a composite stone immersed in water. Note the dark green line around the girdle where the two parts are joined with green cement; (right) face-up view of the same stone, which was made to look like a deep-green emerald. *Photos © Renée Newman.*

Synthetic gems are not a recent phenomenon. Lab-grown ruby, the first synthetic, has been sold commercially since the early 1900s; if your grandmother has some ruby jewelry, the stones could very well have been made in a laboratory. Today, lab-grown stones are even more common, especially in birthstone jewelry and class rings. Synthetic stones are also found in designer jewelry (fig. 3.1), set with diamonds in gold or platinum. Some of the stones that are synthetically produced and sold to consumers in jewelry are: synthetic alexandrite, synthetic opal, synthetic amethyst, synthetic ruby, synthetic chrysoberyl, synthetic sapphire, synthetic diamond, synthetic spinel, synthetic emerald, and synthetic turquoise.

Some sellers call imitation stones “synthetic.” For example, imitation tanzanite may be sold as “synthetic tanzanite” because “synthetic” sounds better than “imitation.”

Green CZ (cubic zirconia) is often called synthetic emerald. Green CZ is a lab-grown stone, but it’s not synthetic emerald. It’s synthetic CZ, which is much cheaper than lab-grown emerald.

In most countries, it’s against the law to call a synthetic ruby, for example, simply a ruby. Not all countries, however, have laws like this and some stores don’t follow the law. Therefore when buying expensive gems abroad, have the store specify on the receipt if the stone is of natural origin. This is added protection for you. Technically, synthetic ruby is ruby. Ethically, though, it should be called synthetic, man-made, or lab-grown ruby.

Deceptive Practices

Listed below are practices that are normally done with the intent to deceive. All of them, however, can be considered legitimate when they're properly disclosed to buyers.

SURFACE COATING WITH COLORED SUBSTANCES: Plastic, wax, lacquer, paint, enamel, ink calcium fluoride and diamond-like carbon thin films are materials that have been used to coat gemstones. One of the newest coating processes is chemical vapor deposition. Applying colored coatings without disclosure is deceptive and therefore not accepted by trade organizations.

The coating sometimes covers the entire stone, but often it's applied only to the pavilion and/or the girdle or a facet of the stone. Slightly yellowish or brownish diamonds can be turned into more expensive-looking orange, yellow, blue, green, red, pink, or purple diamonds when the right color substance is strategically applied.

Translucent opal cabochons may be painted on the bottom to enhance and intensify their play of color. Peacock feathers, multicolored butterfly wings and mother of pearl have on occasion been placed behind opal to improve color play, too. Sometimes purple ink is applied on the back of yellowish diamonds or under the prongs of the setting to make the diamonds appear almost colorless and more valuable. Since purple is the complimentary color of yellow, it has the effect of absorbing part of the yellow color. Therefore, **beware of closed-back settings** with no holes.

FOIL BACKING: For centuries, foil backings have been used to add color and brilliance to gems. As gem-cutting techniques progressed and brought out more brilliance in stones, these backings became less popular. Today foil backings are

occasionally found on genuine stones, but they're more likely to be seen on glass imitations. Again, **beware of closed-back settings**. Something such as foil or paint might be concealed underneath the stones. Foil-backed stones are commonly found in antique pieces. The price of this jewelry should be based on its antique value.

QUENCH CRACKLING: Stones that are quench crackled have been heated and then plunged into cold water. This procedure is sometimes done to produce cracks in synthetic stones so they'll look more natural. Colorless quartz may be quench crackled so it can afterwards be fracture-filled with colored oil or dyes and used to imitate emerald or ruby.

MAKING COMPOSITE STONES (Assembled Stones): Stones formed from two or more parts are called **composite** or **assembled stones**. If they're composed of two parts, they're **doublets**. Those consisting of three parts are **triplets**. Assembled opals are one of the most typical composite stones. Opal doublets and triplets are normally disclosed and sold in a legitimate manner so selling them is **not** considered a deceptive practice. Ruby, sapphire, emerald and jade assembled stones, however, are generally used to trick buyers.

For example, pale yellow sapphire pieces may be cemented with a blue glue to form a blue sapphire. Two pieces of pale emerald may be joined together with a green gelatin or cement to make it appear like a deep green emerald (figs. 3.3 & 3.4).

Jade is sometimes made into triplets. They consist of pale jade that has been hollowed out, filled with a green gel and smaller cabochon and then cemented to a jade back to make it look like expensive green jade.

The key to identifying a composite stone is to find where its parts have been joined together. This can often be seen by immersing the stone in water

(immersion tends to make color differences and the glue layer more obvious). However, don't immerse assembled opals in water or other liquids; just look at them from the side.

Magnification is another helpful identifying technique. It can reveal separation lines, flattened air bubbles between the parts, or swirly areas where the stone has been brushed with glue.

The term “composite ruby” can have a double meaning. It can refer to an assembled stone or to very low grade corundum (mineral name for ruby and sapphire) that has been color enhanced and impregnated with a lot of lead glass —in other words a composite of corundum and glass. It is not natural ruby and it requires special care. Avoid acid and jeweler’s torches.

Beware of gem prices that seem too good to be true. The stone(s) could either be fake, assembled, coated, lab-grown or filled with glass.

4/Colored Gemstones

Alexandrite & Cat's-eye (Chrysoberyl)

Alexandrite and cat's-eye look very different, yet they're the same mineral—chrysoberyl (kris'so ber'l'). Cat's-eye is known for the band of reflected light across it, whereas alexandrite is characterized by light-induced color changes. Occasionally, however, alexandrite can exhibit the cat's-eye effect if it has enough fiber-like inclusions.

A less expensive type of chrysoberyl, simply called chrysoberyl, is transparent, shows no optical effects and ranges in color from green, to yellow to brown



Fig. 4.1 Chrysoberyl. Ring & photo by Omi Privé. **Fig. 4.2** Cat's-eye. Photo © Renée Newman.



Fig. 4.3 Alexandrite viewed in daylight equivalent light.

Fig. 4.4 Same alexandrite viewed in incandescent light.

Rings and photos courtesy Mark Henry Jewelry.



Fig. 4.5 Alexandrite and diamond moon pendant.

Fig. 4.6 Alexandrite and diamond ring.

Jewelry and photos courtesy Mark Henry Jewelry.

ALEXANDRITE: Natural alexandrite is difficult to find in jewelry stores because it is extremely rare. It's defined by its color change which ranges from purple red or lavender in incandescent light (e.g., lightbulb, halogen light, candle light) to bluish green or greenish blue in daylight or fluorescent light. Don't expect to see a color change from ruby red to emerald green. The "red" of alexandrite typically resembles the color of amethyst and the "green" is not as green and intense as in top-grade emeralds, but more like a tourmaline. The more yellowish the green and the more brownish or grayish the purple, the lower the price.

Top quality alexandrites weighing less than one-half carat have retailed for as much as 9000/ct. In sizes above five carats, fine alexandrites have sold for more than \$30,000/ct. The most expensive ones have a strong color change in all directions and on all the facets. Alexandrite is a regal gem that fetches regal prices.

CAT'S-EYE: The unmodified term "**cat's-eye**" means chrysoberyl cat's-eye. Other minerals such as quartz, tourmaline and beryl may also display a cat's-eye

(band of reflected light across a cabochon), but chrysoberyl cat's-eye is the most prized and has the sharpest eye. Other cat's-eye stones must include the mineral name, as for example, cat's-eye quartz or quartz cat's-eye.

The GIA Colored Stones Course describes the most prized body color for cat's-eye as a golden yellow, slightly greenish or brownish yellow "honey" color. Keep in mind that color is a matter of personal choice and that any cat's-eye may be attractive if it has a distinct eye and acceptable clarity. Cat's-eye can retail for more than \$9000/ct. Stones with fuzzy, non-sharp eyes, dull colors and eye-visible inclusions may sell for less than \$200/ct.

Major sources

Brazil and Sri Lanka are the primary sources of chrysoberyls. Other deposits are in Madagascar, Myanmar, Russia, Tanzania and Zimbabwe.

Beware

Because of alexandrite's prestige, ordinary chrysoberyl is occasionally sold as alexandrite. If a chrysoberyl doesn't change color when moved from daylight to incandescent light, it is not an alexandrite.

There's a lot of imitation and man-made (synthetic) alexandrite on the market. Man-made alexandrite is the most difficult to separate from natural alexandrite because both have basically the same chemical composition, and most of their physical and optical properties are the same. A key test for determining if a stone is natural or not is high magnification. The most common imitation alexandrites are color-change synthetic sapphire (sometimes called **alexandrine**) and synthetic spinel. **Zandrite** is a glass that imitates alexandrite. It is available in two colors: pink and purple. Zandrite that is pink in incandescent light turns green under fluorescent lighting, whereas purple zandrite turns blue. If a color-change stone is large and eye-clean, it probably is not natural alexandrite.

Alexandrites above five carats are rare, and even smaller stones often have eye-visible inclusions. Likewise, beware of unusually low prices, which suggest that the stones may be imitations. If a seller tells you a stone is natural, have him write “natural alexandrite” on the receipt. Deal with reputable jewelers, and when buying expensive stones, get a report from a reputable lab.

Lower priced quartz cat’s-eye is often sold as cat’s-eye. Therefore verify that cat’s-eyes are chrysoberyl, and have this written on the receipt if your intention is to buy a chrysoberyl cat’s-eye.

Basic chrysoberyl data

Chemical composition: BeAl_2O_4 —Beryllium aluminum oxide

RI: 1.74–1.76, **Hardness** 8.5, **SG:** 3.64–3.80. Alexandrite is a birthstone for June, along with pearl and moonstone.

Care tips

If chrysoberyl stones are **not** fractured or heavily flawed, it’s safe to clean them in ultrasonics and steamers; otherwise they can be safely cleaned in soap and water. Chrysoberyl’s Mohs hardness of 8.5 makes it harder than all other natural gemstones except ruby, sapphire, and diamond. Chrysoberyl is stable to heat and light and it doesn’t react to chemicals. Overall, it’s hard, strong and generally very durable.

Additional information and photos on chrysoberyl are available in *Exotic Gems, Volume 2* by Renée Newman. That volume contains three chapters on chrysoberyl, cat’s-eye and alexandrite. *Russian Alexandrites* by Dr. Karl Schmetzer is another helpful source.

Amethyst & Other Quartz Gems

Because of their abundance, quartz gemstones are quite affordable. Amethyst, the most expensive variety, might retail from \$2–\$150/ct depending on quality, cut and size. Even amethyst that sells for \$15/ct can be very attractive.

AMETHYST (Purple or violet quartz): The most expensive color is an intense, deep, evenly-colored purple with flashes of red under incandescent light. The least costly is pale lavender. Major sources of amethyst include Brazil, Uruguay, Bolivia, Zambia and the U.S. A lot of synthetic amethyst, citrine and other colors of synthetic quartz are made in Japan and especially in Russia. Some amethyst is heat-treated to lighten its color and remove brownish hues or to transform it into citrine and sometimes green quartz. Some material undergoes a combination heat and irradiation treatment to improve color.



Fig. 4.7 Arizona Four Peaks amethyst (7 cts). *Amethyst from Commercial Mineral Co; photo by Michael Romanella.*

Fig. 4.8 Citrine fashioned by Mark Gronlund. *Photo by Robert & Orasa Weldon.*



Fig. 4.9 Ametrine (21.73 cts) cut by John Dyer. *Photo by Lydia Dyer.* **Fig. 4.10** Rose quartz ring by Zaffiro. *Photo by Elizabeth Gualtieri.*

CITRINE (Yellow or orange quartz): Most citrine is heat-treated amethyst or smoky quartz. Natural-color citrine is rare and is usually pale yellow. Its name is derived from the French word for lemon—citron. A lot of citrine is sold as topaz. It can retail from \$2–\$100/ct. Greenish yellow citrine is sometimes marketed as “green gold” or “oro verde” quartz.

AMETRINE (Purple and yellow quartz, amethyst + citrine). This popular gem is mined commercially in Bolivia and has only been available since the late 1980’s. Ametrine can retail for about \$2–100/ct.

GREEN QUARTZ, PRASIOLITE: Most green quartz is either heated and irradiated colorless quartz or heat-treated amethyst. Natural color green amethyst is rare and its gemological name is “prasiolite.” Green quartz is also marketed under the non-gemological names of “greened amethyst” and “lemon quartz” which also refers to citrine.

QUARTZ CAT'S-EYE: Sri-Lanka, India and Brazil are sources of quartz cat's-eye. It may be white, green, yellow or brown. Quartz cat's-eye ranges from about \$4–\$100 per cabochon.

ROCK CRYSTAL (Colorless quartz): This is the most widely distributed variety of quartz. Besides being cut as beads and faceted stones, rock crystal is

used for lenses and all sorts of decorative objects.

ROSE QUARTZ (Pink quartz): This quartz, which is typically translucent, is sometimes irradiated to intensify its color. Occasionally it shows a cat's-eye effect.

RUTILATED QUARTZ: This is colorless transparent quartz that has needle-like inclusions of a mineral called rutile. Brazil, Madagascar and the U.S. are major sources. If the needle inclusions consist of tourmaline, the stone is called **TOURMALINATED QUARTZ**.



Fig. 4.11 Rutilated and tourmalinated quartz. Necklace and photo from Robert Bentley Company.

SMOKY QUARTZ (Brown to black quartz): Even though smoky quartz is found worldwide, some of it on the market is irradiated rock crystal and this tends to be very dark. This quartz is often sold incorrectly under the misnomer “smoky topaz.” Smoky quartz is very affordable; it’s often priced by the stone and can retail for about \$1–\$20/ct.

TIGER'S-EYE: This is a translucent to opaque quartz with a silky luster and brown and gold stripes. Stones cut *en cabochon* with a gold band along the center resemble a cat's-eye. South Africa is the most important source of tiger's-

eye. A grayish-blue quartz with a similar cat's-eye effect is called **HAWK'S-EYE**.

Basic Quartz Data

Chemical composition: SiO_2 —silica (crystalline quartz)

RI: 1.544–1.553, **Hardness:** 7, **SG:** 2.64–2.66.

Amethyst is the birthstone for February.

Quartz care tips: Avoid strong heat because it may change the color of amethyst, citrine, rose quartz and smoky quartz. Some rose quartz and amethyst may fade in light. In general, quartz is a fairly durable stone and can be safely cleaned in most ultrasonic cleaners if it's not fractured. It can also be safely washed in warm soapy water. Avoid steam cleaning and sudden temperature changes because they can cause fracturing or cleaving. Quartz reacts to hydrofluoric acid and alkalies.

Ammolite

Ammonite is an iridescent gem formed within an ancient marine fossil for which it was named—ammonite. Originally discovered by the Blackfoot Indians, ammolite is mined only in Southern Alberta, Canada. Most ammolite is assembled into doublets or triplets to increase durability because solid ammolite is usually thin and fragile. If it's untreated and solid, ammolite is usually priced per carat and shaped as a freeform to maximize weight.

Extra fine quality ammolites display three or more sharp, brilliant colors with no obvious dark areas except for fine lines which separate the patches of color. The narrower the lines the better. The most prized stones are those that exhibit the full color spectrum including blue and purple, which are the rarest colors, but ammolite with only two bright and brilliant colors can also be attractive. Red and brown are the most common colors, so stones with those predominant colors sell for less. Thick dividing lines and dull, grayish colors also lower the price.

Basic ammolite data

Chemical composition: (CaCO₃) A form of aragonite from fossilized ammonite, an extinct shellfish.

RI: 1.525–1.67, Hardness: 3.5–4, S.G. 2.75–2.84

Ammolite care tips

Avoid ultrasonics, rough wear, heat and chemicals. Clean with damp soft cloth. Korite International, the largest producer of ammolite, recommends limiting contact with water while wearing ammolite. Some locales have high mineral content in the water and these minerals can deposit on the surface of the ammolite and setting.

For a more in-depth discussion of ammonite, consult [*Exotic Gems, Volume 1*](#) by Renée Newman and the Spring 2001 & Fall 2009 editions of [*Gems & Gemology*](#).



Fig. 4.12 Ammolite. *Gem & photo from Korite International.*

Fig. 4.13 Ammolite and fire opal pendant by Leslie Weinberg. *Photo by Robert & Orasa Weldon.*



Fig. 4.14 Montana agate. *Pendant by Pearce Jewelers; photo by Charlie Freiberg.*

Fig. 4.15 Agatized dinosaur bone carved by Martha Borzoni. *Photo by Jessica Dow.*

Chalcedony

Chalcedony (kal sed'nee) is an aggregate composed of tiny sub-microscopic quartz crystals. It's affordable, durable and suitable for fine carving. Members of the chalcedony family include:

AGATE: Dealers tend to apply the term agate to any patterned chalcedony that is translucent to semi-transparent. This material generally has parallel twisted fibers of quartz. On the other hand, jasper, another chalcedony, is usually semi-opaque or opaque to the naked eye and has a grainy structure.

In a more strict usage, **agate** is a chalcedony with curved or straight or even angular bands (layers) of color. The bands may be multicolored or similar in color. Certain types of colorless or gray agates from Brazil and Madagascar are often permanently dyed red, black, green, blue or yellow with stable, inorganic chemicals. The main cutting and processing center for agate traditionally has been Idar-Oberstein in Germany, where a lot of agate was once mined. Other sources of agate are Uruguay, Mexico, the U.S., Russia and India.

Some white, gray or colorless chalcedony with inclusions is called agate. **MOSS AGATE** has moss-like green, brown, and/or red inclusions. **DENDRITIC AGATE (LANDSCAPE AGATE)** has dark inclusions that resemble trees or ferns like the Montana agate in [figure 4.14](#).



Fig. 4.16 Carnelian. Ring by Claudia Endler; photo by Barry Blau. **4.17** Blue chalcedony. Earrings by Mark Schneider: photo by David Carlo Photography.



Fig 4.18 Australian chrysoprase. Ring and photo by Jessica Dow of Different Seasons Jewelry. **Fig. 4.19** Fire agate from Slaughter Mountain, AZ cut by Ryszard Krukowski of Fire Agate Art Studio. Photo by Ryszard Krukowski.

AGATIZED DINOSAUR BONE: Dinosaur bone that has been replaced with agate. It is also called “dinobone” or “gembone.” Other minerals such as calcite, iron pyrite and opal may also be present in gembone, but chalcedony is the most frequent mineral, which is why it is called agatized dino bone even when it contains other minerals. Bright canary yellow is the rarest color for gembone and therefore sells at a premium. Green, red, orange and blue are also desirable colors. Gray, brown beige and mustard colors are the lowest priced, but can make attractive jewelry for people who like earth tones. *Exotic Gems; Volume 2* by Renée Newman has a chapter and 58 photos on agatized dinosaur bone and poop.

BLOODSTONE: An opaque dark green chalcedony with orange or red spots, which some Christians thought represented the blood of Jesus Christ. India is the main source of bloodstone.

CARNELIAN or CORNELIAN (UK): Translucent orange or red chalcedony. Essentially all material sold as carnelian is heat-treated or stained and heat-treated chalcedony.

CHALCEDONY: White, gray or bluish gray chalcedony. Some of the main deposits are in Brazil, Madagascar, India and the United States.

BLUE CHALCEDONY: Chalcedony that ranges in color from bluish gray to blue, violet, purple or lavender. Malawi, Namibia, Turkey, Mexico, and the U.S. have been important producers of natural-color blue chalcedony. *Exotic Gems: Volume 3* by Renée Newman has a chapter with 53 photos on blue chalcedony.

CHRYSOCOLLA CHALCEDONY: Greenish blue chalcedony that is colored by chrysocolla. It's also called gem silica chrysocolla or simply gem silica. Chrysocolla and blue chalcedony are the most prized chalcedonies, with the possible exception of fine inclusion specimens.

CHrysoprase: Translucent light-to medium-green chalcedony, somewhat resembling jade. It used to be the most prized chalcedony variety. The best quality chrysoprase has come from Queensland and Western Australia. Other sources are Brazil, Poland, Myanmar and the US.

FIRE AGATE: This agate contains iridescent thin films of iron hydroxides between layers of chalcedony and typically has a bubbly surface. Fire agate was first documented in the 1940's in Arizona and California. Arizona in the U.S. and the states of Jalisco Aguascalientes, Chihuahua, and San Luis Potosi in Mexico are the most important sources of fire agate, but it has also been found in California and New Mexico. For additional information and photos on fire agate,

consult *Exotic Gems: Volume 3* by Renée Newman.

JASPER: An opaque, fine-grained chalcedony. It's usually multicolored, spotted or striped but can be uniformly colored. The most common colors are red, brown, yellow, gray and green. Jasper is found worldwide. Jasper with patterns reminiscent of landscapes is called picture jasper.

ONYX: Chalcedony that is composed of relatively straight, parallel layers of different colors. When the dark layers (bands) are brown or brownish red, it's often called **SARDONYX**.

BLACK ONYX is not really onyx. It's chalcedony that has been dyed black.

PETRIFIED WOOD: (Fossilized Wood, Agatized Wood): Wood that has been replaced by chalcedony.

SARD: Brown or brownish-red chalcedony. It's generally considered to be similar to carnelian but is darker and brown. There's no distinct dividing line between sard and carnelian. Brazil and Uruguay are sources of both varieties.

Basic chalcedony data

Chemical composition: SiO_2 —silicon dioxide, a.k.a. silica.

RI: 1.53–1.54, **Hardness:** 6.5–7, **SG:** 2.58–2.8



Fig. 4.20 Morrisonite jasper necklace © 2011 by Barbara Heinrich Studio. *Photo by Hap Sakwa.*



Fig 4.21 Clear quartz (rock crystal) and black onyx. *Ring & photo from Hassan Bounkit.*

Chalcedony care tips

Chalcedony is durable, and it's usually safe to clean untreated high quality material in ultrasonic cleaners. Treated, unstable or cracked stones, however, can be negatively affected by ultrasonics. Soapy water is always safe. Chalcedony is affected by some acids, and high heat may change the color. Avoid prolonged exposure to strong light unless the seller confirms that the stone will not fade. Even though chalcedony has good durability, avoid hard wear and sharp blows in order to maintain the beauty of your chalcedony jewelry.

Emerald, Aquamarine & Other Beryls

In its pure form, beryl is colorless. But thanks to the presence of impurities, this mineral can be blue, green, pink, red, yellow or orange. Of all the beryls, emerald is the most highly valued and has the longest history. Aquamarine and yellow beryl have also had a long history, but it's hard to determine when they were first used. The orange, pink and red beryls have only been recognized as gems since the early 1900s.

EMERALD: By definition, emeralds are green. If they have a saturated green color and are transparent and eye-clean, they can be worth several thousand dollars per carat wholesale. On the other hand, a semi-opaque emerald can sell for as little as \$10 per carat. Clarity and transparency play a major role in emerald pricing. However, it's normal for an emerald to have inclusions and cracks, especially if it has a deep green color.

Emeralds are routinely treated with oil, wax or epoxy-like substances to hide fractures and improve transparency. This is considered an acceptable trade practice as long as it's disclosed. However, the extent of the treatment can affect the price of emeralds because the less filler that is required, the higher the quality. Lab reports quantify the amount of filler with terms such as "minor," "moderate," or "significant." Colombia is the most important source of top-grade emerald. High-quality emerald is also found in Zambia, Zimbabwe, Brazil and Pakistan, but not in the same quantities.

GREEN BERYL: There is no agreed-upon criterion in the trade for distinguishing between green beryl and emerald. However, light green beryl is commonly called green beryl, whereas medium to deep green beryl is called emerald. Likewise, there's no clear dividing line between green beryl and aquamarine.

AQUAMARINE: Most natural-color aquamarine is light bluish-green. Prior to the 1900's, this was the preferred color for the stone. Today aquamarine is routinely heat-treated to remove the green, thereby producing a permanently-colored blue stone. The more intense the blue color, the more valuable the stone. Aquamarines usually have a high transparency and clarity, and they're durable. Brazil is the main producer of aquamarine. Madagascar, Mozambique, Kenya, Nigeria, Pakistan and Zambia are other major sources.



Fig. 4.22 Emeralds. Rings & photo courtesy Omi Privé.



Fig. 4.23 Aquamarine (17.37 cts). Ring by Gary Dulac; photo by John Parrish.

Fig. 4.24 Morganite. Ring and photo by Hanna Cook-Wallace of Studio Jewelers.



Fig. 4.25 Red beryl bracelet from Cynthia Renée Inc. Photo by Harold & Erica Van Pelt.

HELIODOR (YELLOW BERYL): Found in Madagascar, Brazil, Russia,

Namibia and the U.S., this beryl is not uncommon. It has also been called golden beryl. Almost all heliodor has been irradiated to produce its color. Some stones may fade with prolonged exposure to heat or strong light.

MORGANITE: Pink, orange, or purple beryl. The first morganite to be described was a pale pink variety found in California. Some of the finest, most intensely-colored morganite is found in Madagascar. Brazil is another important source, but the colors are usually lighter even though the crystals are much larger. Morganite is frequently heat-treated and/or irradiated to intensify the color.

RED BERYL (BIXBITE): This valuable beryl was discovered in Utah in 1906. Red beryl is sometimes erroneously called red emerald. Oil and resin fillers are frequently used to improve its clarity. Due to the rarity of red beryl, it remains a collector gem.

Beware

Lab-grown emerald is sometimes sold as natural emerald. Light green beryl may be darkened by green oil, coated with green plastic or cemented together with green glue to look like a deep green emerald. Glass is often used to imitate emerald and aquamarine. Blue topaz is sometimes sold as aquamarine. When buying an expensive emerald, find out if the filling enhancement has had a major impact on its clarity. You wouldn't want to pay, say, \$6,000 for an emerald that in its unenhanced state is worth \$600.

Basic beryl data

Chemical composition: $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$ —Beryllium aluminum silicate, RI: 1.56–1.60, Hardness: 7.5–8, S.G: 2.65–2.80

Emerald is the birthstone for May and the 20th & 35th anniversary stone. Aquamarine is the birthstone for March.

Care tips

Beryl is a relatively durable mineral and can be cleaned ultrasonically if it doesn't contain inclusions and cracks. Emeralds, however, typically have fractures, which can be enlarged with the vibration of ultrasonics and with hard knocks. In addition, ultrasonics can remove emerald fillers, making the stones look worse after cleaning. Clean emeralds with a damp cloth or spray with window cleaner and wipe dry. Do not soak emeralds in cleaning solutions because they can dissolve fillers.

Avoid high heat. It can make liquid inclusions expand, causing fracturing; it can dry out oil in emeralds; and it can produce fading in morganite and heliodor.

Stones with fractures like those found in emeralds are not a good choice for everyday rings. Wear emeralds, instead, in necklaces, earrings and brooches, which won't be subjected to knocks and hard wear.

Garnet

Traditionally, people have considered garnets to be red, but they can also be various shades of green, yellow, orange, brown, pink or purple. Garnet is the birthstone for January and 2nd wedding anniversary stone.

The principal species of the garnet group are almandine, pyrope, spessartine, andradite, grossular and uvarovite. Mixed garnet species include rhodolite, mali garnet and malaya & color-change garnets. Brief descriptions of these garnet species are provided below:

ALMANDINE: Also called almandite, this garnet ranges from purplish red, to red and orangish red and usually has a dark tone. Gem-quality almandine is rare. Sources include Sri Lanka, India, Brazil, Australia, Tanzania, Madagascar and the United States. Star almandine is found in Idaho.

Basic almandine data

Chemical composition: $\text{Fe}_3\text{Al}_2(\text{SiO}_4)_3$ —iron aluminum silicate

RI: 1.78–1.83, Hardness: 7.25–7.5, SG: 3.80–4.25

PYROPE (PIE rope): This garnet, whose name is derived from the Greek *pyropos* meaning fiery, ranges in color from brownish red to purplish red. One of the most significant sources of pyrope has been the Czech Republic, formerly Czechoslovakia. The material from there is often called Bohemian garnet. Pyrope is also mined in India, China, Australia, South Africa, Brazil, Canada and several states within the USA.

Arizona anthill garnet is a variety of pyrope noted for its ruby red color, which is the result of traces of chromium in the molecular structure of the crystals. Red pyrope that is colored by chromium is called **chrome pyrope**, or anthill garnet if

it is found in anthills. It often occurs in diamond mines or inside diamonds as an inclusion.

Pyrope is a very affordable stone with retail prices ranging from about \$5 to \$150/ct. The redder the stone, the more valuable it is. Eye-clean material is readily available.

Basic pyrope data

Chemical composition: $Mg_3Al_2(SiO_4)_3$ —magnesium aluminum silicate. RI: 1.73–1.75, Hardness: 7–7.5, SG: 3.7–3.8

SPESSARTINE: Also called spessartite, this garnet is colored by manganese and is yellowish orange to reddish orange. It usually occurs in combination with almandine, whose iron component can give spessartine a reddish color. Spessartine is sometimes confused with yellow topaz or hessonite garnet.

Namibia and Nigeria have been the most important producers of spessartine. Other sources include Sri Lanka, Brazil, Afghanistan, Myanmar, Madagascar, Nigeria, Tanzania, and California. The production of spessartine has been sporadic. Retail prices of top-grade material can be as high as \$2000/ct.

Basic spessartine data

Chemical composition: $Mn_3Al_2(SiO_4)_3$ —manganese aluminum silicate. RI: 1.774–1.814, Hardness: 7–7.5, SG: 3.80–4.25

ANDRADITE: The best-known andradite variety is **demandoid**, which was discovered in 1868 in Russia. It resembles an emerald with added brilliance and fire.

Good demandoid is not easy to find. In sizes above ten carats, top quality Russian demandoid has wholesaled for more than \$20,000/ct. Even small stones under a half carat are expensive with top quality stones retailing for as much as \$1200/ct.

Stones that approach an emerald green color are the most highly valued. Some demantoids are heated to improve color.

In addition to Russia, sources of demantoid include Iran, Madagascar, Namibia and Pakistan.



Fig. 4.26 Spessartine (6.40 cts). *Ring by Hubert; photo by Diamond Graphics.* **Fig. 4.27** Rhodolite cut by John Dyer. *Photo by David Dyer.*



Fig. 4.28 Russian demantoid from Evan Caplan. *Photo by Harold & Erica Van Pelt.*



Fig. 4.29 Tsavorites. *Ring and photo by Omi Privé.*



Fig. 4.30 Yellow grossular cut by J. L. White Fine Gemstones. Photo by Jeff White.

Fig. 4.31 Malaia garnet (20 cts). Pendant by Cynthia Renée Inc; photo by Robert & Orasa Weldon.

Basic andradite data

Chemical composition: $\text{Ca}_3\text{Fe}_2(\text{SiO}_4)_3$ —calcium iron silicate

RI: 1.87–1.89, Hardness: 6.5–7.0, SG: 3.8–3.9

GROSSULAR: The most valued grossular variety is **tsavorite**, a transparent green garnet, which owes its color to trace amounts of vanadium and/or chromium. It was discovered in Tanzania in 1968. Tsavorite is found in almost all shades of green but tends to be yellowish-green. When its color resembles that of fine emerald, it can retail for more than \$6,000/ct in sizes above 3 carats. Prices of smaller commercial quality stones can drop down to less than \$1000/ct. Most tsavorite comes from the East African countries of Tanzania, Kenya and Madagascar. Minor amounts are also found in Pakistan.

Hessonite is a much less expensive variety of grossular that is sometimes called **cinnamon stone**. The colors are often brownish and can be red, orange, yellow or colorless. There are hessonite deposits in Sri Lanka, the U.S., Canada, Madagascar, Siberia and Brazil. Translucent and opaque grossular is used for beads, cabochons and carvings. The green material is sometimes called **Transvaal jade**, after its main source in South Africa. It has also been found in the USSR, Hungary and Italy.

UVAROVITE: This green garnet, which owes its color to chromium, is usually too small to be cut into gemstones. However, a drusy form covered with minute crystals has been on the market since the late 1990's. Uvarovite is usually priced by the piece rather than by carat weight. The best quality specimens have uniform surface coverage of crystals with no exposed matrix. Besides being sold as drusy cabochons and freeforms, uvarovite is also sold on its host rock as a mineral specimen to collectors.

RHODOLITE: (Pyrope + almandine) Rhodolite, a purplish red garnet is mined in Africa, Brazil, India and Sri Lanka. Tanzania is the major commercial source. Rhodolites can range in price from \$5 to \$250 per carat retail. Top-quality stones are clean, very transparent and saturated in color but not dark.

Basic rhodolite (pyrope + almandine) data

RI: 1.75–1.78, Hardness: 7-7.5, SG: 3.70–3.95

MALAIA (MALAYA): This distinctive orange variety may be reddish, pinkish or yellowish. Malaia garnet was found in East Africa in the search for rhodolite. Pinkish orange and orange with overtones of red are the most valued colors.

COLOR-CHANGE GARNET is found in many different colors and displays a variation of color behavior. For example, it may be blue or green in daylight and red in incandescent light.



Figs. 4.31 & 4.32 Color-change garnet from Kenya (1.85 cts) viewed in daylight (left) and incandescent light (right). *Garnet cut by Lisa Elser; photo by C. Tom Schlegel.*



Fig. 4.33 Tanzanian iolite (8.34 cts) carved by Sherris Cottier Shank. *Photo by Amy Balthrop.* **Fig. 4.34** Iolite (5.52 cts) cut by John Dyer. *Photo by David Dyer.*

MALI GARNET or GRANDITE: (Andradite & grossular) Marketed only since 1995, Mali garnets are found in western Africa in the Republic of Mali. They can be various shades of green, yellow or brown.

Basic grossular-andradite data

RI: 1.762–1.779, Orange to brown stones generally have higher RIs than yellowish green or green stones,

Hardness: 6.75–7, SG: 3.64–3.68

Garnet Care tips

It's safe to clean garnets in ultrasonics if they don't have fractures or liquid inclusions. It's safer to clean them with warm soapy water. Never boil or steam clean garnets. Abrupt temperature changes cause fracturing. They are slightly attacked by hydrofluoric acid, but otherwise they're resistant to chemicals. Garnets do not fade.

Retipping or repairs on stone settings should be done after the garnet has been removed. When jewelry is sized, garnets should be placed in a water bath or covered it with a heat-shielding product.

For further information about garnet consult [*Garnet: Great Balls of Fire*](#) by Lithographic LLC and [*Exotic Gems: Volume 2*](#) by Renée Newman, which has six chapters on garnet.

Iolite

Before the 1980s, iolite was mainly considered a collector's stone because so little of it was being sold. Today, it's more available, and it's sometimes used as a sapphire or tanzanite substitute because of its blue-violet color and lower price.

Some people have referred to iolite as **water sapphire** because it resembles sapphire face-up and it looks clear or watery from the side. This effect is caused by the way iolite polarizes light. In one direction the crystal typically appears dark blue or violet; in another it's colorless, gray or yellowish; and in a third direction it's light blue or violet.

Geographic sources

Most iolite comes from India, Sri Lanka, Tanzania and Brazil. Additional sources include Myanmar, Madagascar, Zimbabwe and Namibia.

Basic iolite data

Chemical composition: $Mg_2Al_4Si_5O_{18}$ —a complex silicate of magnesium and aluminum RI: 1.53–1.58, Hardness: 7–7.5, SG: 2.56–2.66

Care tips

Clean with warm soapy water. Avoid ultrasonics and sudden changes of temperature. Iolite is attacked by acids and it's susceptible to cleaving (cracking) if it's hit against something.

Jade (Jadeite & Nephrite)

Jade refers to two different minerals—**jadeite** and **nephrite**. Both stones are rocks (aggregates), which are masses of tightly interlocking crystals. However, they have different chemical compositions and properties. Jadeite is a little harder and denser, and as a result can take a higher polish than nephrite. Neither stone is very hard (resistant to scratching) compared to diamond and ruby, but both jades are unusually tough—resistant to breakage and chipping. Of the two, nephrite is slightly stronger.

JADEITE is more valuable and rare than nephrite. It is found in a variety of colors including lavender, white, gray, yellow, orange, brownish-red, black, colorless, and many shades of green. When it's very translucent and has an intense even green color, it's often called **Imperial jade**.

Today, jadeite is usually the jade chosen for fine jewelry. Its intrinsic value is generally the basis for its price. While both jadeite and nephrite are known for their carving excellence, nephrite is mainly valued for its antiquity.

Basic jadeite data

Chemical composition: $\text{NaAl}(\text{Si}_2\text{O}_6)$ —Sodium aluminum silicate. RI: 1.66–1.68, Hardness 6.5–7, SG: 3.30-3.36

Jade is the 12th wedding anniversary stone.



Fig. 4.35 Color range of better jadeite including a fine ice jade stone & fine green in the center. *Jade & photo: Mason-Kay.*



Fig. 4.36 Burmese jadeite. *Bangles and bracelet from Jade by Nikolai; photo by Nikolai Tsang.*



Fig. 4.37 Burmese jade that is semi-transparent, a very desirable quality for jade. *Carving from Jade by Nikolai; photo by Nikolai Tsang.*



Fig. 4.38 Siberian jadeite with a highly valued intense green color. *Peacock bracelet & photo from Jack Liu of Land C Corp. and Lam Naikai of DMS Co. in Hong Kong.*

NEPHRITE is plentiful and most of it is grayish green—typically forest green or olive green. It can also be white, gray, black, brown, yellow or beige. Most nephrite is very affordable. For example, you can easily find nephrite costume jewelry ranging from \$10 to \$100. The antique value of old nephrite pieces often outweighs their intrinsic worth.

Basic nephrite data

Chemical composition: $\text{Ca}_2(\text{Mg},\text{Fe})_5(\text{Si}_4\text{O}_{11})_2(\text{OH})_2$ —

Calcium magnesium iron silicate.

RI: 1.60–1.63, Hardness 6-6.5, SG: 2.90–3.05

Evaluation of Jade

TRANSPARENCY: The best jade is either near transparent or highly translucent. As the transparency of jade decreases, so does its value, with opaque jade being worth the least. Another term for transparency is “translucency.”

COLOR: An intense green with a medium to medium-dark tone is the most valued. As the color becomes lighter, darker, more grayish or brownish or yellowish, the value decreases. When the jade has good transparency and color saturation, lavender is the next most valued hue followed by colorless jade, which is called **ice jade**. Transparency and color saturation are key value determinants of red, orange, yellow and white jade. Prior to the importation of Burmese jadeite into China, white nephrite was the most coveted jade. Green nephrite is typically grayish, blackish or brownish. The more it approaches a pure green, the more valuable it is.

COLOR UNIFORMITY: In top quality jade, the color is uniform throughout the stone. The more uneven or blotchy the color is, the lower the value. However, jade with multiple colors within the same stone can be very expensive if the colors are intense and distinct. The most desired color combinations are green and lavender, orange and green, or white with strong green (**moss-in-snow** jade).

CLARITY (PURITY): Fine jade is free of flaws such as cracks, included foreign material, and spots which reduce beauty or durability. The number, size, color, position and nature of flaws determines the clarity of a stone. Cracks that break the surface or that are visible internally are particularly detrimental to the value.

TEXTURE: Since jade is composed of interwoven crystals, it can have a texture

that ranges from fine to coarse. The finer and more tightly interwoven the crystal components are, the better the jade.

SHAPE: The best jade is cut into cabochons. Ovals and rounds normally sell for more than rectangular, marquise, and pear shapes. Smooth uncarved pieces are more valuable than carved ones. Carving allows the removal of flaws from inferior material.

CUT QUALITY (CRAFTSMANSHIP): Moderately curved cabochons tend to be more valued than flat or very high ones. Symmetrical cabochons with balanced proportions are the most desired. Intricate, high-quality carving is naturally more valued than shoddy, quick carving.

SIZE: Since large, fine quality jadeite is rare, size plays a role in increasing its value. The thickness of good jadeite is also important. If a jadeite cabochon is thinner than 2 mm or smaller than 8 x 6 mm, there can be a considerable deduction in its price.

POLISH & FINISH: The more brilliant the polish and the smoother the surface, the more valuable the stone is.

TREATMENT STATUS: Untreated jade is the most expensive. The following treatments are used to improve the appearance of jade:

Waxing: This is commonly done after the final polish to improve luster and hide microscopic pits and cracks. Heat and strong solvents will undo this treatment. Material with only a superficial waxing is often called **A Jade** and is well accepted by the trade.

Dyeing: This is done usually to add green or lavender color to white or light-colored jade, but can be and is done to add any color, even colors not seen in natural jade. Blue and pink are examples. Blueberry juice is a common dye for

lavender jade. It looks good at first but it can fade in sunlight. Dyed jade is called **C Jade** and is not accepted as fine jade.

Heating: Dark green nephrite may be treated by this method to lighten the color of dark-green material. Red jade can be heated to increase redness, but the usual result is a dull brown, and transparency is reduced in the process.

Bleaching and polymer impregnation: This treatment masks fractures and removes brown and yellow iron staining from jade, making white colors whiter and green colors brighter. The jade is first soaked and bleached in chemicals. Then the bleached jade is impregnated with a wax or synthetic resin to fill voids created from the bleaching process. The resulting material is called **B Jade**.

Sometimes dye is used before impregnation and other times it's added to the filler. Don't plan on handing bleached jade down to future generations; it has durability problems and will discolor with time; it has durability problems and will discolor with time. Dyed jade is often referred to as **C Jade**. A few Chinese sellers incorrectly use the term "**D Jade**" for imitations such as serpentine, aventurine quartz, dyed chalcedony, grossular garnet or assembled stones like doublets with a jade top and plastic backing.

In summary, the treatment classifications for jade are:

A Jade: natural untreated jadeite except for possible surface waxing.

B Jade: bleached jadeite impregnated with synthetic resin

C Jade: bleached, dyed and resin impregnated jadeite

D Jade: definition varies depending on the seller. A few sellers incorrectly use the term to refer to imitation jade, but D Jade may also refer to jade that was dyed without resin impregnation.

Major sources: Myanmar (formerly Burma) has been the main source of jadeite since the late 18th century. Some jadeite is also mined in Russia (Siberia),

Guatemala, Japan, and California; but Myanmar is credited with having the finest quality jade. The oldest known source of nephrite is Xinjiang Province in China. Nephrite is also found in New Zealand, Taiwan, British Columbia, Australia, Poland, Germany, India, Zimbabwe, Mexico, Alaska, California, and Wyoming.

Beware: Sellers are supposed to disclose treatments but not all do. Therefore ask for treatment information, particularly when buying high-priced jadeite. If a store claims their jade is only waxed and otherwise untreated, have them write this on the receipt. Expensive jadeite should have a report from a reputable lab that confirms infrared (FTIR) spectroscopy testing was done. (See sample jade report in [Chapter 15](#)).

If you're buying quality jade jewelry, check if it has open back settings to let light through the stone. Closed backs with no openings are often a sign that the jade might be of low value or that something may be hidden. For example, it might be hiding a thin, hollow stone or the back of a jadeite triplet—an assembled stone consisting of a thin hollow cabochon of translucent grayish-white jadeite that's coated inside with a thin, green jelly-like substance and cemented to a piece of flat oval jade. When mounted it looks like an imperial jadeite cabochon. You're much more likely to encounter polymer impregnated and/or dyed jade than jadeite triplets.

A few jade sellers use the term "Burma jade" to refer to jadeite and the unmodified term "jade" to incorrectly refer to any green stone. Deal with reputable sellers, and if you wish to buy jadeite ask if the material is jadeite (fei cui in Chinese) and find out where it was mined.

Jade care tips

Jade can be safely cleaned in soapy water. Never steam jade or place it in

ultrasonic machines as this can damage or remove the standard wax coating. It reacts slightly to warm acids. Since jade has a lower hardness than gems such as sapphire, emerald and topaz, it can get scratched more easily. Jewelers can eliminate the scratches and restore the luster by polishing the jade. Natural jade, however, is very durable. In fact, no other gem is as resistant to breakage and chipping as jade.

Kunzite (Spodumene)

Kunzite is pink to purple in color and is typically eye-clean and low priced. You can find well-cut, light pink stones of high clarity for less than \$250/ct. Stones with a more saturated color are available, but they can be difficult to find in North America or Europe. These stones are often reserved for buyers in Asia. Some kunzite is irradiated to intensify its color. Unfortunately, the color fades over time when exposed to strong light or heat.

Major kunzite sources

Kunzite and other spodumene varieties are mined in Afghanistan, Pakistan, Brazil, Madagascar and the U.S.

Basic kunzite (spodumene) data

Chemical composition: $\text{LiAlSi}_2\text{O}_6$ —Lithium and aluminum silicate, RI: 1.66–1.68, Hardness: 6.5–7, SG: 3.14–3.21

Kunzite care tips

Clean with soapy water. Avoid ultrasonics and sudden temperature changes. Kunzite can crack easily if it's knocked against a surface. It may fade in light, and it's sensitive to heat and hydrofluoric acid.



Fig. 4.39 Kunzite. *Bracelet by Hubert; photo by Diamond Graphics.*



Fig. 4.40 Lapis lazuli. *Jewelry by Katy Briscoe; photo by Kennon Evett.*

Lapis Lazuli

Lapis lazuli is a rock composed of lazurite and some other minerals such as calcite, pyrite and sodalite. The most valued lapis has a natural, even, deep violet-blue color that is free of white calcite veining. It also has a high polish and a bit of pyrite.

Dyed lapis is the least valuable type. Dye is used to improve the color and to hide white calcite. Often, the dye is not very stable and may rub off on your skin. A wax coating is commonly used to seal in the dye and to make the polish look better. It's not always possible for salespeople to know if lapis has been dyed. However, if they claim the color is natural and the stone is untreated, have them write this on the receipt. Generally, most lapis beads are dyed. Dye can frequently be detected by rubbing the stone with cotton dipped in fingernail polish remover or alcohol. Never do this in a conspicuous spot and always get permission first.

Major sources: For more than 5,000 years, lapis lazuli (lapis) has been mined in Northeastern Afghanistan. This is still the world's most important source both in terms of quality and quantity. The second most important source of lapis is Chile. However, Chilean lapis tends to contain a lot of white calcite and the color can be relatively light. Consequently it's often dyed.

Beware

German and Swiss lapis are not lapis lazuli. They're blue dyed jasper, the most widely used lapis imitation. Glass, plastic, and sodalite are also used to imitate lapis. The Gilson company produces another imitation lapis.

Lapis lazuli care tips

Cleaning tips

Clean with warm soapy water but don't soak. Ultrasonics and steamers are risky cleaning methods. Avoid rough wear, heat and acids.

Malachite

Malachite is usually banded with differing shades of green in agate-like patterns. It's attractive, yet low-priced. Often, malachite is banded and intermixed with other copper minerals such as blue azurite. The resulting material is called **azurmalachite**. Sometimes, malachite is impregnated with wax or epoxy to improve the polish and hide small cracks.

Major Sources

DR Congo is the major producer of malachite. Other sources include Russia, Zambia, Namibia, Arizona, New Mexico and Australia.

Beware

Synthetic malachite is produced in Russia. Malachite is so inexpensive that it's not often imitated.

Malachite care tips

Malachite can easily break or scratch. It's also sensitive to heat, acids and ammonia. Never clean it ultrasonically; wipe it with lukewarm, soapy water and rinse.

Moonstone & Some Other Feldspars

MOONSTONE: This gem is noted for a floating light effect and sheen called **adularescence**, which has been compared to the light of the moon. High moonstone cabochons may resemble cat's-eye gems due to the concentration of light along the top of the stone. Moonstone is typically white, colorless or light grayish blue, but it may also be yellow, orange, brown, blue or green. It ranges from near transparent to almost opaque. The most valued stones are blue and near transparent—sometimes up to \$250/ct. Translucent white stones can cost less than \$25/ct.

LABRADORITE: This name most often refers to a dark, opaque feldspar, first found in Labrador, that displays a flash of color(s) when viewed at certain angles. This optical effect, which is called labradorescence, is typically bright blue to green, but it can also be yellow, orange or rarely purple. **Spectrolite** is a rare colorful type of labradorite found previously only in Finland but now also in India.



Fig. 4.41 Malachite from Zaire with bull's-eye pattern. *Pendant and photo by Guy Pushee.* **Fig. 4.42** Moonstone. *Ring & photo by Jessica Dow of Different Seasons Jewelry.*



Fig. 4.43 Labradorite. Photo by Renée Newman.

Fig. 4.44 Spectrolite from Finland. Gem from Different Seasons Jewelry; photo by Mark Anderson.



Fig. 4.45 Oregon sunstone. Gems & photo from Desert Sun Mining & Gems.



Fig. 4.46 Amazonite. Beads & photo from Earthstone Co.

SUNSTONE: There are two main types of sunstone. One is opaque and has glittery red or golden inclusions. Another is transparent and is orange, yellow,

red, green or colorless. It's the state gem of Oregon and may contain minute copper inclusions, which can give it a sheen (fig.4.45).

AMAZONITE (Amazon Stone): A bluish-green variety of microcline feldspar that is usually translucent to semi-opaque. Sometimes sold as "Pikes Peak jade" in Colorado, its sources include Brazil, India, Madagascar, Russia and the USA.

Major feldspar sources

Most moonstone comes from India, Sri Lanka, Brazil, Madagascar, Myanmar and Tanzania. Aventurine feldspar (sunstone) is found in India, Canada, Norway, Siberia and the USA. Transparent sunstone is mined in Oregon. Labradorite is named after its most famous source, Labrador, Newfoundland, but it is also found in China, Finland, India and Madagascar.

Basic feldspar data

Feldspar is a group of closely related minerals whose chemical composition is too complex for this book. *Exotic Gems: Volume I* by Renée Newman has charts and tables that clarify the relationships among the various feldspar members and that give more precise data and information on each member.

RI range: 1.51–1.58, Hardness: 6–6.5, SG range: 2.54–2.77

Moonstone is an alternate birthstone for June.

Feldspar care tips

Clean with soapy water and a soft cloth. Never clean feldspar with an ultrasonic cleaner, steamer or chemicals. The *GIA Gem Reference Guide* rates feldspar's toughness as poor, so don't wear it in everyday rings. Heat and knocks cause it to crack. In fact, "feldspar" is derived from "field" and "spar," a word that refers to any shiny rock that splits easily. Since feldspar cannot withstand the heat from a jeweler's torch, it should be removed during repairs.

Opal

When comparing opal prices, find out what type of opal you're looking at. Here are the various types:

COMMON OPAL and POTCH: Opal with **no** play-of-color (shifting of spectral colors) and a translucent to semi-opaque transparency. These opals may also be identified by their color and/or source, e.g., pink opal, blue opal, Peruvian opal. Opal with a play-of-color, the most popular type, is called **precious opal** by many opal dealers.

LIGHT OPAL: Opal with a play-of-color and a light body color. **White opal** is the most common type. It typically has an off-white background color and can be translucent to opaque. Milky white stones with little play-of-color are used in budget-priced jewelry. White opals with a brilliant play-of-color can retail for several hundred dollars per carat. When an opal has a high transparency, a near colorless body color and a distinct play-of-color, then it's called a **crystal opal**.

BLACK (DARK) OPAL: A generic term for any opal with a play-of-color against a dark background. If the stone is transparent to semi-transparent and dark with a play-of-color, the stone is a **black crystal opal**. Today top-grade black opal can sell for as much as \$25,000/ct. Most black opal is found in Lightning Ridge, Australia.

FIRE OPAL: A transparent to translucent opal with a red, orange, yellow or brownish body color both with or without a play-of-color. Mexico is the principal source. The most valued fire opal is reddish orange, transparent, and has a play-of-color within the stone. For in-depth information and photos on fire opal and common opal, consult [*Exotic Gems: Volume 2*](#) by Renée Newman.

BOULDER OPAL: Opal that is still attached to the rock (usually ironstone) in which it is found. Boulder opal, which can resemble either light or dark opal, is typically cut in irregular shapes. Gem quality boulder opal may sell for \$5,000 to \$50,000 per piece, but you can purchase attractive stones for a few hundred dollars. Boulder opal is mined in Queensland, Australia.



Fig. 4.47 Peruvian blue opal. *Pendant by Zaffiro; photo by Elizabeth Gualtieri.* **Fig. 4.48** Light opal with play-of-color. *Ring copyright by Eve Alfillé; photo by Matthew Arden.*



Fig.4.49 Lightning Ridge black opal. *Ring & photo courtesy Cary Harris.* **Fig. 4.50** Fire opal. *Gems and photo from Columbia Gem House.*

MATRIX OPAL or **OPAL-IN-MATRIX:** A stone with veins, grains or patches of opal randomly distributed throughout its host rock or “matrix” (the rock in which the opal is formed). Unlike boulder opal which has opal on top of a boulder matrix, a matrix opal stone is opal within matrix. Queensland, Australia is the most important source of matrix opal and much of it comes from

the Yowah and Koroit areas.

Some matrix opal is also found in Mexico, Peru, Honduras and Ethiopia. The price of matrix opal determined by the amount, type, and quality of the opal within the matrix. Andamooka, Australia is known for a porous matrix opal which is often dyed to simulate black opal. Additional information and 80 photos on matrix opal are available in [*Exotic Gems: Volume 3*](#).

Factors Which Affect Opal Value

OPAL TYPE: Solid black opal is more expensive than boulder opal if similar qualities and colors of each category are compared. Matrix opals and assembled stones are usually the least expensive types. There's a great difference in price between a natural and an assembled opal of similar appearance, so it's important to have salespeople identify the type of opal verbally and on the receipt.

BODY TONE: (The darkness or lightness of the background color): Black opal is more expensive than light opal of like quality. With black and boulder opal, generally the darker the background the more valuable the stone is. When determining body tone, look at the top of the stone.

BRILLIANCE: The overall brightness and intensity of the play-of-color. The more brilliant the flashes of color, the better the stone. Examine brilliance both under a consistent light source and away from it. Stones that maintain their brightness away from light are the most highly valued. Brilliance is one of the most important value factors.

PLAY-OF-COLOR: The dominant color(s) and the combination of colors are both important. Intense red is the most rare and therefore the most prized color. In terms of value, it's followed by orange, green and blue, the most plentiful color. The way in which different color combinations are priced can vary from one dealer to another. Any type of play-of-color can be desirable, as long as the colors are intense and not dull when viewed face up.

COLOR PATTERN: The diffracted colors in opals are displayed in various patterns such as **pinfire**—small pin-point like color specks and **flashfire**—larger splashes of color, usually irregular in shape. Broad patterns or large flashes are generally more valued than pinfire and small type patterns.

TRANSPARENCY: For light opal and fire opal, the higher the transparency, the more valuable the stone. For black opal, the opaque, blacker stones tend to be more highly valued than those with greater transparency.

SHAPE: The most sought-after traditional shape is a well-formed oval. It tends to bring a higher price than other shapes because it's in greater demand, it's easier to set, and valuable opal material is sacrificed when stones are cut as ovals. Many designers, however, prefer other shapes, especially freeforms. Unusual freeforms may sell for more than ovals, especially after they're mounted.

CUT: All else being equal, domed cabochons tend to be more valued than flat ones. Excessive weight on the bottom and a thin or unsymmetrical profile can all reduce the value of an opal.

IMPERFECTIONS: Opal value decreases when there are eye-visible imperfections on the top of the stone. The larger and more noticeable they are, the greater their impact on value. Cracks drastically reduce value. A common opal flaw is **crazing**—a thin, network of fractures that resembles a spider web. When deep, it has a serious impact on price.

SIZE & CARAT WEIGHT: Stones under a carat are generally worth less per carat than larger ones. If a stone is unusually large, it may be worth less per carat than stones more suitable for general jewelry use. Boulder opals are typically priced by size rather than carat weight. The larger the opal the higher the price.

Opal Treatments, Assembled Stones, Etc.

Beware

Opal is sometimes impregnated with oil, wax or plastic to improve the play-of-color and to prevent or disguise crazing. The plastic is stable, but the oil and wax isn't. There are various techniques for creating the appearance of black opal. These include smoke impregnation, backing with black or colored paint, and treatment with dye, silver nitrate or sugar carbonized by acid. These treatments are not well accepted by the trade because they're usually done to deceive buyers. When buying opal, asked if it's been treated or enhanced in any way. If it's untreated opal, ask the seller to write this on the receipt.

Occasionally sellers try to pass off doublets as boulder opal. An **opal doublet** is a thin slice of opal cemented usually with black glue to another material such as potch opal, ironstone, chalcedony or glass. If this doublet also has a protective top of colorless quartz or glass, it's called an **opal triplet** or a **triplet opal**. Doublets are normally more expensive than triplets because more opal is used but less expensive than boulder opals, which have a naturally attached backing. Often you can detect the man-made stones by looking at them from the side. A doublet typically has a straight separation line whereas a boulder opal has a crooked one.

There are also fake opal stones. One is called **Slocum Stone** and another **Opalite**. Hong Kong is a major producer of imitation opal. Synthetic opal is grown in Japan and Russia.

Major sources of opal

Most of the world's black and boulder opal comes from Australia, especially fine quality stones. Ethiopia has become an important producer of light opal

along with Australia. Most fire opal comes from Mexico. However, significant quantities of opal are also found in Brazil, Peru, South Africa, Tanzania and the U.S.

Basic opal data

SiO_2 —Silica + up to 10% water

RI: 1.40–1.47, Hardness: 5.5–6.5, SG: 2.00–2.20

Opal is an alternate birthstone for October.

Opal care tips

Since opals are relatively soft and fragile, they require special care. Don't clean them in ultrasonics. Instead, wash them in water with a mild soap and soft cloth. (Opal doublets and triplets, however, should not be immersed in water.) Avoid heat and sudden changes of temperature. Do not wear them while sunbathing or set them on a sunny window sill or under hot lights. Avoid chemicals and activities that could cause abrasions, pressure or knocks. With proper care, opal can give you a lifetime of enjoyment.



Fig. 4.51 Boulder opal. Pin/pendant by Paula Crevoshay; photo by Fineline. **Fig. 4.52** Matrix opal. Pendant by Whitney Robinson; photo by Studio Jewelers.



Fig. 4.53 Peridot. *Ring and photo by Mark Sadovsky.*

Fig. 4.54 TorusRing peridot carved by Glenn Lehrer. *Ring by Paula Crevoshay; photo by Crevoshay Studio.*

Peridot

Peridot is a transparent yellowish green gem, which is the birthstone for August and the 16th wedding anniversary stone. The color is natural and not the result of a treatment process. Occasionally its clarity is improved with fillers if fractures are present. Prices of peridot have steadily increased since 2000. Large high-quality stones have retailed for as much as \$600/ct.

Major sources

The oldest source of peridot is St. John's Island, Egypt, in the Red Sea. Arizona, China and Pakistan are the main sources today. Myanmar, Tanzania, South Africa and Vietnam are also sources.

Basic peridot data (Olivine group, forsterite species) Chemical composition: $(\text{Mg},\text{Fe})_2\text{SiO}_4$ —Magnesium iron silicate. RI: 1.64–1.69, Hardness: 6.5–7; SG: 3.27–3.45

Beware

Glass and synthetic spinel are occasionally used to imitate peridot. Occasionally it is confused with tourmaline.

Peridot care tips

Clean with soapy water. Ultrasonics are risky. Sudden temperature changes or uneven heat can cause fracturing. Jewelers' pickling solutions and some acids will attack peridot.

Ruby & Sapphire (Corundum)

Ruby and sapphire are the same mineral—corundum, so they have the same physical characteristics. Color is what distinguishes ruby from sapphire. Rubies are red and sapphires are either blue or another color such as green, orange, pink, yellow, purple, colorless or black (sapphire colors other than blue are called **fancy colors** and are identified by color, e.g., green sapphire).

RUBY: Generally, the redder the ruby and the stronger the red fluorescence, the better the ruby. Top-grade stones have a minimal amount of black, gray or brown masking the red. Medium to medium-dark tones are generally preferred by the trade. The highest percentage of stones that have met these color criteria is from the Mogok area of Myanmar (Burma).

But don't assume that a ruby is good quality if it originates from Mogok. Likewise, don't assume that rubies from other localities such as Madagascar, Mozambique, Sri Lanka, Tanzania, Thailand and Vietnam must be inferior. High-quality material has originated from all of these countries.

Large rubies have sold for more than \$400,000/ct, but good rubies in the one-carat range may retail for about \$1000/ct to \$25,000/ct depending on quality, source and treatment status.

On the other hand, you can find nearly opaque rubies for as low as \$10/ct. Semi-transparent to transparent lead glass-filled rubies can also be purchased for as little as \$10/ct. These are also called composite rubies or manufactured products.

The treatment status of ruby plays a major role in its price. Untreated rubies with lab documents can command premiums. Oiled, dyed and/or beryllium-treated rubies may be discounted significantly. “Ruby” that is impregnated with colored

lead glass to improve color, clarity and transparency is sold for prices below \$100/ct even in sizes as large as ten carats.

SAPPHIRE: When used by itself, the term **sapphire** normally refers to the blue variety. In its highest qualities, it's more expensive than the other varieties. Top-quality Kashmir sapphires, for example, can wholesale for over \$30,000/ct (mining in Kashmir has been extremely limited for decades).

Opinions differ as to which is the best sapphire hue. Some say blue, others say violetish blue. Most dealers agree, however, that greenish blues are less valuable. Dealers also have different tone preferences. Some prefer medium tones of blue while others prefer medium-dark tones. Pale, blackish or grayish stones, however, cost the least. Good sapphires in the one-carat range are available for about \$1000–\$10,000/ct retail. Larger sapphires can be as high as \$25,000/ct.



Fig. 4.55 Ruby with excellent color. *Photo from Asian Institute of Gemological Sciences (AIGS).*

Fig. 4.56 Unheated Burmese sapphire with excellent color. *Sapphire and photo from Fred Mouawad.*



Fig. 4.57 Sapphire suite from Mayer & Watt. Photo by Geoffrey Watt.



Fig. 4.58 Pink sapphire bead bracelet. Jewelry & photo by Alexandra Hart.

FANCY SAPPHIRE: Non blue sapphires are called “fancy sapphires” or “fancy-color sapphires.” These sapphires may be pink, orange, yellow, green, purple or colorless. If a sapphire has a natural orange-pink hue with a light to medium tone, it’s called a **padparadscha**. In large sizes, padparadschas can wholesale for more than \$20,000/ct. Untreated pink sapphires are the next most expensive fancy sapphire. Fine untreated pink sapphires in the 1-to 3-carat range may retail for \$5000 to \$12,000/ct. Some Asian dealers prefer to call pink sapphires rubies. However, the jewelry trade in western countries prefers to treat the pink sapphire as a unique stone with its own merits, rather than as a lower-priced ruby. Colorless sapphire, which is also called “white sapphire,” is produced by heat treating light-colored sapphire. Natural sapphire normally has a trace of color. In recent years, colorless sapphire has become a popular diamond substitute.

As with ruby, the treatment status, transparency and clarity of sapphires have a major impact on their price. Even though some sapphires sell for thousands of

dollars per carat, others sell for as little as \$10/ct if they are semi-opaque or heavily impregnated with colored glass. In his book [Ruby & Sapphire: A Collector's Guide](#) (p 312), corundum guru Richard Hughes indicates that irradiation, dying, oiling, and beryllium treatment (lattice diffusion) have a very significant to huge impact on corundum pricing. As for stones heated and impregnated with colored glass, he says that “such stones should never even have the words ‘ruby’ or ‘sapphire’ attached to them.” Hughes further states that high temperature heat treatment above 1,400 degrees centigrade can have a significant impact on sapphire pricing. Dealers typically charge premiums for untreated sapphires and rubies because of their rarity.

STAR SAPPHIRE & STAR RUBY: Star corundum with a fine blue or red color is rare. Gray, maroon and black star stones are easier to find, and their prices can be relatively low compared to fine star sapphire or star ruby, which can sell for thousands of dollars per carat. Black star sapphire, on the other hand, normally retails for about \$15--\$150/ct.

Geographic sources of sapphire

Major producers of blue sapphire include Australia, Madagascar, Myanmar and Sri Lanka. Sapphire is also mined in China, Colombia, India, Kenya, Malawi, Montana, Nigeria, Tanzania, Thailand and Vietnam. The lowest priced stones often are from Australia because they tend to be overly dark and have low transparency. The highest priced blue sapphires are generally from Kashmir, Mogok in Myanmar and Sri Lanka. Important sources of fancy color sapphires include Australia, Madagascar, Malawi, Montana, Myanmar, Sri Lanka, Tanzania, Thailand and Vietnam.

Beware: There's a lot of synthetic (man-made) ruby and sapphire on the market, which is sometimes identified as natural. If a ruby is large and flawless, assume it's lab-grown. Normally, large rubies and most large sapphires have inclusions.

Lab-grown ruby may also have inclusions. As a result of a Burma ruby ban imposed by the US Government and the scarcity of natural ruby, most of the ruby sold in the U.S. is either man-made or impregnated with a high quantity of colored glass. Glass-impregnated sapphire is not as common. However, a fair amount of fancy sapphire has been beryllium treated.

When buying rubies and sapphires, always ask if and how the stones have been treated. Have the seller write this information on the receipt. Unfortunately, not all sellers disclose gem treatments, and some do not know what treatments their stones have undergone. Therefore, it's important to deal with a knowledgeable and ethical seller. The heat treatment of rubies and sapphires is an accepted trade practice and often cannot be detected. However, beryllium treatment, oiling and cavity filling can be identified by gem labs. Stones impregnated with colored glass are easier for jewelers to detect. When purchasing an expensive ruby or sapphire, get one with a lab report from a respected independent gem lab. Examples are provided in [Chapter 15](#).

Basic ruby & sapphire (corundum) data

Chemical composition: Al_2O_3 —Aluminum Oxide

RI: 1.76--1.78, Hardness: 9, SG: 3.95--4.05. Ruby is the birthstone for July; sapphire is the birthstone for September.

Care tips for rubies & sapphires

Rubies and sapphires can be safely cleaned in ultrasonics and steamers provided they're not oiled, cavity filled, fractured or impregnated with glass. One exception is black-star sapphire, which tends to be fragile. Heat treated ruby and sapphire is stable to light, but some irradiated orange and yellow sapphires may fade. Corundum that is impregnated with glass requires special care because acids such as vinegar or lemon juice can create white lines throughout the stones where fractures are present. Other corundum is usually resistant to most

chemicals except for soldering flux or pickling solutions containing borax, which can etch the surface of corundum. Don't use jewelers' torches near glass impregnated stones because this can cause the stone to fall into pieces when the glass melts. On the other hand, natural rubies and sapphires are hard, strong and generally very durable.

Spinel

Custom jewelers and collectors who like unusual gems appreciate spinel. It's available in a variety of colors including red, pink, blue, purple, orange and black. With the exception of a few intense blue cobalt-colored spinels, ruby red is the most valued color; top-quality red spinels can retail for more than \$10,000/ct. Low-quality brownish stones are available for less than \$200/ct. Prices for stones above 10 carats are negotiable. The pink variety is the next most expensive spinel variety and can retail for more than \$7000/ct in sizes about five carats. Most blue spinels tend to be grayish or dark. In an attempt to lighten the color, stones are often cut shallow.

The color of most spinel is natural, but occasionally it is heated to improve color and clarity. Four and six-rayed stars sometimes occur in spinel.

Geographic sources of spinel

Myanmar, Sri Lanka, Tanzania and Vietnam are key sources of transparent spinel. Thailand is a major source of black spinel. Other localities include Afghanistan, Cambodia, Madagascar and Tajikistan. Spinel is often a by-product of the search for ruby and sapphire.



Fig. 4.59 North Vietnamese red spinel concave faceted by Richard Homer. Ring by

Thomas Dailing; photo by Azad.

Fig. 4.60 Pink spinel. Ring & photo courtesy Suna Bros. Inc.



Fig. 4.61 & 4.62 Blue spinel (4.59 ct) and North Vietnamese spinel (3.92 ct) concave faceted by Richard Homer. Rings by Thomas Dailing; photos by Azad.

Beware

Synthetic spinel may be sold as natural spinel and is also used to imitate other stones such as ruby and sapphire. Sometimes natural blue spinel is sold as “cobalt spinel” even when its color is not the result of cobalt in its chemical structure. Select spinel on the basis of its appearance rather than the name that a seller attaches to it such as “cobalt spinel.” Intense blue spinels are rare and are more valued than grayish or very dark blue spinels.

Basic spinel data

Chemical composition: MgAl_2O_4 —Magnesium aluminum oxide. RI: 1.71–1.73, hardness: 8, SG: 3.57 - 3.67

Spinel care tips

Spinel can be cleaned in ultrasonics, steamers and warm soapy water. Its color is stable to light, but some light-colored stones may fade under intense heat. It doesn't react to chemicals. Overall, spinel is durable, comparatively hard and typically has a better clarity than ruby.

Tanzanite (Zoisite)

Tanzanite, a blue to purple variety of the mineral zoisite, was discovered in the 1960's in the foothills of Africa's Mt. Kilimanjaro. Later, Henry Platt, vice-president and director of Tiffany's, named the stone after its source, Tanzania.



Fig. 4.63 Tanzanite. Ring by Mark Schneider, photo by Danielle Ginsburg. **Fig. 4.64** Multicolored tanzanite "Big Kiss" ring by Loretta Castoro; photo by Jeff Scovil.

Some dealers think that the most desirable tanzanite color is a deep blue with a faint purple secondary color. Others prefer an equal mix of blue and purple. Most dealers would agree, however, that blue tanzanites are worth more than those that are purple. Light lavender stones are priced the lowest. You can find tanzanites with excellent color saturation for less than \$1500/ct retail. Most tanzanite is heat-treated to intensify the color and/or eliminate brown, gray or green.

Zoisite comes in a variety of other colors: pink, green, yellow, gray, brown, and some material is multicolored. But since "tanzanite" sounds more exotic and appealing, some dealers tend to use the term for all transparent zoisites. However, as with sapphire, the unmodified "tanzanite" refers to the blue or violet variety, whereas other colors must be specified, e.g., yellow tanzanite.

This practice allows dealers to distinguish between the transparent and non-transparent varieties. In the marketplace, for example, green tanzanite is transparent green zoisite whereas green zoisite is typically the non-transparent variety used for carvings. Museums and most gem labs only use the term “tanzanite” for blue to purple zoisite.

Beware: There are some good tanzanite imitations, which may be glass, synthetic forsterite, Coranite™ (synthetic corundum), or Tanavyte™ (synthetic garnet). Sometimes these imitations are sold as synthetic tanzanite. So far, no one has been able to synthesize tanzanite in a laboratory.

Basic zoisite data

Chemical composition: $\text{Ca}_3\text{Al}_3(\text{SiO}_4)_3(\text{OH})$ —Calcium aluminum hydroxysilicate. A birthstone for December.

RI: 1.69–1.70, Hardness: 6–7, SG: 3.20–3.15.

Tanzanite care tips

Clean tanzanite in warm, soapy water. Avoid ultrasonics and steamers. Tanzanite is stable to light but reacts to hydrochloric and hydrofluoric acid. It's also very susceptible to cracking when bumped or knocked. That combined with its tendency to abrade makes it inappropriate for wear in everyday rings. It's an impressive gem, however, for necklaces, earrings and pins.



Fig 4.65 Topaz suite from Pala International. *Photo by Mia Dixon.*

Topaz

Historically, topaz was considered to be a yellow stone, but most topaz is colorless or light brown. Otherwise, it tends to be pale blue. Consequently, yellow, orange, and pink topaz are highly regarded. Topaz is hard and dense, and crystals weighing several kilos are common.

PINK to RED TOPAZ: Top-grade red or strong pink topaz is the most valuable type of topaz and can cost several thousand dollars per carat. The redder and more saturated the color, the rarer and more costly the stone. Natural-color stones, which generally come from Pakistan, can sell for much more than those which are treated. Most pink topaz is heated brownish-yellow topaz from Brazil.

GOLDEN YELLOW to ORANGE TOPAZ: When this variety is intensely colored and has reddish or pink overtones, it is called **imperial topaz** and can retail from about \$200/ct to more than \$3,000/ct. Stones with a low color saturation are less valuable.

BLUE to BLUE-GREEN TOPAZ: Produced by irradiating and then heating certain colorless material, blue topaz can look like fine aquamarine, but in most cases appears a stronger blue and looks less natural. Ever since the market was flooded with this topaz, its price has dropped to levels below \$30/ct. In addition to being produced by irradiation + heat, topaz has been heated in cobalt powder to turn it blue, a process called surface diffusion. Topaz may also be coated with a very thin layer of metallic oxide (chemical vapor deposition) to create an iridescent effect. This material has been called “mystic topaz” or “rainbow topaz.” In addition to having blue, green and rainbow colors, some of it may be entirely pink.

Geographic sources of topaz

The world's largest producer of topaz is the state of Minas Gerais in Brazil. For almost 300 years, its Ouro Preto district has supplied the world with yellow, orange and pink topaz. Other sources include Mozambique, Myanmar, Nigeria, Pakistan, Russia, Sri Lanka and the U.S.

Beware: Citrine quartz is often sold as "quartz topaz" or even "topaz" to make it sound more expensive. Therefore, when buying topaz, ask the seller to specify on the receipt that it is genuine topaz and not quartz or another gemstone. A fair amount of colorless topaz has been coated with a chemical vapor deposition process to create various topaz colors. Rough wear and scrapes can remove the coating.

Basic topaz data

Chemical composition: $\text{Al}_2(\text{F},\text{OH})_2\text{SiO}_4$ —aluminum fluoro-hydroxysilicate. RI: 1.61–1.64, Hardness: 8, SG: 3.5–3.6.

Topaz is the birthstone for November.

Topaz care tips

Clean with warm soapy water. Avoid ultrasonics, steamers, strong heat and sudden changes of temperature. Topaz is relatively hard, but fractures easily when dropped or knocked because in one direction, topaz crystals have a weaker bond between atoms.

Tourmaline (a group of mineral species)

No other gemstone offers buyers a wider variety of colors than tourmaline. Besides being found in every color of the rainbow, tourmaline may also be multicolored in one piece. Some species and varieties of tourmaline are listed below:

CUPRIAN TOURMALINE: Tourmalines with traces of copper in their chemical structure are called cuprian tourmalines. They may be various shades of green, blue or purple, but are especially noted for their intense greenish-blue color, due to the presence of copper. Stones that are purplish contain more manganese. The first recorded copper-bearing tourmaline was in the 1980's from Paraiba, Brazil.

Most of the gem-grade cuprian tourmaline from Paraiba occurred in 1990 and 1991 and became known as **PARAIBA TOURMALINE**. The intense turquoise blue color of this tourmaline was unlike any other tourmaline that had ever been mined so its prices rose rapidly. Now Paraiba tourmaline is so rare that two-carat stones can fetch wholesale prices of more than \$25,000/ct. Larger stones have attained higher prices. Cuprian tourmalines were also found in the 1990's in the Brazilian state of Rio Grande do Norte. In 2001, cuprian tourmaline from Nigeria and Mozambique also appeared on the market, and since it resembled material from Paraiba, it was also called paraiba tourmaline. African cuprian tourmaline is more plentiful and typically has a lower color intensity than copper tourmaline from Paraiba of the same size, so the African tourmaline sells for less than true Paraiba tourmaline of equal size and similar quality. Cuprian tourmaline is commonly heated to improve color.



Fig. 4.66 Paraiba tourmaline (10.64 cts) from Mayer & Watt. *Photo by Geoffrey Watt.*

Fig. 4.67 Mozambique golden tourmaline (11.19 cts). *Pala International/Jason Stephenson.*



Fig. 4.68 Afghan tourmaline cut by Clay Zava. *Photo by Robert & Orasa Weldon.*

BLUE-GREEN to GREEN-BLUE TOURMALINE: Some turquoise-colored tourmaline is colored by iron rather than copper, and much of it comes from Afghanistan. Some sellers call it Paraiba tourmaline even though it's not from Paraiba and it's priced much lower than Paraiba tourmaline and African cuprian tourmaline. Blue-green to green-blue tourmaline is also called **mint tourmaline**. Columbia Gem House identifies it as **Seaf沫am tourmaline** and trademarked the name in 1999.

GREEN TOURMALINE: This variety is plentiful and comes in a wide range of shades. It tends to appear very dark and non-transparent in one direction. To

lighten and improve the color, green tourmaline is commonly heat-treated. Stones that are blackish and yellowish are the least expensive. Those with an intense green color resembling a good emerald cost the most. Tanzania is noted for its green **chrome tourmaline**, which is colored by chromium and/or vanadium. Eye-clean green tourmaline is readily available. Therefore, good-quality stones are expected to have a high clarity. Top quality chrome tourmaline can retail for as much as \$2,500/ct. Low quality, very dark green tourmaline, however, may retail for less than \$100/ct.



Fig. 4.69 Tourmaline rings by Linda Quinn. *Photo by Chris Rockafellow.* **Fig. 4.70** Bicolor tourmaline cut by Tatyana Vyalkin. *Pendant & photo by Sara Commers.*

PINK or RED TOURMALINE: The discovery of pink tourmaline in southern California in 1898 helped popularize this stone. Red and pink tourmaline are also mined in Afghanistan, Brazil, Maine, Nigeria, Russia and Madagascar. **RUBELLITE** is a trade name applied to red and hot-pink tourmaline. True-red rubellites often have a low clarity. Pink and red tourmalines are commonly irradiated to intensify their color. The stones are not radioactive and the color is relatively stable. However, strong heat like that from a display window or a jeweler's torch can cause the color to fade. Sometimes rubellite is treated with fillers to improve its clarity. Even when treated, you should expect it to have a lower clarity than other transparent tourmalines

BLUE TOURMALINE (INDICOLITE or INDIGOLITE): The term

“indicolite” generally refers to blue tourmaline colored primarily by iron; it’s not used an alternative name for blue cuprian tourmaline. Indicolite comes in various shades of blue, but frequently, it’s a dark greenish or grayish blue. The color is often lightened with heat treatment. Brazil is the most famous source of indicolite but it’s also been found in Russia, Madagascar, Mozambique, Nigeria and the U.S.

YELLOW, ORANGE, BROWN or GOLDEN TOURMALINE: Yellow and orange tourmaline occur naturally but are sometimes produced by irradiating light yellow or green tourmaline. Heat may cause the resulting color to fade. Orange and yellow tourmalines are not easy to find. Most of them come from Tanzania, but some are from Brazil, Malawi, Nigeria, Nepal and Pakistan.

BICOLORED or MULTICOLORED TOURMALINE: The pink and green variety is the most common type, but stones can also be pink and colorless or blue and green. Some stones have more than two colors. The most valued stones have distinct saturated colors with sharp boundaries and no fractures. Green and pink slices of crystal tourmaline that have concentric color banding are called **watermelon tourmaline**. Multicolored tourmaline is found in Afghanistan, Brazil, Madagascar, Mozambique, Nigeria, Tanzania and the U. S.

CAT'S-EYE TOURMALINE: This is found in a variety of colors but pink and green are less difficult to find than red or blue colors. Cat's-eye tourmaline is occasionally treated with epoxy fillers to improve transparency and seal the tubes causing the cat's-eye.

Beware

Glass and synthetic spinel are sometimes sold as tourmaline by street vendors and at gem shows. The meaning of “paraiba” varies depending on the user. Many sellers use the term to refer to any blue-green tourmaline regardless of

origin or copper content. True Paraiba tourmaline is a rare collector's item that is difficult even for tourmaline dealers to find. Don't expect to find it on the Internet or in your local jewelry store.

Tourmaline care tips

Clean tourmaline with warm soapy water. Ultrasonics are considered risky for this stone. Avoid steamers and strong heat because it may alter the color; sudden temperature changes may also cause fracturing. Tourmaline does not react to chemicals. It's normally stable to light, but some irradiated stones may fade with prolonged exposure.

For additional tourmaline information consult *Tourmaline: The Gemstone Spectrum* by ExtraLapis, and *Exotic Gems: Volume 3*, which has seven chapters and 221 photos on tourmaline.

Turquoise

The most highly valued turquoise is untreated and dense and has an even, intense sky-blue color. Usually this type of material is from Iran. The value is reduced if the color is green or pale or if inclusions or lines called “spider-webbing” are present. Some people, though, prefer greenish colors and patterned turquoise.

Natural turquoise has stability problems. If it's not from Iran and it's not treated, it may turn green, white, or occasionally brown within a year after it's mined. Porous material can crack or crumble. This is why most of the turquoise sold today has been treated—usually with a plastic substance designed to prevent discoloration and increase durability. A colorant may be added to improve the color. Sometimes turquoise is impregnated with wax to deepen the color and decrease porosity. However, the wax can pick up dirt and gradually discolor. When buying turquoise, assume it's treated unless you're dealing with a knowledgeable, trustworthy seller who writes on the receipt “untreated natural turquoise.”

Sometimes powdered turquoise is bonded with polymers and sold as “reconstituted turquoise.” Distinguishing it from heavily polymer impregnated turquoise is difficult. Cara Williams of Stone Group Labs states that “In our experience, most material that is labeled as reconstituted or reconstructed turquoise contains no turquoise at all. There is a product that is currently sold to jewelry manufacturers as ‘reconstituted turquoise,’ but it's a polymer-based imitation and does not contain actual turquoise. It is available both with veining and without. A huge percentage of turquoise in the market is actually magnesite, especially the so-called ‘turquoise’ beads offered for sale at some gem shows. You can get an idea based on heft especially when it comes to beads (magnesite is denser than turquoise although both are commonly dyed and stabilized), but

for mounted cabochons it is virtually impossible to tell by looking.”

Stone Group Labs uses Raman and FTIR spectroscopy to test turquoise. If it is magnesite, Raman will identify it, but if it is turquoise, then they also have to test for dyes and polymers.

Major sources

The best turquoise occurs in northeast Iran near Nishapur, where it has been mined for over 3,000 years. The material there is typically more stable and blue than that of other sources—China, India, Mexico, the Sinai Peninsula, Tibet and Southwestern USA, which is the main producer.

Beware: Turquoise is imitated by plastic, glass, dyed chalcedony, dyed howlite, dyed magnesite and a reconstructed turquoise made from turquoise powder bonded with plastic. There's also a lab-grown turquoise, which is produced by Gilson. Sometimes liquid black shoe polish is used to create matrix patterns in turquoise or its imitations.



Fig. 4.71 Turquoise Victorian brooch (Circa 1870). *Jewelry and photo from Three Graces Antique Jewelry.*



Fig. 4.72 Magnesite that was sold as turquoise. Cabochon and bead lab samples from Stone Group Laboratories LLC; photo by Cara Williams.

Basic turquoise data

Chemical composition: $\text{CuAl}_6(\text{PO}_4)_4(\text{OH})_8 \cdot 5\text{H}_2\text{O}$ —hydrated copper aluminum phosphate

RI: 1.61–1.65, Hardness: 5–6, SG: 2.4–2.9

December birthstone along with blue zircon and tanzanite

Turquoise care tips

Clean with soapy water, but don't soak it. Avoid ultrasonics and steamers. Also, avoid heat and chemicals. Perspiration, skin oils, and cosmetics may turn blue turquoise green.

Zircon

Zircon is not the same as cubic zirconia (CZ). Zircon is a natural gemstone with exceptional brilliance and a diamond-like luster. Cubic zirconia is a synthetic stone with a different chemical composition. Zircon is found in a variety of colors.

BLUE ZIRCON: It often resembles aquamarine and blue topaz but has more fire and brilliance. The blue color results from heating brownish zircon. Blue zircon sold in jewelry stores is heat treated and susceptible to abrasions, especially when mounted in rings. Blue zircon prices can retail from \$30/ct to \$800/ct depending on size and quality. Most blue zircon is from Cambodia.



Fig. 4.74 Blue zircon. Ring & photo courtesy Suna Bros. Inc.

Fig. 4.75 Tanzanian bicolor zircon cut by Clay Zava. Photo by Clay Zava.



Fig. 4.76 Zircon from Tanzania. Gems cut by Larry Woods of Jewels from the Woods; photo by John Parrish.

GREEN ZIRCON: Found mostly in Sri Lanka, this zircon is often grayish or yellowish. It's not uncommon for street vendors to sell it as green tourmaline or green sapphire. A curious property of green zircon is that it usually emits some level of natural radioactivity.

YELLOW, ORANGE, BROWNISH-RED, VIOLET, & COLORLESS ZIRCON; In their natural state, these zircons tend to be either brownish or pale. Heat treatment can intensify or eliminate the color and reduce brown tints. To verify color stability, dealers sometimes expose zircons to the sun for several days.

Geographic sources of zircon

Four of the main sources of zircon are Cambodia, Tanzania, Thailand and Sri Lanka. It's also found in Australia, Madagascar, Myanmar, Nigeria, and Vietnam. Bangkok is the world's cutting and marketing center for zircon.

Basic zircon data

Chemical composition: ZrSiO_4 —Zirconium silicate

RI: 1.78–2.01, Hardness: 6–7.5, SG: 3.9–4.8

Zircon is a birthstone for December.

Zircon care tips

Clean with warm soapy water. Ultrasonics are risky cleaning methods. According to the GIA *Gem Reference Guide*, page 262, the toughness of untreated stones is fair to good whereas that of heat-treated stones is poor to fair. This means zircons can easily abrade and chip. Some heat-treated stones may revert to their original color. Zircon is resistant to chemicals.

5/Diamonds

Diamond Price Factors in a Nutshell

There are seven basic price factors for diamonds:

Cut quality (proportions and finish)

Color

Clarity

Carat weight

Stone shape and cutting style

Transparency

Treatment status (untreated or treated? type of treatment)

CUT QUALITY: (proportions and finish): This is a crucial factor which can affect prices by as much as 50%. The proportioning of the pavilion (bottom of the diamond) determines the overall brilliance of the stone. If the pavilion is too deep, the stone will look dark in the center; if it's too shallow, brilliance is diminished and a white circular area resembling a fisheye may be visible. In both cases, light is leaking out of the pavilion instead of being reflected back to your eye.



Figs. 5.1 & 5.2 Face-up view & profile of a well-cut diamond. *Diamond from Joe Landau; photo © Renée Newman.*



Fig. 5.3 A dark center resulting from a pavilion (bottom) that is too deep. **Fig 5.4** White circle (fisheye) caused by a pavilion that is too shallow. *Photos © Renée Newman.*

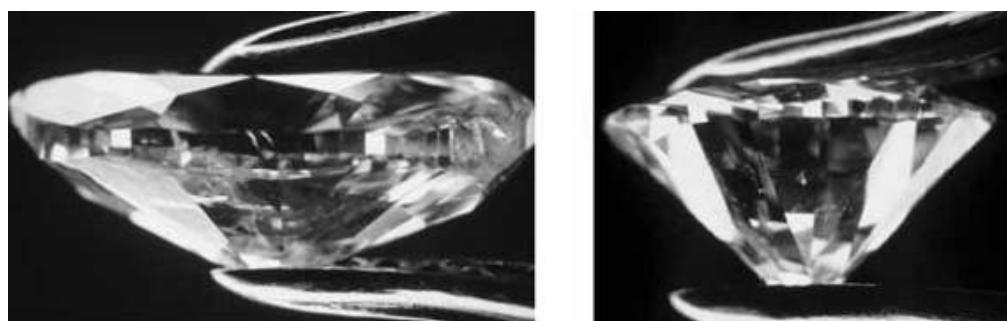


Fig. 5.5 A chunky marquise with a very thick girdle and a bulging pavilion. It looks small for its weight face up. **Fig. 5.6** Thin crown, deep pavilion. Face-up this diamond has reduced fire, sparkle, and brilliance. *Photos © Renée Newman.*

If the crown (top of the diamond) is too shallow and the table (large top facet) is too large, the diamond will not have good sparkle and fire. **Fire** refers to flashes

of rainbow colors. If the crown is too high or the girdle (diamond edge) is too thick, the stone will look small for its weight and you'll pay for unnecessary weight that can reduce brilliance.

Look at figures 5.1 and 5.2 to see what a well-cut round diamond looks like face-up and from the side. Compare them to figures 5.3 to 5.6. For more photos and information on judging cut, consult the *Diamond Handbook* by Renée Newman and *Diamond Grading ABC* by Verena Pagel-Theisen. In addition, deal with salespeople who can explain diamond proportioning and cut quality in language you can understand. You'll need assistance.



Fig. 5.7 Diamonds of five different color grades ranging from D (colorless) to Z (light yellow). Actual colors are slightly different than digital colors. *Diamonds and photo from J. Landau, Inc.*

COLOR: Basically the less color, the higher the price. Stones that are as clear as colorless water are the most expensive and have a D to E rating, D being the highest. Stones in the G to J range are near colorless. Diamonds in the K to M range are faint yellow, and as the letters descend toward Z the color gradually goes from very light yellow to fancy yellow. These letter designations are based on the GIA (Gemological Institute of America) color grading scale. Diamonds with a body color other than light yellow, light brown, or light gray are called **fancy color diamonds**. These colored diamonds may cost a lot more than those which are colorless, especially if they're naturally red or blue. Some diamonds are colored artificially by irradiation or high-heat–high-temperature treatment.

CLARITY: The fewer and smaller the flaws, the higher the price. There are 11 GIA clarity grades. They are:

Fl: Flawless—no **inclusions** (flaws inside the diamond) and no **blemishes** (flaws on the surface). Rarely used in jewelry.

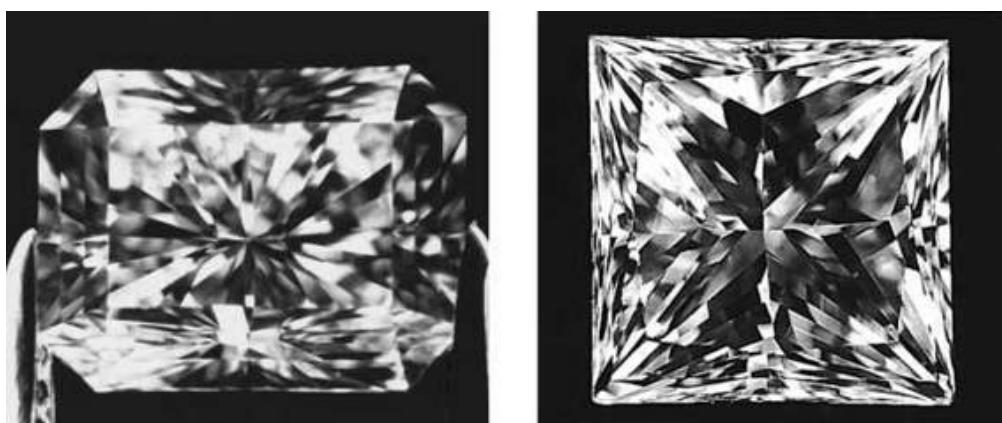
IF: Internally Flawless—**no** inclusions and only insignificant blemishes

VVS₁ & VVS₂: Very, very slightly included—minute inclusions difficult to see under 10-power magnification. Jewelers seldom have these stones in stock due to their rarity.

VS₁ & VS₂: Very slightly included—minor inclusions ranging from difficult to somewhat easy to see under 10-power magnification. VS diamonds are available in jewelry stores.

SI₁ & SI₂: Slightly included, noticeable inclusions easy (SI₁) or very easy (SI₂) to see under 10-power magnification, but that normally aren't eye-visible.

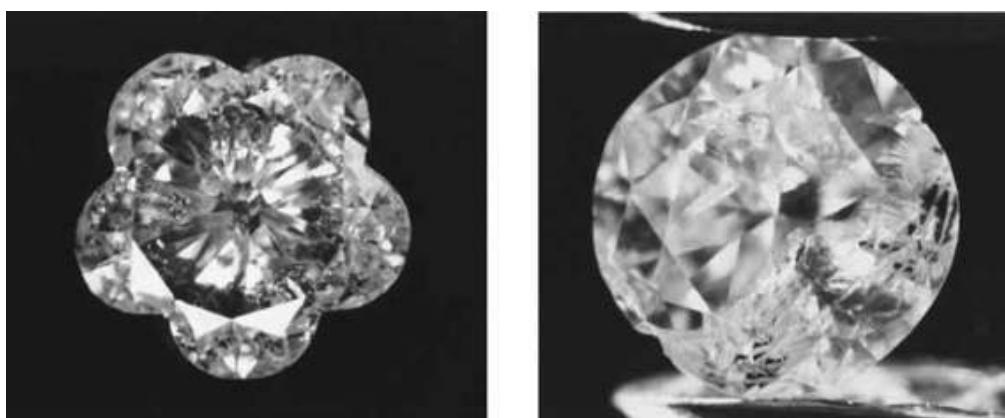
I₁, I₂, & I₃: Imperfect—eye-visible inclusions face up that range from just visible (I₁) to extremely visible to the naked eye (I₃). Some I₂ and I₃ diamonds may be damaged by ultrasonic cleaning. They may also be less resistant to knocks.



Figs. 5.8 &5.9 (Left) VS₂ radiant-cut (octagonal shape, brilliant cut) diamond. (Right) SI₁ princess-cut diamond (square brilliant cut). Photos © Renée Newman.



Figs. 5.10 & 5.11 (Left) SI₂. (Right) I₁. Photos © R. Newman.



Figs. 5.12 & 5.13 (Left) I₂. (Right) I₃. Photos © R. Newman.

CARAT WEIGHT: In most cases, the higher the carat weight category, the greater the per-carat price. A carat is a unit of weight equaling a fifth of a gram. The weight of small diamonds is often expressed in points. One point equals 0.01 carats. There's a difference between the labels **1 ct TW** (one carat total weight) **and 1 ct** (the weight of one stone).

SHAPE & CUTTING STYLE: Some shapes such as rounds cost more than others like pear shapes. The effect of shape on price depends on the stone size, demand and available supply.

Radians may cost slightly more than emerald cuts depending on size. They have the same shape but different faceting styles.

Patented and trademarked cutting styles typically sell for more than generic cuts

of the same shape.

TRANSPARENCY: Not all diamonds are transparent. Some are cloudy or translucent because they have finely divided particles which interrupt the passage of light. Normally, the higher the transparency the more valuable the diamond.

Even though transparency can have a significant impact on price, lab documents do not include it as a price factor. Gem labs, however, may take it into consideration when assigning a clarity grade. Some labs identify translucent diamonds as “fancy white diamonds” and may omit a clarity grade. This terminology does not change their inherent lower value.

If you’re interested in buying a brilliant diamond, choose one with high transparency. You don’t need a lab report to help you do this. Your eye is the best judge of transparency. Make sure the diamonds you’re comparing are clean, and be aware that transparency is an important price and beauty factor.

TREATMENT STATUS: Unlike colored gems, most diamonds are untreated. That is changing. Before 1999, buyers only needed to know if diamonds were fracture-filled or laser drilled to improve their clarity, or irradiated to change their color. In 1999, jewelry trade magazines announced that General Electric was able to turn a special class of brown diamonds colorless by heating them with high pressure and high temperatures (HPHT treatment). Brown diamonds typically sell for about 40% to 70% less than colorless diamonds of the same quality and size.

HPHT-treated diamonds have become more readily available since 1999 and are now found in a variety of colors, which retail for much less than natural-color diamonds. They are sold under the generic names “processed diamond” or “HPHT diamond” or under trademarked names such as “Bellataire.”

Gemstones which are naturally beautiful are more highly valued than their

treated counterparts. Not all countries require disclosure of gem treatments, and some sellers don't comply with disclosure laws that exist. Therefore, ask if a diamond you want is treated or of natural color and make sure it has a lab document from a reputable lab stating that it is untreated if you want a natural-color diamond with no clarity enhancement.

Major sources: Australia, Botswana, Canada, Russia and South Africa are the world's leading diamond producers. Canada became a diamond producer in October 1998 when the Ekati diamond mine opened northeast of Yellowknife in the Northwest Territories. Diavik, Canada's second mine, began production in 2003.

Basic diamond data

Chemical composition: C—crystallized carbon

RI: 2.417, Hardness: 10, SG: 3.51-3.53

Diamond is the birthstone for April and the 60th and 75th anniversary stone.



Fig. 5.14 Natural-color diamonds. *Rings and photo from the Jye Luxury Collection.*



Fig. 5.15 An Asscher Cut Princess diamond, a square patented diamond with cut corners. *Ring & photo courtesy Quadamas.*

Fig. 5.16 Black diamond surrounded by “white” brilliant-cut diamonds. *Ring & photo courtesy Todd Reed.*

Beware: Some sellers over-grade their stones and neglect to provide information about the quality of the cut. Their prices may seem low when in fact they might be higher than those of ethical jewelers. If you’re buying an expensive diamond, either purchase one with a lab report from a respected lab or else make the sale contingent on an appraisal from an independent appraiser.

Diamonds that are fracture-filled, irradiated, drilled or heat & pressure treated should sell for less than untreated diamonds, all other factors being equal. In addition, the fillings in fracture-filled diamonds might be damaged by repeated ultrasonic cleanings or by jewelry repair procedures involving direct heating.

One popular diamond imitation is synthetic moissanite. It reacts like diamond to thermal diamond testers, but jewelers can distinguish it from diamond because its facets appear doubled under magnification.

Synthetic (man-made) diamonds were first produced in the early 1950s for industrial purposes, but it wasn’t until about 2003 that they became commercially available in stores and on the Internet. Sellers typically identify them by their brand name or as lab-created or lab-grown diamonds. Sometimes synthetic diamonds are incorrectly called “cultured” diamonds. Man-made diamonds often sell for a few thousand dollars per carat, but their prices are

dropping as production costs go down and competition increases. On the other hand, the prices of natural, mined diamonds are remaining stable or are rising. If you would like for your diamond to retain its value, then select an untreated natural diamond, one that has been mined in the earth. See the [Diamond Handbook](#) by Renée Newman for more information on synthetic diamonds.

Sometimes people are concerned about diamond switching or identifying their diamond(s) in the event of loss or theft. Thanks to sophisticated technology, an optical “fingerprint” has been developed called GEMPRINT®. It’s been used by the FBI, Canadian government and insurance companies to identify diamonds that were “gemprinted” at the time of purchase. These diamonds receive discounts from insurers because it is easier to positively identify them when jewelry is recovered. For more information, go to www.gemprint.com

Diamond care tips: Untreated diamonds without cracks and large inclusions can be cleaned by any method. You can soak them in soapy water, alcohol or an ammonia solution and then rub them clean with a lint-free cloth. Ultrasonic cleaning is usually the easiest and most effective method. Most jewelers will clean your jewelry and check your diamond settings free of charge.

6/Gems from Living Organisms

Pearls, amber, coral and ivory are not stones, but they're regarded as gems because they're attractive, relatively rare, and can be worn as jewelry. Of all the gems produced by living organisms, pearls are the best known and most highly valued.

Pearl Price Factors in a Nutshell

The following factors can affect the price of a pearl:

Luster

Shape

Surface quality

Color

Size

Thickness of the nacre (pearly substance secreted by mollusks)

Treatment status (untreated or treated? Type of treatment)

Pearl type (saltwater/freshwater, natural/cultured, whole/blister)

LUSTER: This is pearl brilliance; the shine and glow of a pearl. The higher and deeper the luster, the more valuable the pearl. Pearls with a high luster display strong and sharp light reflections and a good contrast between the bright and darker areas of the pearl. Pearls with low luster look milky, chalky and dull. Select pearls that have a good luster.



Fig. 6.1 Luster qualities ranging from high to very low. *Pearls from King Plutarco;*
photo © Renée Newman.

SHAPE: Normally, the more round and symmetrical the pearl, the more it costs, but unique, asymmetrical shapes are also desirable and are used to create distinctive pearl pieces. The lowest priced shapes are baroque (irregular and asymmetrical in shape) or have ring-like formations encircling the pearl.

SURFACE QUALITY: The fewer and smaller the flaws, the more valuable the pearl. Blemishes on single pearls tend to be more obvious and less acceptable than those on strands. It's normal for pearl strands to have blemishes. Natural pearls normally have more flaws than cultured akoya pearls. That's because they've been in the oyster longer and have had more time to develop blemishes. Cultured pearls from the South Seas are also more likely to have flaws than akoyas, which have a thinner nacre coating.



Fig. 6.2 South Sea pearl shapes: round, oval, drop, button, circled drop and baroque.
Pearls from King Plutarco; photo © Renée Newman.



Fig. 6.3 Surface qualities ranging from clean to heavily blemished. *Pearls: King Plutarco; photo © Renée Newman.*



Fig. 6.4 Some Australian South Sea pearl colors. *Pearls from King Plutarco; photo © Renée Newman.*

COLOR: Saltwater pearls that are yellowish usually sell for less than those which are white and light pink. Golden South Sea pearls from Indonesia and the Philippines are an exception and can sell for as much as white South Sea pearls, provided the gold color is intense and natural.

Natural-color black pearls (they're actually gray) can sell for as much as white pearls of the same size and quality, as long as they have overtone colors and are not just plain gray. The overtone colors, which are visible in the light-colored areas of black pearls, may be green, pink, blue or purple.

Pink overtones are desirable on white pearls and are visible in the dark areas of the pearl. Greenish or yellowish overtones tend to reduce the price of white pearls. Occasionally, iridescent rainbow-like colors are visible on pearls. Pearl iridescence is always considered a valuable quality.

The way in which color affects the pricing of freshwater pearls varies from one dealer to another. Often it has little or no effect. However, when comparing the prices of any pearls, try to compare pearls of the same type and color.

NACRE THICKNESS: Nacre thickness is not a price factor for natural pearls because they're nearly all nacre. However, it is of critical importance in cultured saltwater pearls.

The thicker the nacre coating of a pearl, the better and more durable the pearl. Before about 1960, Japanese akoya pearl farmers left the pearls in the oyster for at least two and a half years. Around 1979, pearl harvesting started to be done just after six to eight months. The result—a lot of inexpensive, thin-nacre pearls on the market, many of which look like dull white beads and have nacre that's peeling off the pearls.

Fortunately, better pearls with thicker nacre are also available, but they're rarely as thick as those cultured before the 1960's. South Sea pearls normally have a thicker nacre coating than akoya pearls. Nacre thickness is one of the most important quality factors for cultured saltwater pearls because it affects both the beauty and durability of the pearls.

Nacre thickness is not as important a factor in cultured freshwater pearls as it is

in saltwater pearls. This is because most freshwater pearls have no shell nucleus. When one is present, the nacre is usually thicker than in akoya pearls. One of the biggest selling points of cultured freshwater pearls is that they usually have a higher percentage of pearl nacre than their saltwater counterparts.

SIZE: The larger the pearl, the more it costs. An exception would be round pearls with a diameter of less than 7 millimeters. A 2–2½ mm strand, for example, might sell for the same price or more than a 4–4½ mm strand (pearl measurements are generally rounded to the nearest half or whole millimeter). Pricing often depends on availability and demand.

TREATMENT STATUS: Dyed and irradiated pearls cost less than those of natural color. Irradiated pearls normally cost more than dyed pearls because the irradiation process is more costly and because it's usually reserved for higher quality pearls. During the 1920s and 30s, however, dyed black pearls were considered fashionable and sometimes sold for as much as white pearls of similar size and quality.

PEARL TYPE: Before you price a pearl, you should know, for example, if it's **saltwater** (from the oceans, sea, gulf or bay) or if it's **freshwater** (from a river, lake or pond).

Good saltwater pearls (e.g., South Sea and Japanese akoya) can cost several times more than freshwater pearls of similar quality and size. One of the reasons for this is that one mussel in a lake can produce as many as forty freshwater pearls in one harvest. An oyster in the sea typically produces one or sometimes two saltwater pearls at a time. In addition, most freshwater pearls are cultured in China, where labor costs are lower than in Japan, Australia and Tahiti.

Natural pearls are more valuable than cultured pearls. **Natural pearls** are usually formed as the mollusk secretes layers of protective nacre (pronounced NAY-ker)

around an irritant that *accidentally* enters the mollusk. The irritant can be a minute snail, worm, crab, or a particle of shell, clay or mud.



Fig. 6.5 Cultured South Sea pearls from A & Z Pearls. *Photo by Diamond Graphics.*



Fig. 6.6 Abalone shell carving by Lou Hernandez. *Photo by Arnim Huber.* **Fig. 6.7** Cultured mabe Cortez Pearls. *Pearls and photo from Columbia Gem House.*

Cultured pearls are formed around irritants that are *intentionally* introduced by man. The irritant may be a shell bead, another pearl or tissue from an oyster or mussel. The shape and size of the resulting pearls depend to a large degree on the shape and size of the implanted irritant. More than 99% of the pearls on the market today are cultured. Perhaps the highest percentage of natural pearls sold today are found in Europe and the Middle East. In Europe, “pearl” means “natural pearl.” In the United States, the term “pearl” has come to mean

“cultured pearl” because natural pearls are not normally sold in jewelry stores. If a pearl is natural, it’s usually called a natural pearl. According to the U.S. Federal Trade Commission, however, pearls that are cultured are supposed to be preceded by the word “cultured.”

One type of natural pearl that is found in New Zealand and off the west coast of North America is the abalone pearl. Even though the abalone is a snail and not an oyster or mussel, the colorful nacreous gems it produces are considered to be pearls because they consist of many concentric layers of nacre. The shell of the abalone is also used for jewelry and carvings.

Colorful pearls also come from the rainbow-lipped oyster in the Sea of Cortez near the city of Guaymas, Mexico. These pearls are cultured by Columbia Gem House and are available in semi-round, drop and round shapes.



Fig. 6.8 Chinese freshwater bead-nucleated cultured pearls (rounds: 12-14 mm, baroques: 17-30 x 21-37 mm), a 14.32 mm golden round Philippine South Sea cultured pearl, a 16.2 mm round Tahitian South Sea cultured pearl and round Vietnamese white akoya cultured pearls (2.5-3 mm). *Pearls and photo from Betty Sue King of King's Ransom.*

Besides knowing whether a pearl is natural or cultured, one must also consider if the pearl is a whole pearl, blister or three-quarter pearl.

Whole pearls are much more valued than **blister pearls**— those which grow attached to the inner surface of a mollusk shell and **three-quarter pearls**—whole pearls that have been ground or sawed on one side, usually to remove blemishes. **Mabe pearls** are made from blister pearls by removing the interior, filling it with a paste and covering it with a mother of pearl backing. These assembled pearls offer a big look at a low price, but they're not as durable as non-assembled pearls.

Geographic sources of pearls

Japan is still the major producer of akoya pearls that are 7 mm and above in size. China has become a large cultivator of small akoya pearls, and Vietnam is also a source of akoya cultured pearls. China is the main producer of freshwater pearls, but they have also been cultured in the United States and Japan.

Australia is the principal producer of white South Sea pearls, whereas Indonesia is the largest source of golden South Sea pearls. A significant quantity of golden South Sea pearls are from the Philippines. The majority of black pearls are cultured in Tahiti, but some are also produced in the Cook Islands and Mexico. The highest percentage of natural saltwater pearls have been harvested in the Persian Gulf, the Red Sea and the Gulf of Manaar (between India and Sri Lanka). Natural freshwater pearls have been found in the rivers of the USA, Scotland, Ireland, France, Austria and Germany, but they're no longer commercially important.



Fig. 6.9 Cultured freshwater pearl frog on a green opal base.

One-of-a-kind sculpture and photo by A & Z Pearls.

Basic pearl data

Chemical composition: CaCO_3 —calcium carbonate (most of it aragonite and the rest calcite) + 2–4% water and 4–14% conchiolin. RI: 1.530–1.685, Hardness: 2.5–4.5

Pearl is one of the birthstones for June.

Beware: Dyed and irradiated pearls are not always disclosed. For black and golden South Sea pearls that cost thousands of dollars, it's a good idea to get a report from a respected lab stating there's no evidence of artificial coloring, especially if you don't know the seller. Imitation pearls are occasionally sold as cultured pearls.

For information and photos on detecting fake and dyed pearls, consult the [Pearl Buying Guide](#) by Renée Newman and *Pearls* by Elisabeth Strack.

Another common problem with pearls is nacre so thin that it peels off. This can be detected both with the naked eye and a 10-power magnifier. You can usually

avoid getting thin-nacre pearls by selecting pearls that have a high, rich luster. To learn how to evaluate luster, have salespeople show you a variety of luster qualities from very high to very low.

Pearl care tips

Clean pearls by wiping them with a soft damp cloth after wearing them. Avoid ultrasonics, steam cleaners, detergents, bleaches, powdered cleansers, ammonia-based cleaners, and chemicals. Pearls are attacked by all acids, but it's safe to use acetone on pearls to remove glue and stains. Put your pearls on after applying hair spray, cosmetics and perfume. If you wear pearls often, have your jeweler check the strands at least once a year to determine if they need restringing.

Amber

Amber is fossilized tree resin, which is produced by some trees as a form of protection from disease and wood-burrowing insects. It was one of the earliest gems used for personal adornment. Of special interest to scientists are ambers containing insects, pollen, leaves, and occasionally frogs and lizards that were trapped millions of years ago as the sticky resin dripped down the tree trunk. Ambers with inclusions provide a rare look at plant and insect life of that time period.

Most amber is brownish yellow to orange in color but it can also be blue, green, or red. Brownish colors are the least valued. The best quality amber is transparent and either has no flaws or else has very distinctive inclusions.

Major amber deposits

The majority of gem-quality amber is found along the Baltic coasts of Russia and Poland. Other significant sources are the Dominican Republic, Mexico, Myanmar, Sicily, and Romania.

Beware

Amber is sometimes dyed to make it darker or a different color. The dye may fade. Be on the lookout for **pressed amber** (also called **reconstituted amber**). It's made by heating small amber fragments and compressing them into larger pieces. It can be identified by magnification. A lot of natural amber is heated just to make it more transparent.

Amber can be separated from imitations such as plastic by placing it in a saturated salt solution. Amber will normally float while imitations may sink. However, copal and polystyrene plastic have about the same specific gravity as

amber, so amber experts find high magnification to be more useful in detecting imitations.



Fig. 6.10 Mexican amber containing a variety of insects; the main inclusion is a winged termite. Specimen & photo from Dave Gibson of www.MexicanAmber.org.uk.

One imitation that is harder to detect is copal, a young version of amber. It has essentially the same chemical formula as amber but different physical properties. Copal contains liquids such as oils, acids and alcohol, whereas in amber these liquids have evaporated, resulting in a more durable product. Besides its greater resistance to cracking and crazing, amber is much more rare and valuable than copal. A drop of acetone nail polish remover on the back of the material can help separate copal from amber. The acetone will make copal sticky but it will have no effect on amber.

Basic amber data

Composition: fossilized plant resins

RI: 1.53–1.55, Hardness: 2-2.5, SG: 1.05–1.10

Amber Care tips

Amber scratches, abrades and melts easily. If it's left in the sun, it can dehydrate and crack. Avoid ultrasonics, all chemicals, brushes, and heat. To clean amber, wipe it with a soft damp cloth; or clean it in cool soapy water, rinse and dry with a soft cloth.

For more information on amber, consult *Gem & Ornamental Materials of Organic Origin* by Maggie Campbell Pedersen and www.MexicanAmber.org.uk.

Coral

Coral is formed by colonies of tiny boneless sea animals called coral polyps. They secrete a hard outer framework which becomes a coral home for them and which can eventually grow into reefs. The Mediterranean and Red Seas are the main sources of the finest coral. Much of it is fashioned and traded in Torre del Greco, Italy near Naples. The current production of coral is limited by environmental regulations.



Fig. 6.11 A termite, cockroach and fly in amber. *Specimen & photo from Dave Gibson of www.MexicanAmber.org.uk.*

Fig. 6.12 Victorian coral cameo ring from Lang Antique & Estate Jewelry. *Photo by Cole Bybee.*

Coral occurs in a variety of colors—pink, red, orange, white, cream, black and occasionally blue or purple, but the most highly valued is red, followed by pink. The stronger and more even the color the better the quality. Coral is typically cut into cabochons, beads, cameos and figurines; or branch segments are drilled and strung into necklaces.

Major coral sources

Australia, Ireland, Japan, Malaysia, Western Mediterranean Sea, Philippines,

Red Sea, Taiwan and Hawaii. Black coral is found in Australia, Hawaii and the West Indies. Even though there are hundreds of species of coral worldwide, only a small number are used for jewelry.

Beware

Ask if the coral has been dyed to deepen or change the color. Dyed coral may fade and should cost less. Low quality material may be impregnated with glue-like material to fill and hide surface cavities, and broken pieces or cracks may be glued back together. Common imitations include bone, chalcedony, plastic, glass, and shell. Gilson coral is an imitation coral made by Gilson Inc.

Basic coral data

Chemical composition: primarily CaCO_3 —calcium carbonate (in the form of calcite).

RI: 1.48–1.66, Hardness: 3–4, SG: 1.37–2.60–2.70

Coral care tips

Coral scratches and abrades easily, and it dissolves in acidic substances such as vinegar and lemon juice. Avoid ultra-sonics, all chemicals, brushes, bright light and heat. To clean coral, wipe it with a soft damp cloth.

Ivory

Ivory is dentine, a substance common to the teeth of all mammals. However, the term is generally used to refer to elephant's tusks and the teeth of hippopotamus, mammoth, narwhal, sea lion, walrus, whale and wild boar.



Fig. 6.13 A David Webb ivory and turquoise bracelet—hammer price of \$11,950 on 5-2-2011 at Heritage Auction Galleries. It was made on 5/8/1970, which was before the use of ivory was prohibited. *Photo & information from Gail Levine's www.AuctionMarketResource.com.*

Since more and more ivory-bearing animals are threatened with extinction, trading in most new ivory has become illegal in much of the world. As a result, some new ivory pieces are dyed to make them appear as if they are valuable antiques. Today people are encouraged to use imitation ivory made from bone or palm nuts (vegetable ivory) as a substitute. Plastic is also used to imitate ivory.

Major ivory sources

Tanzania and Zaire are key sources. It's also found in India, Kenya, Senegal, Sri Lanka and Thailand.

Basic ivory data

Composition: calcium phosphate with collagen and elastin
RI: 1.53–1.54, Hardness: 2–3, SG 1.7–2.00,

Ivory care tips

Ivory is soft and porous and it can shrink and discolor from heat. Avoid rough wear, ultrasonics, chemicals, brushes, bright lights and heat. To clean ivory, wipe it with a soft damp cloth; or clean it in soapy water, rinse and dry with a soft cloth. For additional information, see [*Ivory Identification: A Photographic Companion*](#) by William R. (Bobby) Mann and Charles M. Marts and [*Gem and Ornamental Materials of Organic Origin*](#) by Maggie Campbell Petersen.

7/Gold, Platinum, Palladium & Silver

Jewelry is normally made from **alloys**, mixtures of two or more metals. Gold, for example, is alloyed (combined) with metals such as silver, copper and zinc to make it harder, to change its color and/or to reduce its cost. Platinum alloys are usually made by combining platinum with ruthenium, iridium, palladium, cobalt or copper.

When comparing fine jewelry prices, find out the gold, platinum, or palladium content of the metal. It's called **fineness**—the amount of the precious metal in relation to 1000 parts. For example, gold with a fineness of 750 has 750 parts (75%) gold and 250 parts of other metals. An alloy containing 95% platinum or palladium has a fineness of 950.

In some countries, the **karat** is also used as a measure of gold purity. One karat is 1/24 pure, so 24 karat represents pure gold. Metal containing 75% pure gold is 18 karat (18K) gold. Tables 7.1–7.4 list gold, platinum, palladium, and silver content notation used in jewelry.

Table 7.1 Gold (Au) Content & Notation

USA Karat Gold %	Fineness	Notes
24K 99.9%	999 or 1000	Pure gold
24K 99.0%	990	Minimum allowed for pure gold jewelry; popular in China.
22K 91.6%	916 or 917	Popular in India
21K 87.5%	875	Popular in the Middle East
19.2 80.0%	800	Standard in Portugal
18K 75.0%	750	Standard intl. karatage for high quality jewelry; minimum in Saudi Arabia,
15K 62.5%	625	Used in Great Britain from 1854-1932
14K 58.3%	585	583 or 58.3% in U.S., minimum standard in Austria and Thailand.
12K 50.0%	500	Used in Great Britain from 1854-1932
10K 41.6%	416 or 417	Minimum standard in the U.S.
9K 37.5%	375	Minimum standard in Australia, Canada, Israel, Italy, New Zealand, the U.K. and for the Hallmarking Convention.
8K 33.3%	333	Minimum fineness in Denmark

Table 7.2 Platinum (Pt) Content & Notation

Name & PLAT %	Fineness Stamp	Notes
Fine PLAT 99.9%	999 or 1000	Pure platinum, most common purity for Japanese wedding bands
PLATINUM PLAT, PT 95%	950	Most common platinum alloy fineness standard throughout the world; minimum standard in Canada, India, Kingdom of Bahrain, New Zealand, The Netherlands, Poland, Romania.
90%	900	Minimum standard in Hungary, India and Thailand; most common purity in China and Japan.
85%	850	Minimum standard in Australia, China, Hong Kong, Israel, Japan, Saudi Arabia, the UK and most European countries.
80%	800	A permissible purity in the US
50%	500	Lowest platinum standard and the minimum fineness standard in Bulgaria, Lithuania and the U.S.

Table 7.3 Palladium (Pd) Content & Notation

Name	Palladium %	Fineness Stamp	Notes
Fine palladium	99.9%	999	Pure palladium
Palladium	95.0%	950	Most common palladium fineness standard in Europe and North America
	85%	850	A palladium standard in Finland, Lithuania, Poland
	50%	500	Lowest palladium standard. Any alloy with less than 50% palladium cannot be called palladium in countries with a palladium standard.

Sources of data for Tables 7.1–7.4: *CIBJO Precious Metals Book, World Hallmarks, Volume 1, 2nd Edition* by William B. Whetstone, D. Niklewicz, & L. Matula; *GIA Gold & Precious Metals Course, Palladium Technical Manual*, UK Edition, *FTC Guidelines for the Jewelry & Precious Metals Industries*, www.thegoldsmit..., www.competitionbureau.gc.ca, www.stillwaterpalladium.com, www.luxury..., www.gold.org, www.ftc.gov/enforcement/rules

Table 7.4 Silver (Ag) Content & Notation

Name & Silver %	Fineness Stamp	Notes
Fine silver, 99.9%	999 or 1000	Pure silver
Britannia silver, 95.84%	958	Formerly the British silver standard
French First Standard, 95.0 %	950	Popular in Peru and Thailand; French silver standard before 1973
Sterling silver 92.5%	925	Most common silver alloy fineness throughout the world; the silver standard now for the UK, US, Canada, and many other countries.
Coin silver 90.0%	900	A former standard for silver coins
83.5%	835	Used in Australia, Austria, Czech Republic, Belgium, Germany, Hungary, Israel, Portugal, Slovakia
“Scandinavian silver” 83%	830	Used in Bahrain, Lithuania, Finland, Norway, Portugal, Romania
“European Silver,” “Egyptian silver” 80%	800	Used in Australia, Austria, Estonia, Hungary, Finland, Germany, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Spain, Saudi Arabia, Slovakia, Sweden, Switzerland, The Netherlands, UK



Fig. 7.5 Repousse sterling silver and gilded gold cuff by Michael Galmer. *Photo from Repousse Jewelry.* **Fig. 7.6** Pierced and hand-engraved sterling silver. *Brooch created & photographed by Vincent Hawley of VWH Jewelry.*



Fig. 7.7 Palladium set with diamonds. *Ring & photo courtesy Todd Reed.* **Fig. 7.8** Palladium frame ring inlaid with a 24K solid gold bar hand-engraved with a Celtic dragon. *Ring and photo by Roy Rudolph Duran of Finer Jewelry.*



Fig. 7.9 Platinum and tanzanite necklace. *Handwoven by Barbara Berk; photo by*

Robert & Orasa Weldon.



Fig 7.10 Rose gold. *Ring by Whitney Robinson; photo by Hanna Cook-Wallace.* **Fig.**

7.11 Gold (18K) with a fleece matte finish. *Ring and photo by Stephen Vincent Design.*

Other Jewelry Metal Terms

Budget-priced jewelry is made with the following metal types:

BONDED GOLD & SILVER: An unofficial trade term used to describe a layer of at least 10K gold that is mechanically affixed to sterling silver. Example marking: 925 1/20 10K for sterling silver with a 10K gold layer that is 1/20th of the gross weight of the article.

GOLD ELECTROPLATE (GEP), ELECTROPLQUÉ D'OR: Having an electroplated gold layer of at least .175 microns or 7/1,000,000 of an inch thick in the U.S. and one micrometer in Canada. The gold must be at least 10K gold.

GOLD FILLED (GF) DOUBLÉ D'OR: Having a solid layer of at least 10K gold bonded with heat and pressure to a base metal such as brass. The Gold layer must be at least 1/20th of the weight of the metal in the entire article. Example markings “1/20 14K GF” or “14 Kt Gold Filled.” Gold-filled items, even when worn daily, can last several years, but will eventually wear through.

GOLD FLASHED OR GOLD WASHED: Having a thinner gold layer than 7/1,000,000 of an inch thick.

GOLD OVERLAY: Having a thinner solid, mechanically bonded layer of gold than gold filled.

GOLD PLATE (GP): Having a gold layer of $\frac{1}{2}$ microns or about 20 millionths of an inch. Example markings: “2 microns 12 K. gold plate” or “ 2μ 12 K. G.P.” for an item plated with 2 microns of 12 karat gold.

ROLLED GOLD PLATE (RGP), PLAQUÉ D'OR LAMINÉ: Having a solid layer of gold less than 1/20 of the gross weight of the entire article. The layer is

applied by a mechanical process with at least 10K gold. Marking examples: “1/40th 12 Kt. Rolled Gold Plate” or “1/40 12 Kt. RGP”

VERMEIL: Consists of a base of sterling silver plated with a layer of at least 10K gold and a minimum thickness throughout equivalent to 2 1/2 microns of fine gold in the US. The layer of gold may be either electroplated or mechanically bonded. In Canada the thickness of the gold layer must be at least one micrometer.

Geographic sources

South Africa, the United States, China, Australia, Peru, Russia and Canada are the largest producers of gold. Other sources include Indonesia, Uzbekistan, Ghana, Mali, Argentina, Chile and Brazil.

More than 70% of the world's platinum is mined in South Africa. Russia is the second largest producer. Canada, the U.S. and India are other sources.

The majority of the world's palladium has come from Russia and South Africa. There have also been finds in Montana, Canada, and Zimbabwe. The leading producers of silver are Mexico, Peru, Australia, Russia, Canada and the U.S.

Beware

Plated gold is sometimes sold as genuine gold, so beware of street vendors and of prices that seem too good to be true. Some fake gold can be detected with a magnet. Unlike many fakes, gold is not magnetic. Fineness stamps on clasps can be misleading. For example, it is legal for a 14K clasp to be attached to a fake gold chain with a jump ring that is bent closed, provided it is not soldered or welded to the chain.

Nonetheless, fineness stamps are helpful. So select jewelry that is stamped. Look for the stamp on the inside of the piece and on the clasp. You may need a hand

magnifier to read it. The stamp doesn't guarantee the purity, but it's a good indication. Preferably there should be a trademark stamped next to the fineness mark. This may enable authorities to track the maker of the piece if the metal is different than stamped.

Don't expect consumer protection laws to be as strict in developing countries as they are in industrialized countries. When buying jewelry abroad, it's especially important to deal with jewelers that meet the criteria discussed in [Chapter 12](#).

Care tips: Clean gold, platinum, palladium and silver with soapy water and a soft cloth. Avoid using brushes because they can scratch these precious metals. Ammonia solutions and jewelry cleaners may also be used, provided the jewelry is not set with stones such as pearls, coral, emeralds, malachite and turquoise, which may be damaged by cleaning solutions.

Avoid cleaning jewelry with toothpaste, powder cleansers or scouring pads because these can wear away the metal. Baking soda is safe, however, and can help remove tarnish on silver and low-karat gold. If jewelry is so dirty that it can't be cleaned with ammonia, soapy water or baking soda, have it cleaned professionally. Some jewelers do this free of charge.

Avoid wearing gold jewelry in swimming pools or hot tubs that have chlorine disinfectants, and never soak it or clean it with bleach. The chlorine can pit and dissolve the metals with which gold is alloyed, causing prongs to snap and mountings to break apart. Chlorine does not affect pure gold, platinum or palladium, but it may darken some silver alloys.

For further information and photos on alloys, metals testing, and markings read [Gold, Platinum, Palladium, Silver & Other Jewelry Metals](#) and the [Jewelry Handbook](#): How to Select, Wear & Care for Jewelry. Go to www.reneenewman.com to see descriptions and reviews of these and other books by Renée Newman.

8/Jewelry Craftsmanship

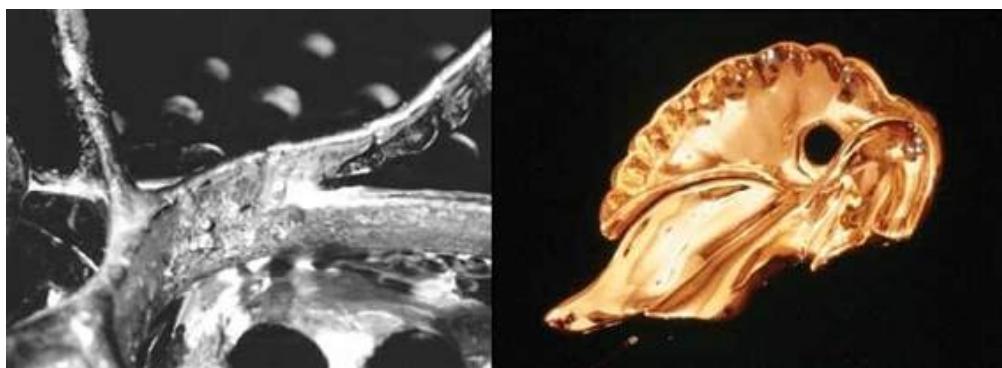
If you want your jewelry to last and to hold gems securely, pay attention to the mounting and setting. Here are some basic tips:

Mountings

Select sturdy mountings and chains for everyday rings, necklaces and bracelets. Rings that are wire thin and bracelets that can bend and dent do not last long. Herringbone chains offer a big look at a low price but may kink. Platinum mountings can normally be thinner and more delicate than those made of gold because platinum is stronger and denser.

Avoid hollow rings and chains. They provide a big look at a low price, but they're hard to repair and they're less durable than solid jewelry. Rings, bracelets, and chains need to be more durable than earrings, brooches and pendants, which are not subjected to as much wear and tear.

Check to see if the piece is well-finished on the back and underneath. If it is, chances are it's well constructed. If it's rough, or has excess solder, holes and an illegible fineness stamp, this suggests the piece was done quickly without much care. It's helpful to use a hand magnifier when checking a jewelry piece.

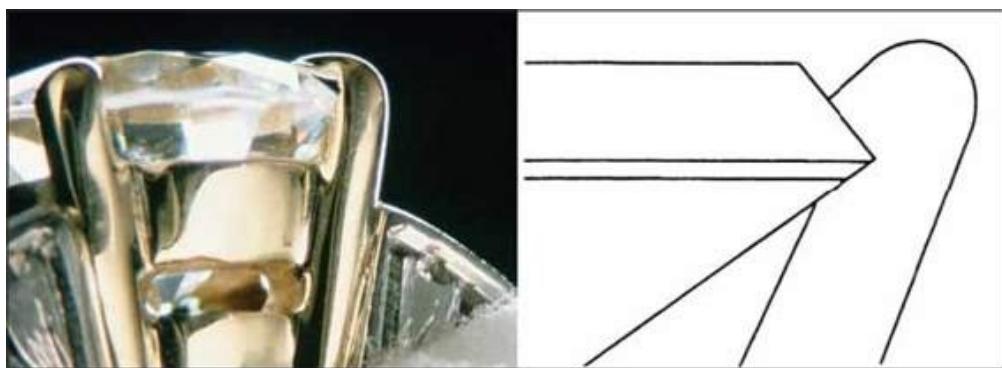


Figs. 8.1 & 8.2 Unacceptable rough finish and a high quality finish on back of cast jewelry. Photos © Renée Newman.



Figs. 8.3 & 8.4 Herringbone chain with kinks & a clasp with a knob so small it doesn't stay closed. *Photos © R. Newman.*

Make sure the clasp works if there is one. It may be defective or hard to open. Ask the salesperson to show you how to open and close it. Then try it twice yourself. For bracelets, see if you can open and close them with one hand.



Figs. 8.5 & 8.6 (Left) Improperly set stone. Note the space between the stone and the right prong. (Right) Edge of stone flat against the seat in the prong. *Images © Renée Newman.*



Figs. 8.7 & 8.8 (Left) Bulky irregular prongs. (Right) Good prong setting in a Varna Platinum ring. *Photos © R. Newman.*

Ask if the jewelry is well crafted and find out why it is or isn't. Jewelers that

sell well-made pieces often like to explain why their mountings, settings and finishes are better than those of competitors. You can learn a lot about workmanship by listening to them. Salespeople must understand jewelry craftsmanship in order to help you select a well-made piece,

Settings

Determine if there's enough metal holding the stone. Use a ten-power hand magnifier. For example, if prongs are missing, the stone is not secure.

If possible, **make sure the edge of the stone is flat against the seat** (the groove in the metal which supports the stone). There shouldn't be space between the prongs and the stone.

Verify that you can see most of the stone. Gems shouldn't be covered by so much metal you can hardly see them. No more than one-third of the stone should be covered.

For every-day prong-style rings, **it's good to select hand fabricated or die-struck (machine made) settings.** They're stronger than cast settings, which are more porous and brittle. Ideally, the settings will be made of platinum, because it's stronger and wears better.

Ask your jeweler to show you some examples of good-quality setting so you'll have a basis for comparison.

Check jewelry for loose stones by shaking or tapping it lightly with your forefinger while holding it next to your ear. If you hear the stones rattle or click, there's a problem.

Make sure pearls are secured to jewelry with a metal post and not just glued to the mounting. Otherwise, they can easily be knocked out of the mounting. Ideally the post should screw into the pearl. Even if the glue fails, the screw will still hold the pearl securely.

For more information on jewelry craftsmanship, finishes, chains and settings, consult the [*Jewelry Handbook*](#) by Renée Newman.

9/Notable Gem Sources

Listed below are the primary sources of the gems discussed in this book along with those of precious metals. Other deposits are included in the write-ups of each gem under “Major sources.”

Africa

BOTSWANA: diamond

DR CONGO: diamond, malachite

EGYPT: formerly the most important source of peridot **ETHIOPIA:** opal

KENYA: aquamarine, grossular, rhodolite, ruby, spessartine, tsavorite

MADAGASCAR: agate, aquamarine, garnet, morganite, blue sapphire, pink sapphire, spodumene, star rose quartz, yellow beryl **MALAWI:** blue chalcedony, yellow tourmaline

MOZAMBIQUE: aquamarine, ruby, tourmaline

NAMIBIA: blue chalcedony, tourmaline, spessartine **NIGERIA:** aquamarine, tourmaline, spessartine

REPUBLIC OF MALI: grandite (Mali garnet), yellow opal

TANZANIA: garnet, green opal, iolite, ruby, fancy-color sapphire, spinel, tanzanite, tourmaline, tsavorite, zircon **SOUTH AFRICA:** diamond, gold, hydrogrossular, palladium, platinum, pyrope, tiger's-eye

ZAMBIA: amethyst, aquamarine, emerald, tourmaline

Asia

AFGHANISTAN: lapis lazuli, red topaz, tourmaline **CAMBODIA:** sapphire, zircon

CHINA: aquamarine, pearls (akoya and freshwater), nephrite jade, peridot, tourmaline, turquoise **HONG KONG:** a shopper's paradise for all gems and jewelry even though none are mined there **INDIA:** agate, almandine garnet, bloodstone, chalcedony, iolite, moonstone, quartz cat's-eye, star ruby; sunstone, a cutting center for lower-quality diamonds **INDONESIA:** South Sea pearls (golden)

JAPAN: coral, pearls

KASHMIR: former important source of the highest quality sapphire

MYANMAR: jadeite jade, moonstone, peridot, ruby, sapphire, spinel

PAKISTAN: aquamarine, emerald, kunzite, peridot, pink topaz, tourmaline

PHILIPPINES: South Sea pearls (golden) **SINGAPORE:** a shopper's paradise for all gems and jewelry even though no gems are mined there **SRI LANKA**

(FORMERLY CEYLON): alexandrite, cat's-eye (chrysoberyl), garnet, moonstone, padparadscha, ruby, sapphire (blue & fancy-color), spinel, zircon; cutting center for colored gems **TAIWAN:** cutting center for colored gems **THAILAND:** ruby, sapphire, black spinel, zircon; a trading and cutting center for colored gems, especially ruby and sapphire **VIETNAM:** spinel

Europe

BELGIUM: Antwerp: a cutting and trading center for diamonds **CZECH REPUBLIC:** red garnet

FINLAND: spectrolite

GERMANY: Idar-Oberstein: a major cutting center for colored gemstones and processing center for agate **ITALY:** gold manufacturing center; **Torre del Greco:** a trading center for coral **POLAND:** amber

SCOTLAND: agate, smoky quartz

RUSSIA: alexandrite, amber, demantoid and uvarovite garnet, diamond, palladium, platinum, red tourmaline, silver, yellow beryl **SERBIA:** green opal **TURKEY:** blue chalcedony, diaspore **UKRAINE:** blue topaz, bicolor topaz



Fig. 9.1 Mozambique tourmaline. Ring & photo from Suna Bros. **Fig. 9.2** Tanzanite from Tanzania. Earrings by Cynthia Renée Inc; photo by John Parrish.



Fig. 9.3 Burmese red spinel from Pala International. *Photo by Mia Dixon.* **Fig. 9.4** Sri Lankan star sapphire. *Ring & photo from Cynthia Renée Inc.*



Figs. 9.5 & 9.6 Columbian emerald and Mexican fire opal. *Rings by Hubert; photos by Diamond Graphics.*



Fig. 9.7 Mt Mica, Maine tourmaline (256 cts). *Cut by Art Grant of Coast to Coast Rare Gemstones International; photo by Tino Hammid.* **Fig. 9.8** Hessonite garnet from Canada. *Cut & photographed by Jeff White of J. L. White Fine Gemstones.*



Fig 9.9 Non-beaded Chinese freshwater cultured pearls (10-14mm). *Necklace and pearls from King's Ransom; photo by Lee-Caraher.*

Near & Middle East

IRAN: turquoise

ISRAEL: a cutting and trading center for diamonds

North America

CANADA: diamond, gold, silver **Alberta:** ammonite

British Columbia: nephrite jade, hessonite garnet **Newfoundland:** labradorite

USA: gold, silver

Western United States: agate, chalcedony, jasper **Alaska:** gold

Arkansas: clear quartz **Arizona:** fire agate, peridot, pyrope garnet, turquoise

California: abalone pearls, benitoite, quartz, tourmaline **Hawaii:** black coral, peridot from volcanos for tourists **Idaho:** star garnet

Maine: tourmaline

Montana: agate, palladium, sapphire (blue and fancy color) **Oregon:** agate, sunstone **Utah:** red beryl

Wyoming: black jade

MEXICO: agate, chrysocolla, fire agate, yellow labradorite, fire opal, pink grossular (rosolite), turquoise; **Taxco**, a silver manufacturing center

South America

ARGENTINA: rose quartz **BOLIVIA:** ametrine

BRAZIL: agate, alexandrite, amethyst, aquamarine, cat's-eye (chrysoberyl), citrine, emerald, iolite, morganite, quartz cat's-eye, opal, rose quartz, rutilated quartz, sard, smoky quartz, spessartine garnet, spodumene, topaz, tourmaline, yellow beryl **CHILE:** lapis lazuli **COLOMBIA:** emerald

PERU: blue opal, gold, pink opal, silver **URUGUAY:** agate, amethyst

South Pacific

AUSTRALIA: black jade, diamond, gold, opal, sapphire, silver, South Sea pearls **Lightning Ridge, New South Wales:** black opal

Queensland: boulder opal, chrysoprase, matrix opal, sapphire, opal **South Australia:** light opal, Andamooka matrix opal **Western Australia:** chrysoprase, diamond, sapphire, South Sea pearls **FRENCH POLYNESIA:** black pearls (Tahitian pearls) **NEW ZEALAND:** abalone mabe pearls, nephrite jade

10/Euphemisms, Marketing Terms & Misnomers

What does the term “**clarity-enhanced diamond**” mean to you?

I asked several lay people this question. Nobody knew exactly what it was. The most common response was “I don’t know” or “I have no idea, what is it?” Here are other responses:

- “They did something to the diamond to make it look better.”

- “It means the color is clearer and brighter, so it’s more expensive.”
- “The diamond is fake.”
- “It sounds like a low-quality diamond that was pumped up.”
- “It’s a better quality diamond than others.”
- “It’s a doctored-up diamond.”
- “It doesn’t mean anything. How can you enhance a diamond?”
- “It’s either clear or it isn’t.”

Sellers may tell you that a clarity-enhanced diamond is one whose imperfections have been eliminated thanks to amazing achievements in modern technology.

In actuality, “Clarity-enhanced diamond” is a marketing term for **fracture-filled diamonds**—diamonds whose fractures have been masked with a very thin glass-like film. Although you may not see the fractures, they’re still present. “Clarity-enhanced” can also refer to **diamonds that have been laser drilled** to remove black flaws by bleaching them and sometimes filling them. Both of these treated diamonds are worth less than untreated diamonds of similar size and quality, and they’re harder to resell. Some jewelry repairs involving heat (e.g., retipping) can damage the filler, and the treatment is not always permanent if a filler has been

used. Nevertheless, clarity-enhanced diamonds can be an affordable alternative for people who want a big look at a lower price.

It's not surprising that suppliers of fracture-filled diamonds prefer to describe them as clarity-enhanced. This allows them to disclose the treatment in a positive, vague manner. However, sellers to the general public should explain the meaning of "clarity-enhanced" to their customers because lay people may not know what it means. The term even misleads some people into thinking the enhanced diamond is more valuable than an untreated diamond. Gem laboratories should define "clarity-enhanced" on their lab documents or else they should use clear, specific terminology such as "fracture-filled." Otherwise, they're not providing proper disclosure.

Gem colors are often described with non-color adjectives such as champagne, honey, pistachio, grape, cornflower and sherry. These marketing terms are ideal for displays and advertisements because they evoke positive images that entice customers to buy. However, they're not appropriate for lab reports, appraisals and serious gemological texts since they don't provide an accurate visual idea of gem color. For example, depending on whom you talk to, sherry-colored topaz can be either yellow, orange, brownish yellow or reddish. That's because people have different opinions as to the color of sherry. Consequently an insurance appraisal which describes a topaz as sherry-colored won't be very helpful if the owner needs to replace a lost or stolen topaz.

Within the diamond industry, the term "champagne" is a euphemism for light brown. Since the presence of brown and gray in gems often lowers their value, dealers prefer to avoid these two color terms when describing gems and even metals. For example, platinum has an attractive gray color, but it's described as a white metal. If it were really white, platinum would look like plastic. When used to describe colored gems, "champagne" is typically an ambiguous marketing term. "Champagne garnet," for example, has been used to refer to light yellow,

light pink, light orange and light brown garnet.

Salespeople who have your interests at heart will explain trade euphemisms and marketing terms clearly. But since some sellers are more interested in making a quick sale than in establishing a long-term relationship of trust, you may need to refer to the following list to understand their terminology.

Trade Euphemisms Translated into Clear English

B-JADE: Jade that's been bleached and impregnated with a synthetic filler **C-JADE:** Jade that's been dyed in addition to being bleached and impregnated in some cases **CHAMPAGNE DIAMONDS:** Light brown diamonds **BROWN DIAMONDS:** Brown diamonds

CLARITY-ENHANCED DIAMOND: Usually means fracture-filled diamond. Can also mean laser drilled with or without the addition of a filler to mask the drill hole.

CLARITY-ENHANCED EMERALD: Fracture-filled emerald. The filling may be oil, wax, natural resin and/or an epoxy-like substance. Almost all emeralds are fracture filled.

CLARITY-ENHANCED RUBY: Ruby with glassy residues in fractures as a result of being heat treated in a flux such as borax. "Clarity-enhanced" can also denote rubies (or sapphires) that are oiled or cavity filled. In addition, the term "clarity-enhanced rubies" has been used to refer to rubies impregnated with lead-glass, which are typically called lead glass-filled rubies, composite rubies, hybrid rubies or manufactured products.

CREATED: Synthetic, lab-grown, man-made **ENHANCEMENT:** Treatment

FAUX PEARLS: Imitation pearls

FEATHER: Crack, fissure, fracture of any size **PROCESSED DIAMOND:** Heat and pressure treated diamond **STABILIZED:** Impregnated with a colorless bonding agent such as plastic or wax **THERMAL ENHANCEMENT:** Heat treatment

Misnomers

Sometimes gems are sold under names that misrepresent their true identity. These names are called misnomers. For example, a garnet may be called an “American ruby” or “Cape ruby” to make it seem more valuable. If a salesperson adds a qualifying word or prefix to a gem name, ask him or her to explain what it means. Some examples of misnomers include:

- Ceylon diamond: zircon
- Brazilian diamond: colorless topaz
- Herkimer diamond: colorless quartz
- Mogok diamond: topaz

- Evening emerald: peridot
- Medina emerald: green glass
- Oriental emerald: green sapphire
- Spanish emerald: green glass
- Soudé emerald: green doublet
- African jade: translucent green garnet
- Amazon jade: amazonite

- Australian jade: chrysoprase
- Colorado jade: amazonite
- Indian jade: aventurine
- quartz
- Pikes Peak jade: amazonite
- Oregon jade: dark green jasper
- Swiss jade: dyed chalcedony
- D-Jade: an unofficial street term for imitation jade
- German lapis: dyed blue jasper
- Swiss lapis: dyed blue jasper
- Black onyx: dyed chalcedony
- Majorica pearl: imitation pearl
- Red Sea pearls: coral beads
- Semi-cultured pearl: imitation pearl
- Balas ruby: spinel

- Bohemian ruby: rose quartz
- Brazilian ruby: topaz

- California ruby: garnet

- Colorado ruby: garnet

- Cultured ruby: synthetic ruby
- Siberian ruby: tourmaline
- Spinel ruby: spinel
- Brazilian sapphire: tourmaline or topaz
- Meru sapphire: tanzanite
- Oriental sapphire: chrysoberyl
- Spinel sapphire: spinel

- Water sapphire: iolite

- Topaz: citrine quartz

- Madeira topaz: citrine quartz
- Smoky topaz: smoky quartz
- Spanish topaz: citrine quartz

11/Having Jewelry Custom Made

If you don't find the type of jewelry you're looking for, you may wish to have it custom made. Many Asian countries are noted for their fast service—often one to two days. They can be that quick because they have more jewelers per capita than countries such as the United States. A jeweler in Asia may have only one or two pieces to work on at a time, whereas one in the USA may be handling 30 or 40 jobs at once. When having jewelry custom made, follow the guidelines below:

Before selecting a jeweler, ask to see some examples of his or her best work. Normally the quality of the work jewelers will do for you will be no better than what they have done for others. If you're not satisfied with the samples, go someplace else.

Try on jewelry pieces that resemble what you want. What looks good in a picture may not look or feel good on you.

If possible, have good drawings, photos or models of the jewelry piece you want made. Never assume that the jeweler understands your verbal description of what you want. Be as specific as possible about how you want the jewelry to look.

Don't assume a piece of jewelry will look exactly as it does in a photo. It should, however, have a close resemblance. The best way to get what you want is to have a model or sample.

If you have a ring that fits well and has about the same band width as a

custom ring you are ordering, show it to the salesperson or jeweler so they can choose the best ring size for you. The sample metal rings jewelers use for customers can sometimes suggest the wrong size.

Always tell a jeweler you need the ring earlier than you actually do, especially if it's a complicated job. In Asia, allow 3 or 4 hours extra; and in countries such as the United States, at least 3 or 4 days. Either the jewelers may not finish on time, or alterations may be needed. Work out an acceptable delivery date or time and have it put in writing. But still be prepared for delays. It's best not to rush custom-made jewelry.

If possible, **avoid having jewelry custom made in December in countries that celebrate Christmas**. Since jewelers are rushed and overworked at that time of year, they might not do their best work just before the holidays.

Get a written estimate of the cost of the jewelry. If more stones are needed than estimated, the jeweler is not expected to give them to you free of charge. He should, however, get your permission before doing anything that would increase the estimated cost of the jewelry.

Know in advance who will be responsible if your stones are lost or damaged during setting or recutting. If you give a jeweler your gemstones, he's not always liable if something unfortunate happens to them. Reliable jewelers, however, will either feel morally obligated to replace damaged or lost stones or else will clearly warn you that the gems are at risk.

Make sure that gold, platinum, palladium and silver pieces are stamped with a fineness mark. A manufacturer's trademark is also desirable.

If a ring is being cast, ask to see the wax model before casting. Point out any areas you think might be problematic, and suggest alterations if needed.

Know the refund policy of the jeweler. It is normal for jewelers to retain at least a portion of your deposit if you decide not to buy the ring you ordered, particularly if it's a style that would be difficult to sell.

When you have a piece custom made, it often means more to you than ready-made jewelry. The piece is unique, and you played a role in creating it. The experience of having jewelry made should be a positive one. Prevent it from turning into a negative one by taking the necessary precautions.

12/Choosing a Jeweler

When selecting a jeweler or salesperson, consider the following factors: **Are they knowledgeable?** Do they know how to evaluate gem and jewelry quality? Are they well-informed about gem treatments? The more informed salespeople are, the more capable they are of helping you make wise choices that fit your needs. Someone in the store should have gemological credentials such as those listed in the chapter on appraising. It's important, for example, that at least one staff member be able to detect imitations and lab-grown stones. Even honest jewelers may end up selling lab-grown stones as natural if they're unable to identify them as man-made.

Are the sellers candid and ethical? Do they tell you both the good and bad points of their inventory? Do they disclose gem treatments without your having to ask? Do they explain quality and treatments in clear language, or do they rely on trade euphemisms and marketing terms? Jewelers that provide straightforward information demonstrate they care about you.

Do the sellers have a love for gems and jewelry? If so, they probably know about new trends and developments in the industry, and they can help you select unique, appropriate jewelry for yourself and others. Their knowledge and enthusiasm can also help you appreciate your purchases more. Jewelers who only care about price and weight are not likely to have well-crafted, artistic designs.

How to Determine if a Seller is Knowledgeable and Candid

Jewelry industry brochures usually tell you to choose a jeweler by getting recommendations, by checking credentials and length of experience and by finding out if they're affiliated with trade organizations. This is good information, but it's not adequate. Just because a jeweler is a member of trade organizations and has diplomas displayed on the wall does not guarantee he or she is ethical and well-informed. Conversely, some of the most knowledgeable people in the industry do not have gemology diplomas. In addition, it's easy to lie about your experience and educational background.

Getting recommendations from someone you trust is not always easy or possible, especially when you're traveling abroad. More often than not, you'll need to judge for yourself if a jeweler is reliable. To make a good judgment, you'll need to know some basics so that you'll be able to understand and assess the salespeople you encounter. Reading this book is a good start.

To evaluate a prospective jeweler, you should be prepared to ask some of the following questions:

1. Could you tell me something about this piece (or gem)? A salesperson who can compare it to other pieces and who can tell you about the background and quality shows more expertise than one who can only tell you the price, the weight and the identity of the metal and stone(s) by reading the tag.

2. Which one of these pieces (stones or strands) is more valuable and why? Two of the advantages of buying jewelry in a store rather than from a catalogue or the Internet is that you can see the merchandise before buying it and you receive the free services of a jewelry consultant, provided the seller is

knowledgeable. When a jeweler can explain quality differences to you, this indicates he or she is a more competent consultant and one who's probably a better judge of merchandise than a jeweler who can't discern differences between pieces.

3. Are these stones treated (and point to the stones of your choice)? If sellers tell you that none of their emeralds, for example, are treated in any way, this is a strong indication they're either ill-informed or dishonest. Review the information in [Chapter 2](#) on treatments so you'll know how and what stones are usually enhanced. If sellers tell you that an individual stone is not treated, ask how they know it's not treated and ask if they're willing to write this on the receipt. Untreated stones can be worth more than those that aren't.

The way in which jewelers disclose treatments is one of the best indications of how ethical they are.

4. Can you tell me something about the cut of this stone? It's not sufficient for a salesperson to simply describe the shape of a stone and to tell you it's a fine make, if it is. You need specific information about why it's a fine, average or poor make. For example, they should be able to point out if a stone has a strong window, a very thick girdle, a unique faceting design, *etc.* You could also ask the salesperson to show you one of the best-cut gemstones in the store and to compare it to an inferior one. Not only will you learn more about cut, you'll also learn if you're dealing with a knowledgeable salesperson. Keep in mind that rubies, sapphires, emeralds and alexandrite are normally not as well proportioned as most diamonds.

5. How would you rate the quality of your jewelry craftsmanship. Why? Jewelers who sell well-made jewelry often like the opportunity to explain why their mountings, settings and finishes are better than those of competitors. You can learn a lot about workmanship by listening to them. Salespeople must know something about jewelry craftsmanship in order to help you select a well-made

piece,

6. Will you show me the stone(s) under magnification? If they aren't willing to provide you with a loupe (hand magnifier) or a microscope, consider shopping elsewhere.

7. Are you willing to put in writing what you've told me verbally about the piece (stones)? Reliable jewelers will say yes.

8. What's your return policy? It's a good sign when jewelers back up their merchandise and claims by a 100% money-back guarantee. Some jewelers only allow exchanges in order to prevent customers from "borrowing" their merchandise for special events. When you buy jewelry away from home, though, exchanges become impractical. There are many jewelers throughout the world who offer a 100% money-back guarantee on jewelry that is not custom made. It's best to deal with one of them. When buying expensive jewelry abroad, have the salesperson give you a written copy of their return policy or have them write it on the receipt. Then pay by credit card, not a bank debit card. If there's a problem with the piece when you get back home, it will be easier to get your money back.

13/Making the Purchase

General Guidelines

The preceding chapters gave tips on selecting gemstones and jewelers. Here are some additional guidelines:

When buying abroad, ask if the store has an outlet in your home country that can service you and make refunds. If it does, get the name, address and phone number.

Know how much the purchase is in your home currency. Foreign currency prices can be confusing.

Have verbal agreements put in writing. For example, have them write on the receipt or give you a written copy of their “money-back guarantee” policy. If a store is doing custom work, have them write the delivery date on the receipt.

Consider having expensive gems checked by a reputable lab in the city of purchase. It’s easier to return goods and get your money back on the spot than thousands of miles away. Be wary if a store is overly pushy about using a specific appraiser. They may be working together.

Get a detailed receipt. The receipt should at least include:

1. the identity and shape of the stone(s)
2. the identity and purity of the metal
3. the carat weight of any major stones and the total weight of any smaller stones of each gem type

4. the millimeter dimensions of loose stones

This information will help identify the stone or jewelry in the future. For added protection, have the store specify if the stone is of natural origin on the receipt. In the United States, it's against the law to call a man-made diamond, for example, simply a diamond. The gem name must be qualified with terms such as "synthetic" or "lab-grown." Not all countries have laws like this.

If the store tells you a gem is untreated, have them write this on the receipt too. Then it won't be your word against theirs if the stone turns out to be treated. Many countries do not have treatment disclosure laws.

Ask the store to make a photocopy of the receipt or give you a duplicate or e-mail copy, especially if it's a large purchase. You can keep one receipt in your wallet and another with your purchase, or else you can mail one copy home in case the other is lost or stolen. When you return from your trip you'll need two copies anyway—one to keep at home and one for your safe deposit box if it's a major purchase.

Ask the salesperson to give you his or her business card with the store's phone number, street address, and fax number (if they have one). You may need to contact them later.

If you bought jewelry at a store a tour director recommended, get his or her address and phone number. Tour directors can be a big help if problems arise later on.

Pay with a credit card whenever possible. Resist a bargain for cash on large purchases. Credit card companies can be an excellent source of protection if and when problems arise. If a store can't or won't accept your credit cards, think twice before making a major purchase from them. When traveling abroad, notify your credit card company(s) and tell them when and where you will be traveling.

Otherwise, vendors may have a problem getting an authorization number for your card since it is not being used in its usual geographic location. It's advisable to travel with at least two credit cards. If authorization or acceptance problems occur with one card, you'll have a backup card. If you become ill or injured, or have to return home early for family reasons, you'll probably need to use both of them.

Credit Cards Versus Debit Cards

Debit card are sometimes easier to use abroad because they don't offer as much protection as a credit card.

Some basic differences between credit and debit cards are:

Credit card users have full access to their money in the event of card theft, fraud or a dispute about a charge. They don't have to pay until the dispute is settled, which may take a few months. **Debit card holders must wait to be reimbursed for unauthorized debits.** In addition, their checks may bounce and their checking account is no longer safe to use as long as someone else has access to their debit card.

Standard credit cards offer consumers a free loan until the due date of payment. An exception to this is the so called "secured" card, used by people with bad credit, which charges user fees. When you use a debit card, your account is immediately debited.

In case of loss or theft, credit cards offer more protection. Merchants must get an authorization number to avoid responsibility for purchases made on stolen credit cards. This isn't true of debit cards, which is why some merchants in the U.S. no longer require pin numbers or ID's for debit cards.

Many credit cards offer you protection from fraudulent merchants. Using a debit card is almost like paying cash.

When Problems Arise

If an appraiser or gem lab tells you your purchase abroad is either overpriced or misrepresented, proceed as follows:

First send the store a photocopy of the appraisal or lab report (by fax or air mail), and explain how you would like the matter resolved. It's a good idea to follow up with a phone call. You should let the store have a chance to give you an explanation. Appraisers are not infallible, nor are they all highly qualified. In fact, some have little experience valuing and identifying some of the colored gems mined abroad.

If the store ignores you or refuses to resolve the matter, tell the owner or manager that you will be filing formal complaints with business and trade organizations in his city and with your credit card company (if you paid by credit card). If the store still refuses to cooperate, then follow through on your threats.

To get the addresses of business and jewelry organizations, try calling the trade commissioner that represents the country where you made the purchase. Explain the problem, and ask if he can help you. You can usually get the phone number of the trade commissioner by calling the local consulate. Two organizations that handle complaints about jewelers in the United States and Canada are:

Jeweler's Vigilance Committee

25 W. 45th Street #1406, New York, NY 10036,

(212) 997-2002, www.jvclegal.org

Jeweler's Vigilance Canada, Inc.

27 Queen St. E. #600, Toronto, ON M5C 2M6, Canada

(416) 368-4840, (800) 636-9536, www.jewellersvigilance.ca

If you paid by credit card, phone the credit company within 30 days if possible, explain the problem, and ask them to stop payment on your purchase. They'll tell you if they need documentation and let you know how to return the merchandise. Get the name of the person on the phone and the file or reference number of the case (if one can be assigned).

If you bought the jewelry from a store a tour director recommended, you may want to contact him or her first. Good tour directors can save you a lot of time and hassle if problems arise. They will contact the jeweler for you, explain the problem, and relay your requests. Either the jeweler or tour director or both should get back to you to take care of the matter.

If you bought the jewelry from a store recommended in a brochure of a reliable tour operator in your country, contact the tour company. They could give the jeweler one of two choices—either resolve the matter or lose all future business from them.

When you return merchandise, it's best to send it insured registered air-mail and to pay for a return receipt, whenever possible. You may need proof that you returned the merchandise. Sometimes the insurance offered is not adequate to cover the amount of the purchase. It's hardest to get insurance for packages sent to developing countries. This is another reason you should be careful when making large purchases abroad.

If you plan on making a major jewelry purchase while traveling, find out in advance how much insurance your postal service offers to the countries where you might buy jewelry. **If there's no way for you to safely return merchandise via insured mail, you could end up being stuck with misrepresented goods.** As mentioned earlier, some stores abroad may have offices in your home country where you can return jewelry. This is the ideal alternative.

Keep originals of all documentation regarding your case. Only send copies.

It's best to avoid problems before they occur. Learn about gems before you buy; review the tips in this and the preceding chapters; and be wary of deals that seem to good to be true. Every seller needs to make a profit, even those abroad. Unfortunately, some of them won't hesitate to misrepresent their merchandise in order to make that profit.

14/Choosing an Appraiser

If you were buying a classic car, you wouldn't go to the seller's mechanic to have the car checked. You'd take it to your own. Likewise, when you're buying expensive jewelry, you shouldn't rely solely on documents provided by the seller. Instead, have it evaluated by an appraiser who is an unbiased third party and who has your interests in mind. Appraisals paid for by sellers are not independent appraisals.

Four reasons for getting an independent jewelry appraisal are:

1. To verify the identity and quality of the gems and metals used.
2. To get additional information about treatments, origin, and quality that the seller may not have known.
3. To have a written third-party document that will be recognized by insurance companies. Many insurance companies do not recognize appraisals provided by the seller.
4. To determine if you paid a fair price. It's best to find this out from a professional appraiser who doesn't sell jewelry. Competing jewelers may downgrade and under-appraise the merchandise so in order to afterwards sell you something else.

In addition, sellers may have a tendency to give inflated appraisals. This can result in unnecessarily high insurance premiums. For most insurance policies in the United States, the insurance company has the option of replacing your merchandise or paying you cash for the amount it would cost them to replace it, whichever is lower; don't expect to get cash for the value listed on an inflated

appraisal.

However, an undervalued appraisal isn't desirable either. In some cases, insurance coverage has been voided by the company because of either undervalued or highly inflated appraisals. It's best to obtain a legitimate appraisal from a qualified independent appraiser and avoid paying more than necessary in premiums to the insurance company.

The purpose of most appraisals is to obtain insurance coverage and to substantiate claims in the event of loss or theft. An insurance appraisal states the value of replacing a piece; it doesn't establish what you can gain in selling the piece. It must contain a thorough description of the value-making features of the jewelry in order to ensure it will be replaced with a piece of equivalent quality in case of a claim. American insurance companies seldom pay cash for a piece; they usually buy a replacement piece at wholesale.

The type of appraisal that gives you the immediate cash value of your jewelry is called a liquidation appraisal. If you're only interested in a verbal estimate of how much you can sell a piece for, you can usually find that out for free. Simply go to several jewelers or dealers and ask them what they'll pay for the piece. But be aware that the price they offer you can be lower than what you might obtain in a more competitive interactive market such as an auction. If it's an estate jewelry piece, contact an antique specialist and/or auction house to find out if it has value as a collectible or antique piece.

How to Find a Qualified Independent Appraiser

Some ways to find appraisers are:

- Get recommendations from friends and jewelers
- Look through the list of independent appraisers at:
www.reneenewman.com/appraisers.htm
- Write, fax or e-mail an appraisal organization and ask for the names of qualified members in your area. Listed below and on the next page are some organizations that will give you appraisers' names either verbally or on their websites.

American Gem Society (AGS)

8881 W. Sahara Ave, Las Vegas, NV 89117

Phone (866) 805-6500 www.americangemsociety.org/find-an-appraiser

American Society of Appraisers (ASA) www.appraisers.org

11107 Sunset Hills Rd, Suite 310, Reston, VA 20190 Phone (800) 272-8258

(703) 478-2228, Fax (703) 742-8471

The Association of Independent Jewellery Valuers (AIJV) Algo Business Centre, Glenearn Road, Perth, Scotland PH2 0NJ, United Kingdom, Phone +44 (0) 1738 450477

e-mail: info@aijv.org, www.aijv.org

Canadian Jeweller's Institute

27 Queen St. East, Suite 600, Toronto, Ontario M5C 2M6 Canada, Phone (416) 368-7616 ext 223, Fax (416) 368-1986

www.canadianjewellers.com click on "find an appraiser"

International Society of Appraisers (ISA) 225 West Wacker Drive, Suite 650, Chicago, IL 60606 Phone (312) 981-6778, Fax (312) 265-2908, www.isa-appraisers.org

National Association of Jewelry Appraisers (NAJA) P.O. Box 18, Rego Park, New York, 11374-0018

Phone (718) 896-1536, www.NAJAappraisers.com
www.AuctionMarketResource.com

Value the Past (An appraisal service that specializes in antique and estate jewelry and personal property) Phone (877) 797-9011, Fax (866) 551-5017, www.valuethepast.com

In Australia, you can find appraisers through the following branches of the National Council of Jewelry Valuers: **National Council of Jewellery Valuers, Inc. (NCJV)** Level 2 Suite 213, 155 King Street, Sydney, NSW 2000, Australia, Phone 02 9232 6599, Fax 02 9232 6399, www.ncjv.com.au

NCJV Inc. (Queensland)

Grange, Queensland, Australia

Phone/Fax 07 3857 4377 Email: qld@ncjv.com.au

NCJV Inc. (South Australia Division) Henley Beach, South Australia, Australia

Phone 08 8234 2505, Fax 08 8125 5822

Email: sa@ncjv.com.au

NCJV Inc. (Tasmania Division)

Hobart, Tasmania, Australia

Phone 03 6234 2426, Fax 03 6231 5366

Email: tas@ncjv.com.au

NCJV Inc., (Victoria Division)

Melbourne, VIC Australia

Phone 03 9500 9250, Fax 03 9500 2904 Email: vic@ncjv.com.au

NCJV Inc., Western Australia, Australia Perth, WA Australia

Phone 08 9409 2009, Fax 08 9364 5504 Email: wa@ncjv.com.au

After getting the names of some appraisers, interview them to find out if they're qualified to appraise your jewelry. When interviewing an appraiser you should ask:

- What are your qualifications?

- How much do you charge?
- What does your appraisal fee include?

Qualifications to Look For

Qualified appraisers know how to identify gems and gem treatments. Competent professionals should have one of the following gemological diplomas to prove they've gained the required education needed to identify gemstones.

- **AG (CIG)**, Accredited Gemmologist, (Awarded by the Canadian Institute of Gemmology)
- **FCGmA**, Fellow of the Canadian Gemmological Assn
- **FGA**, Fellow of the Gemmological Association of Great Britain (also called Gem A)
- **FGAA**, Fellow of the Gemmological Assn. of Australia
- **FGG**, Fellow of the German Gemmological Association
- **GG**, Graduate Gemologist (Awarded by the Gemological Institute of America)
- A gemologist diploma from another school or association, equivalent in stature to those listed above.

Although the gemologist diplomas listed above are important, they aren't sufficient to qualify individuals to be appraisers. Appraisers must also be skilled in valuation theory; they must be familiar with gem prices, jewelry manufacturing techniques and costs, and the legal aspects of appraising. Appraisers must have trade experience, integrity and the initiative to keep up with the market and new developments in valuation theory and gemology.

This means appraisers should have taken appraisal courses and performed appraisal work after getting their gemologist diplomas. Some of the titles awarded to appraisers are:

AA-CJI, Accredited Appraiser of the Canadian Jewellers Institute. Must have a

gemologist diploma, a gem lab or access to a lab, 3 years Canadian trade experience, must complete an appraisal course and pass a written and practical exam.

ASA, Accredited Senior Appraiser of ASA (the American Society of Appraisers). To be an ASA in the gems & jewelry discipline, the member must be a GG. They must pass the ethics exam, an exam on valuation theory, and a proficiency exam on gems and jewelry and their appraisal. An Accredited Member (AM) must substantiate 3 years of full-time appraisal experience; 5 years experience is required to use the title “ASA.”

CAPP, Certified Appraiser of Personal Property. This is the highest award offered by the International Society of Appraisers. To receive it, one must attend their appraisal courses, pass the exams, and have a gemological diploma and trade experience.

CGA, Certified Gemologist Appraiser. This is awarded by the American Gem Society to certified gemologists that pass their written and practical appraisal exam. Trade experience is a prerequisite.

CMA, Certified Master Appraiser. This is the highest award offered by the National Association of Jewelry Appraisers. To receive it, one must have at least seven years of appraisal experience, take the NAJA appraisal studies course, pass a comprehensive theory and practical appraisal examination, and have a NAJA or AGA Certified Gem Laboratory.

CSM, Certified Senior Member of the (NAJA). CSMs must have a graduate gemologist diploma, at least five years of trade and appraisal experience, at least 14 days of appraisal training and must pass an appraisal exam.

MGA, Master Gemologist Appraiser. This is the highest award offered by the American Society of Appraisers. To receive it, a member must first be an ASA,

have or work in a certified gem lab. They must complete additional course work, and must pass the MGA exam without error, which includes successfully identifying, grading and appraising four pieces of jewelry in a supervised environment and submitting an accepted written appraisal on the items. MGA's must recertify every five years.

ISA, International Society of Appraisers Accredited Member. Must pass an ethics and appraisal exam, submit sample appraisals for peer review, and have two years of full-time appraisal experience and a college degree or equivalent

Besides sharing their educational background and titles, appraisers should also discuss their experience and the type of jewelry and gems they usually appraise.

Appraisal Fees

As a consumer, you have the right to know in advance the approximate cost of an appraisal. Occasionally, an appraiser will tell a caller that it's unethical or unprofessional to quote prices over the phone. This isn't true. Professional appraisers should at least be able to tell you their hourly fee and/or their minimum charge if they have one. Some will tell you a flat or approximate appraisal charge for the piece when you describe it to them over the phone. However, in fairness to the appraiser, they are entitled to change their estimate upon seeing the piece if you have played down certain areas of difficulty or have not described it fully.

Some people will offer to appraise your jewelry free of charge, even if you haven't bought it from them. This is generally a sign that either they want to buy the jewelry from you or else they want to lure you into their store to sell you some of their merchandise. Professionals charge for their services, whether they be lawyers, doctors, accountants or appraisers.

Appraisal fees are charged in a variety of ways. Some are listed below:

- A flat fee per item, sometimes a lower fee for each additional piece brought in at the same time
- An hourly rate (often combined with a minimum fee)
- A rate fully or partly based on the gemstone type
- A rate based on the type of report you're seeking, based on the degree of work required.
- A percentage rate of the appraised value of your jewelry. The higher the value, the more money the appraiser earns. If you want an appraisal that is as objective as possible, avoid appraisers with this type of fee structure. This is an unethical fee if the appraiser is a member of any of the associations listed previously. The

Internal Revenue Service doesn't recognize appraisals done by people who charge percentage fees.

What Does the Insurance Appraisal Include?

The key service the appraiser will provide is an accurate, detailed, word picture of the item you're having appraised. The structure of the resulting report will tell you something about the quality of the appraiser's work, and it will help you to better compare appraisal fees. It's understandable that a five-page report with a photo will cost more than one with only a two-sentence description and an appraised value, and you should avoid the latter type. Items that professional independent appraisers normally include with their reports are:

- The identity of the stone(s) and metal(s)

- The measurements and estimated weights of the stones. If you can tell appraisers the exact weight of the stones, this will help them provide a more accurate appraisal. Therefore, when buying jewelry, ask stores to write on the receipt any stone weights listed on the sales tags).
- Relevant treatment information
- A description of the color, clarity, transparency, shape, cutting style, and cut quality of the stones. The grading and color reference system used should also be indicated. Appraisers use different color communication systems to denote color. Four of the best-known ones are GemDialogue, AGL Color/Scan, Gem-e Wizard, Munsell, and World of Color Book by Gemworld Intl.
- Plots of the inclusions in the stones (of either all or only the major stones)
- A test of the fineness of the metals
- Approximate weight and description of the mounting
- The name(s) of the manufacturers or designers of the piece when this is known
- A cleaning and inspection of the piece
- A photograph
- A list of the tests performed and the instruments used.
- Definitions or explanations of the terminology used on the report
- A

biographical sketch of the appraiser's credentials • A Certification of Appraisal Practices sheet (a written code of business ethics for appraisers) On rare occasions, a country of origin report may also be included, but this requires a high level of expertise.

Besides knowing what appraisers' fees include, you should know what their appraisals look like. Have them show you a sample, and check it for thoroughness and professionalism.

Jewelry appraising is an art. There's a lot more to it than simply placing a dollar value on a stone or jewelry piece. If your jewelry has a great deal of monetary value, it's important that you have a detailed, accurate appraisal of it. Take as much care in selecting your appraiser as you did with your jewelry.

15/Gem Lab Documents

For gems that cost several thousand dollars, it's a good idea to get two types of documents—an independent appraisal describing and evaluating the stone, and a lab report from a major gem laboratory.

Lab reports don't indicate what a stone is worth. They identify the stone and the treatments it may have undergone. They may also indicate its geographic origin and/or evaluate its quality.

Why is a lab report necessary along with an appraisal?

Major laboratories have greater expertise, more sophisticated equipment and more opportunities to examine important gems than the average jeweler or appraiser. As a result, they are better equipped to detect enhancements and synthetic gems, and their documents usually carry more weight than appraisals when gems are bought and sold. If you plan to sell an expensive gem on the international market or through a major auction house, it should be accompanied by a report from an internationally recognized gem lab.

If you're only spending a few hundred dollars on a gemstone, it's not financially worthwhile to pay for a lab report. A good appraisal will do. Some stores provide lab reports with their stones. These are helpful aids, especially when buying gems abroad. For a stone such as a \$30,000 ruby, however, it's wise to obtain another report from a different gem lab than the seller used. Get a written promise of a 100% refund if you're not satisfied with the results of the second report. Treatments have a major impact on ruby prices, but some treatments are difficult for even gem labs to detect. Occasionally, expensive untreated rubies

with surface reaching fractures are oiled after a lab ID report has been issued for them. In addition, labs might tend to show their loyalty to the person who pays for the report. A second report may uncover such practices.

Listed below are some of the most respected gem laboratories in the world along with the types of reports they offer. They all provide treatment reports so these aren't indicated. “**ID**” stands for “identification report,” “**origin**” stands for “geographic origin report.”

AGIL (Asian Gemmological Institute and Laboratory Ltd.) 7/F. No. 11 Lock Road, Tsimshatsui, Kowloon, Hong Kong
Tel (852) 2723 0429, Fax (852) 2367 5201, www.agil.com.hk
Jade, pearl, colored stone ID, diamond grading

AGL (American Gemological Laboratories, Inc.) 580 Fifth Ave. Suite 706, New York, NY 10036
(212) 704-0727 Fax (212) 764-7614, www.aglgemlab.com
Colored stone ID, origin, & quality grading

AIGS (Asian Institute of Gemological Sciences) Jewelry Trade Center, 6th floor, 919 Silom Road
Bangkok 10500, Thailand www.aigslaboratory.com
Tel (662) 267-4325/7 Fax (662) 267-4327,
Colored stone ID, origin, grading; pearl ID; diamond grading **American Gem Society Laboratory (only for the trade)** 8917 W. Sahara Ave., Las Vegas, NV 89117
Tel (702) 233-6120 Fax (702) 233-6125, www.agslab.com
Diamond grading

C.C.I.P. Gemological Laboratory (C.C.I.P. Service Public du Contrôle des Diamants, Perles Fines et Pierres Précieuses) 2 Place de la Bourse, 75002 Paris,

France

Tel (33-1) 40 26 26 46 Fax (33-1) 40 26 06 75

Colored stone ID & origin; pearl ID; diamond grading

CGL Central Gem Laboratory

Miyagi Bldg. 5-15-14 Ueno Taito-ku, Tokyo Tel (813) 3836-1627 FAX : (813)

3832-6861, www.cgl.co.jp Diamond grading & gem identification

Deutsch Diamant und Edelstein Laboratorien Idar-Oberstein (German Diamond & Gemstone Laboratories) Prof.-Schlossmacher-Str. 1, D-55743 Idar-Oberstein, Germany Tel 49-6781-981355 Fax 49-6781-981357

www.gemcertificate.com Email: info@gemcertificate.com

Colored stone ID & origin; pearl ID; diamond grading

GCAL (Gem Certification & Appraisal Lab) 580 Fifth Ave, Lower Lobby, New York, NY 10036 Tel(212) 869-8985, Fax (212) 869-2315,

www.gemfacts.com

Diamond grading, colored stone ID & grading, jewelry

GGTL Laboratories www.ggtl-lab.org

GGTL - GEMLAB Laboratory Gnetsch, 42, LI – 9496, Balzers, Liechtenstein
Tel (423) 262 24 64; (423) 373 22 43 and

GGTL-GemTechLab laboratory, 41 (0) 22 731 58 80 4bis route des Jeunes, H-1227 Les Acacias, Genève Pearl ID, colored stone ID, diamond grading

GIA (Gemological Institute of America) Gem Trade Laboratory Inc., 5355 Armada Drive, Carlsbad, CA 92008

Tel (800) 421-7250 & (760) 603-4500, www.gia.edu/gem-lab

50 West 47th, Unit 800, New York, NY 10036, (800) 366 8519 & (212) 221-5858

Colored stone ID; pearl ID; diamond grading

GIT (Gem and Jewelry Institute of Thailand) 140, 140/1-3, 140/5 ITF - Tower Building. 1st - 4th and 6th Floor, Silom Road, Suriyawong, Bangrak, Bangkok 10500, Thailand Tel (662) 634 4999 Fax: 0 2634 4970 www.git.or.th
Colored stone ID, pearl ID, diamond grading

Gübelin Gem Lab Ltd (GGL), www.gubelingemlab.ch
Maihofstrasse 102, CH-6000 Lucerne 9 / Switzerland
Tel (41) 41 429 1717, Fax (41) 41 429 1734
Colored stone ID & origin; pearl ID; diamond grading

HRD Antwerp

Hoveniersstraat 22, BE-2018 Antwerp, Belgium Tel.: (32) 3 222 06 11, Fax: (32) 3 222 06 99 www.hrdantwerp.com E-mail: info@hrdantwerp.be
diamond grading

SSEF (Swiss Gemmological Institute), www.ssef.ch
Falknerstrasse 9, CH-4001, Basel, Switzerland
Tel (41) 61 262-0640 Fax (41) 61 262-0641
Colored stone ID & origin; pearl ID; diamond grading

How Lab Reports are Sometimes Misused

When used properly, gem lab reports can be a big help to buyers. They serve as a documented second opinion by impartial experts (when issued by reputable labs). Unfortunately, they are sometimes misused in the following ways:

- A lab report may be used with an inferior stone of the same weight. In other words, the document doesn't match the stone. A con artist can have a good stone certified more than once and then use the extra reports for other stones of the same size. Avoid ripoffs like this by dealing with reliable jewelers and by examining stones carefully before you buy them.
- A synthetic stone may be cut to match a gemstone on a report. Then it's substituted for the natural stone.
- A stone may be treated after a report is issued stating it's not treated.
- An identification report from a respected lab may be used to make a very low quality stone seem valuable. If a stone, for example, is identified as a natural ruby on a report, this does not mean it's worth a lot. You should see a quality analysis of the stone before you make a judgment.
- Occasionally the grades on a document may be altered. Most labs make it very difficult to change or counterfeit their documents. Consequently, this is seldom a problem. If you have a question about a report, you can verify the information on it by calling the lab that issued it.
- Quality-analysis reports from non-existent labs may be used to mislead buyers. The grades on these reports are often inflated. Before relying on information from a lab report, check out the lab. Interview them on the phone about their

qualifications and the type of research they conduct. Ask for references and find out if reputable jewelers, auction houses and gemological organizations know about them and use them.

Tips on Using Lab Reports

In order to gain maximum benefit from these lab reports and at the same time avoid their pitfalls, keep in mind the following suggestions:

Don't buy gems solely on the basis of a lab report. Always examine the stones yourself with and without magnification before you buy them. Occasionally, the stone may be different than the one on the report, or a stone might have been damaged since the report was issued. Nevertheless, it's far better to buy an expensive gemstone with a lab report from a respected lab than to buy one without a report, especially when buying gems abroad. Written guarantees, reports and warranties are critically important.

Don't buy gems in sealed plastic containers which you are not allowed to open. Clear plastic covers can mask gem flaws and cutting defects. People involved in gem scams often sell sealed stones with a written warning such as "Breaking the seal will invalidate all guarantees." Legitimate dealers will allow you to look at the stone outside of its packet or container.

Don't buy expensive jewelry and gems through the mail or over the phone or Internet if you don't know the seller. These are probably the most common situations in which lab documents are misused. Make sure there is at least a 30-day unconditional money-back guarantee in writing.

Avoid gem investment schemes even when the stones come with lab reports. People have lost their life savings by believing promises of high returns on gem investments. If a stone is merely identified as a natural ruby or sapphire, this does not necessarily mean it is valuable. Its quality must be taken into consideration.

Keep in mind too, that some appraisers give stones inflated values on their reports, even when they note quality characteristics. This may be due to lack of experience, inadequate training or collusion with sellers.

Remember that lab documents are not infallible. They only represent the opinions of the labs issuing them.

Keep in mind that a written report cannot give a complete picture of a gem. You have to see the stone to really know what it looks like. Lab reports were never created to be a substitute for viewing a stone. Use them as an aid to judging quality and as a confirmation that a stone is real and natural. But when it's time to make the final choice, you be the judge.

On the next six pages are documents from six gemological labs whose reports are used on the international market by dealers and auction houses. These labs are also noted for their research and contributions to the field of gemology.



GIA

GEMOLOGICAL INSTITUTE OF AMERICA®

DIAMOND GRADING REPORT

December 17, 2008

Laser Inscription Registry GIA 6107487215
Shape and Cutting Style Round Brilliant
Measurements 8.13 • 8.17 x 5.10 mm

GIA REPORT 6107487215

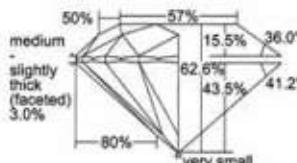
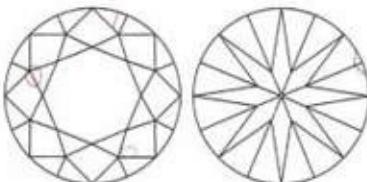
Carat Weight 2.07 carat
Color Grade F
Clarity Grade VS1
Cut Grade Excellent

EXTERIOR GRADE: EXCELLENT

Finish
Polish Very Good
Symmetry Excellent
Fluorescence None

Comments:
"SAMPLE" "SAMPLE" "SAMPLE"

Additional Inscription:
YOUR LOGO OR PERSONAL MESSAGE HERE



Profile to actual proportions

5185 Armada Drive | Carlsbad, CA 92008-4502

T: 760-503-4500 | F: 760-503-1814

GIA Laboratories

Bangkok Carlsbad Gabon
Johannesburg Mumbai New York

www.gia.edu

GIA COLOR SCALE	GIA CLARITY SCALE	GIA CUT SCALE
I	FLAWLESS	EXCELLENT
H	INTERMEDIATE FLAWLESS	VERY GOOD
G	INTERMEDIATE FLAWLESS	GOOD
F	INTERMEDIATE FLAWLESS	FAIR
E	INTERMEDIATE FLAWLESS	Poor
D	INTERMEDIATE FLAWLESS	
S	INTERMEDIATE FLAWY	
A	INTERMEDIATE FLAWY	
K	INTERMEDIATE FLAWY	
L	INTERMEDIATE FLAWY	
M	INTERMEDIATE FLAWY	
N	INTERMEDIATE FLAWY	
P	INTERMEDIATE FLAWY	
R	INTERMEDIATE FLAWY	
S	INTERMEDIATE FLAWY	
T	INTERMEDIATE FLAWY	
U	INTERMEDIATE FLAWY	
V	INTERMEDIATE FLAWY	
W	INTERMEDIATE FLAWY	
X	INTERMEDIATE FLAWY	
Y	INTERMEDIATE FLAWY	
Z	INTERMEDIATE FLAWY	

210100777776

This Report is not a purchased valuation or appraisal and contains only the characteristics of the diamond described herein after it has been graded, tested, measured and analyzed by the laboratory providing the Report. (GIA) which has been selected using the techniques and equipment used by GIA at the time of the classification and/or measurement. Characteristics shown in this Report are not a guarantee of the durability or a diamond's quality, integrity or value. It remains for the diamond seller to determine by his/her opinion or the future sales marketplace can be increased. GIA makes no representations concerning any diamonds, with a symbol which is registered by GIA or which is mentioned in this Report. The recipient of this Report may wish to consult a compensated power or professional about the interpretation contained herein.



IMPORTANT LIMITATIONS ON BACK
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SWISCHES GEMMLOGISCHE INSTITUT
SWISS GEMMOLOGICAL INSTITUTE
INSTITUT SUISSE DE GEMMologie



Test Report No. XXXXX

on the authenticity of the following gemstone,
mounted in a ring with diamonds:

Shape & Cut: oval, brilliant / step cut
Total weight: approximately 9.2 grams
(including mounting and diamonds)
Measurements: approximately 16.35 x 11.95 x 5.15 mm
Calculated weight: approximately 8.5 ct
Colour: red of medium strong saturation

Identification: RUBY (variety of natural corundum)

Comments: The analysed properties confirm the authenticity
of this transparent ruby.

No indications of heating.

Origin: Burma (Myanmar)

The calculated weight is in accordance with the weight of
8.48 ct declared by the customer.

Important note: The conclusions on this Test Report reflect our findings at the time it is issued. Mounting may limit complete analysis of a gemstone or pearl, thus all conclusions are given as far as the mounting permits. The indicated calculated weight is only approximate and may differ from the exact weight of the gemstone/pearl when unmounted. A gemstone or pearl can be modified and/or enhanced at any time. Therefore, the SSEF can reassess at any time whether the gemstone or pearl is in accordance with this Test Report. Only the Test report with the valid original signature, embossed stamp and ProofTagTM label affixed on to the surface of the laminated Test report is a valid document. See terms and conditions on reverse side. © This Test report is copyrighted SSEF.

SWISS GEMMOLOGICAL INSTITUTE - SSEF

Basel, 29 September 2012 ss

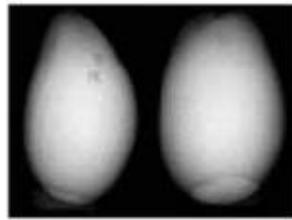
Report authentication link on to www.proffag.com



P. Lefèvre, MSc, DUG

Dr. M.S. Krzemnicki, FGA

Fakultätsstrasse 20 CH-4001 Basel Switzerland Tel +41 61 260 06 40 Fax +41 61 260 06 41 gemmologen.ch www.ssef.ch



Radiography - Radiographie



Nail to scale / Poids à l'échelle

REPORT OF GEMMOLOGICAL EXAMINATION
RAPPORT D'EXAMEN GEMMOLOGIQUE

No. 14-P-XXXX

Description	Two nacreous pearl / Deux perles nacrées.
Weight / Poids	a) 11.65 cts; b) 12.25 cts. Total weight / Poids total 23.90 carats
Color / Couleur	White to pale cream / Blanc à crème pâle.
Shape / Forme	Semi-baroque drop / Goutte semi-baroque.
Measurements / Dimensions	a) = 17.08 x 10.52 x 10.10 mm; b) = 17.08 x 11.28 x 8.74 mm.
Identification	Nacreous natural pearls.
Identification	Perles naturelles nacrées.
Treatments	None.
Traitements	Sans.
Comments	Natural saltwater pearls. 3D radiographic testing has been performed.
Commentaire	Perles naturelles d'eau de mer. Analyse radiographique en 3D a été faite.
Species	-.
Espèce	-.
Conclusions	The examined pearls are of natural origin.
Conclusions	Les perles examinées sont d'origine naturelle.

This gemmological expertise has been carried out with all due care and can be repeated at any time within the framework of an identical analysis methodology. The validity of this document is subject to the conditions overleaf.
 Cet examen gemmologique a été effectué avec tous les soins requis et peut être répété en tout temps dans le cadre d'un protocole identique.
 La validité du présent document est subordonnée aux conditions figurant au verso.

Balzers, June 17, 2014.



Dr. Thomas HAINSCHWANDT, D.U.G.

Franck NOTARI, D.U.G.

The Prestige Gemstone Report™

AGL



Images do not accurately portray size or color.

Accu-Vu™ Imaging:



Comments:
This diagram is an example and does not represent the actual facet arrangement of the item described.

General Report Comments:

Document No.: CS Sample # Validation Date: 01 January 2013

Identification
Mineral Type: Natural Beryl
Variety: Emerald

Carat Weight: 5.23 carats
Measurement: 11.72 x 10.97 x 5.08 mm

Color Description: Green
Shape: Rectangular
Cutting Style: Emerald Cut

Comments:

Origin
Provenance: Colombia

Comments: Based on available gemological information, it is the opinion of the Laboratory that the origin of this material would be classified as Colombia.



Enhancement

Standard: Clarity
Degree: Faint
Type: Traditional
Instability Index: Very Good to Good

Additional: None
Degree: N/A
Type: N/A
Instability Index: N/A

Comments: Emeralds are commonly clarity-enhanced to reduce the visibility of inclusions. The stability of this type of enhancement is Very Good to Good. N/A represents Not Applicable.

Enhancement Stability Index™

Degree of Clarity Enhancement & Relative Rarity™

Color Grade: 3.5 / 00
Color Rating Range: 3 - 4 / 00
Color Name: G - W - B - Y - N
Color Zoning: N/A
Light Source: Duro-Test: Vita Lite
Birefringence: N/A

P	W	G	B	Y	N	W	G	B	Y	P
+	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Clarity Grade: M1
General Texture: Fairly
Reflective Texture: N/A

A	B	C	D	E	F	G	H	I	J	K
+	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Cutting Grade: Excellent to V. Good (2-3)
Depth %: 50.80
Brilliance Range: 60 - 100%
Brilliance Average: 70%
Finish Grade: Very Good (3)

A	B	C	D	E	F	G	H	I	J	K
+	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Total Quality Index: Excellent
Comments:

SAMPLE



American Gemological Laboratories
540 Fifth Avenue • New York, NY 10036 • 212.764.8727 • Fax: 212.764.7614 • www.agl.com
Check us out on the web at www.gemological.com



Gemstone Report



No.	SPECIMEN001
Date	06 June 2020
Item	One faceted gemstone
Weight	10.53 ct
Shape	oval
Cut	brilliant cut / step cut
Measurements	14.32 x 11.86 x 7.67 mm
Transparency	transparent
Colour	blue
Species	Natural corundum
Variety	Sapphire
Origin	Gemmological testing revealed characteristics consistent with those of sapphires originating from Burma (Myanmar)
Treatment	No indications of heating (NTE). Sapphires which have not been heated are scarce.
Comments	This colour variety of sapphire may also be called 'royal blue' in the trade. Important notes and limitations on the reverse.

A handwritten signature in black ink.

Sonia Cherchi, M.Sc., FGA

A handwritten signature in black ink.

Alessandra Spingardi, M.Sc.



亞洲寶石學院及鑑定所有限公司
ASIAN GEMMOLOGICAL INSTITUTE
AND LABORATORY LIMITED

香港九龍尖沙咀櫻桃道11號7字樓
7/F., No. 11 Lock Road, Tsimshatsui, Kowloon, Hong Kong.
Tel: (852) 2723 0429 Fax: (852) 2367 5201 Email: agil@agil.com.hk Website: www.agil.com.hk

翡翠鑑定證書
FEI CUI TESTING CERTIFICATE

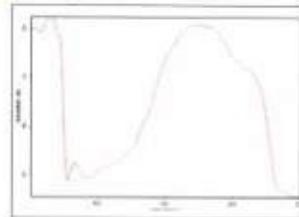
No.: SAMPLE
Date of issue : 18th May 2014



測試結果 · Test Results

數量	Quantity	:	1
形狀及琢型	Shape & Cut	:	圓形拋光件 Round polished
重量(克拉)	Weight (Carat)	:	不能量度 Not measurable
尺寸(毫米)	Dimension (mm)	:	24.82 - 24.86 x N/A
顏色	Colour	:	濃綠色 Intense green
透明度	Transparency	:	半透明 Translucent
偏光儀	Polariscope	:	多晶質 Polycrystalline
折射率	Refractive Index	:	1.66
比重	Specific Gravity	:	不能量度 Not measurable
熒光紫外線長波	Fluorescence UV-LW	:	沒有反應 Inert
熒光紫外線短波	Fluorescence UV-SW	:	沒有反應 Inert
濾色鏡	Chelsea Colour Filter	:	濃綠色 Intense green
可見光譜	Visible Spectrum	:	天然顏色光譜 Natural colour spectrum
紫外-可見光光譜計	UV-Visible Spectrometer	:	天然顏色翡翠光譜 Natural colour Fei Cui spectrum

使用的儀器	Instruments used
Electronic Balance	Ultra-violet Lamp
Polariscope	Chelsea Colour Filter
Spectroscope	Gemmological Microscope
Refractometer	Infrared Spectrometer
Electronic Gauge	UV-Visible Spectrometer
紅外線譜圖	沒有樹脂
FTIR Spectrum	No resin



評語 : 天然顏色翡翠，不含樹脂成份。
珠寶業內又稱這類型的天然翡翠為“A 玉”。
Comments : Natural colour Fei Cui without any resin.

彩色照片只顯示測試石的形狀
Colour photo shows the shape of test stone only

鑑定結論 : 天然翡翠 (A 玉)
[天然硬玉質翡翠]

Conclusion : NATURAL FEI CUI (TYPE A)
[Natural Jadeite Jade, Fei Cui]

ORIGINAL No. SAMPLE
Tested by 測試者簽署 :

莫偉基 MOK Wai-Kei Dominic
MSc, FGA, DGA, FGAA
地質學碩士 Geologist / 寶石鑑定師 Principal Gemmologist



NOTICE: IMPORTANT NOTES ON REVERSE

16/Customs

Common Regulations

Whenever you enter a foreign country, your belongings are subject to search. Here are some of the items customs officials throughout the world are looking for:

- **Drugs.** Even legitimate drugs may be confiscated, so be sure your medications are in their original labeled bottles and just take the amount you'll need while traveling. Also carry a copy of your drug prescriptions or a written statement from your doctor saying you need the medication(s).
- **Weapons and ammunition.** Leave them at home.
- **Endangered species.** Don't travel with ivory jewelry or accessories made from animals such as sea turtles, whales, rare reptiles, mammals and birds. They could be confiscated.
- **Commercial quantities of goods.** If you're carrying merchandise destined for another country, declare it anyway at intermediary ports of entry and have good proof as to where you're taking the goods. Otherwise, you could be charged duty and/or fined for not declaring them.
- **Agricultural products and plants.** Flowers, plants, meat products, fish, dairy products and fresh fruits & vegetables may be seized to help prevent the country from being infested with unusual insects and microorganisms. Australia, New Zealand and the USA are particularly strict. Even airline food, sack lunches, and

some canned foods may be confiscated.

- **Counterfeit products.** Normally no counterfeit copyrighted goods such as copies of videos or computer programs are allowed under any circumstances. The United States does allow one article of each type of product that bears a protected trademark, such as a designer handbag if it's for personal use.

Duty-free Goods and Exemptions

Customs duties are levied in your home country and in countries where you're leaving gifts or commercial goods. Some people think that if they buy goods in a duty-free shop, they won't have to pay duty on them or declare them when they return to their home country. This is false.

"**Duty free**" simply means that items don't have import duties or taxes included in their price. For example, whisky bought in a duty-free store at the Singapore airport does not have Singapore duties included in the price. However it's subject to duty when you arrive home, and it must be declared. If you're traveling with more than the permitted amount of liquor, you could even be charged duty or have it confiscated when you just travel through a country with it.

Incidentally, jewelry sold in duty-free shops is not necessarily cheaper than elsewhere. In fact, often the opposite is true because the shops at the airport have little or no competition.

Duties, exemptions and restrictions vary depending upon the country. Most countries publish customs pamphlets you can pick up at consulates or airports. "Know Before You Go" is a good one for the USA. Also, see www.cbp.gov/travel/

In the United States, there's an **\$800** exemption for items bought for your personal use provided you haven't used the exemption within the preceding 30-day period. The goods must accompany you on your return, and your stay abroad must have been at least 48 hours, except if you're returning from Mexico or the U.S. Virgin Islands.

The duty-free exemption is **\$1600** for items bought in U. S. Insular possessions —Guam, American Samoa and the U.S. Virgin Islands. These exemption amounts are subject to change and may be different when you read this book.

There is a flat duty rate of 3% on the first \$1000 worth of purchases above the personal exemption. Above that amount, duty percentages are based on the item and the country of origin and manufacture. Fine art, antiques over 100 years old and many items from developing countries may be exempt from tax. Loose gemstones are usually duty free in the USA. Duty rates can be complex. For example, duty percentages on watches vary depending on the number of jewels, the type of case, the price, and the type of movement and display.

The personal exemption in Australia is AU\$900 if you are aged 18 years or over and \$450 if you are under 18 years of age.

In Canada, the personal exemption is CAN\$800 including liquor and tobacco allowances.

The New Zealand accompanied goods exemption is NZ\$700 excluding liquor and tobacco allowances. A GST tax is also levied.

In the UK, £390 is the personal customs allowance on goods from outside the European Union. This excludes the liquor, tobacco and perfume allowance.

The last section of this chapter tells you how you can find more detailed customs information about these and other countries on the Internet. All exemptions are subject to change.

U.S. Duty Rates on Jewelry and Gems

When you shop for gems abroad, it's helpful to know in advance how much duty you'll have to pay on them. Information about U.S. duties on jewelry and gems is available in Section XIV, Chapter 71 of the *Harmonized Tariff Schedule of the United States* International Trade Commission. See www.usitc.gov/. The Harmonized Tariff Schedule should also be available at your local library.

Duties vary depending on the country of origin of the goods. Duty-free or reduced-rate tariffs apply to countries classified as **GSP (Generalized System of Preferences)** or that have made special trade agreements with the United States. GSP countries are underdeveloped countries that have good trade relations with the US. Most countries in South America, Central America, Africa, Southeast Asia, Eastern Europe and the Middle East are GSP countries. Japan, Singapore, Hong Kong, Canada and Western Europe are categorized as developed countries and are **not** GSP.

The U.S. has special trade agreements with Canada, Mexico and Israel which exempts many goods made in these countries from duties. Jewelry is one of these duty-free items.

If countries do not have Normal Trade Relations (NTR) status with the US, goods bought there are either prohibited or have a higher than normal tariff rate. As of 2014 Myanmar (Burma), Cuba, Iran, North Korea and parts of Sudan were **non-NTR** countries (formerly called **non-MFN**, Most Favored Nation). Keep in mind that duty rates and country classifications are always subject to change, so these tariffs may be out of date when you read them. Updated information about non-NTR and NTR countries is available at www.usitc.gov/

For specific information about tariffs and duties, contact your nearest customs

office, which is normally at an international airport or seaport. In the U.S, you can find their addresses and phone numbers by going to www.cbp.gov/contact. Then click on “Locate a Port of Entry” and next click on the desired port of entry. Keep clicking on the desired locations until you reach the webpage with the hours, phone numbers and full address of the customs office. Direct information from customs is more reliable than what you may hear from salespeople abroad. Some will tell you anything to encourage you to buy their products.

Tips on Avoiding Hassles with Customs

Keep a record of your purchases as you buy them. It's easy to forget what you've bought and how much you've paid for it. Get receipts whenever possible and keep them in a safe place. For large purchases, it's a good idea to get duplicate receipts that you keep in separate places.

The night before you return home, go through your luggage and make sure all your purchases are written down. No matter how honest you are, you could be accused of smuggling if you forget something you bought.

If you travel with jewelry from home, take along a photocopy of the purchase receipt(s) or appraisal(s). When you return home, it's your responsibility to prove to customs that you didn't buy it abroad. Jewelry can't be registered with customs, except for certain watches. If you don't have receipts or appraisals, photograph the jewelry piece(s) next to something found only in your country, such as your car license plate. It's best, however, not to travel with expensive jewelry or watches.

By the way, customs officials are quite adept at using a loupe to determine if a watch you're wearing is new or not.

Register expensive items with serial numbers such as cameras and laptop computers before you depart from your home country. This can be done at the airport.

Check the customs regulations for your own country and for the countries you'll be passing through before your trip.

When traveling through or to another country, **review in your mind beforehand**

where you're staying or who you're staying with. This is a common question asked along borders, but it's easy to forget the answer. If you don't come up with an immediate response, this may prompt a search of your belongings.

If you plan to buy antiques, find out in advance what documentation and proof you'll need. You may, for example, need an export certificate. To be duty free, antiques usually must be at least 100 years old. Regulations can vary from one country to another. Customs has a right to dispute any certificate you present.

Most important, **tell the truth.**

Websites for Customs Regulations

You can now find the customs regulations of most countries on the Internet. The **World Customs Organization** (l'Organisation Mondiale des Douanes) provides information on customs agencies throughout the world. Its website address is www.wcoomd.org and it has links to the customs websites of individual nations: www.wcoomd.org/en/about-us/wco-members/customs-websites.aspx

Links are also provided below for some of the countries:

AUSTRALIA: www.customs.gov.au

BOTSWANA: www.burs.org.bw/

BRAZIL: www.receita.fazenda.gov.br/

CANADA: www.cbsa-asfc.gc.ca/

CHINA: www.customs.gov.cn

DUBAI, United Arab Emirates www.dxbcustoms.gov.ae

FRANCE: www.douane.gouv.fr/accueil

GERMANY: www.zoll.de

HONG KONG: www.info.gov.hk/customs

INDONESIA: www.beacukai.go.id

ICELAND: www.tollur.is

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