



# Ruby And Sapphire

The road is narrow and winding, the sky a gunmetal blue and cloudless. The day is hot! A cloud of brown dust hovers over the single lane that is paved only in places. The monsoon rains that will soon turn it all into a muddy quagmire have not yet arrived. The road leads to Moguk and the ancient ruby and sapphire mines of upper Burma.

Riding through the countryside, we pass through villages, seeing houses of plaited bamboo, creaking bullock carts, and peasants, reed-thin and brown as dirt, plodding along the road. The green fields of rice stretch along both sides of the road, like a well-tended lawn, on toward the horizon. Farmers in conical straw hats bend over rice paddies in a tableau from centuries past.

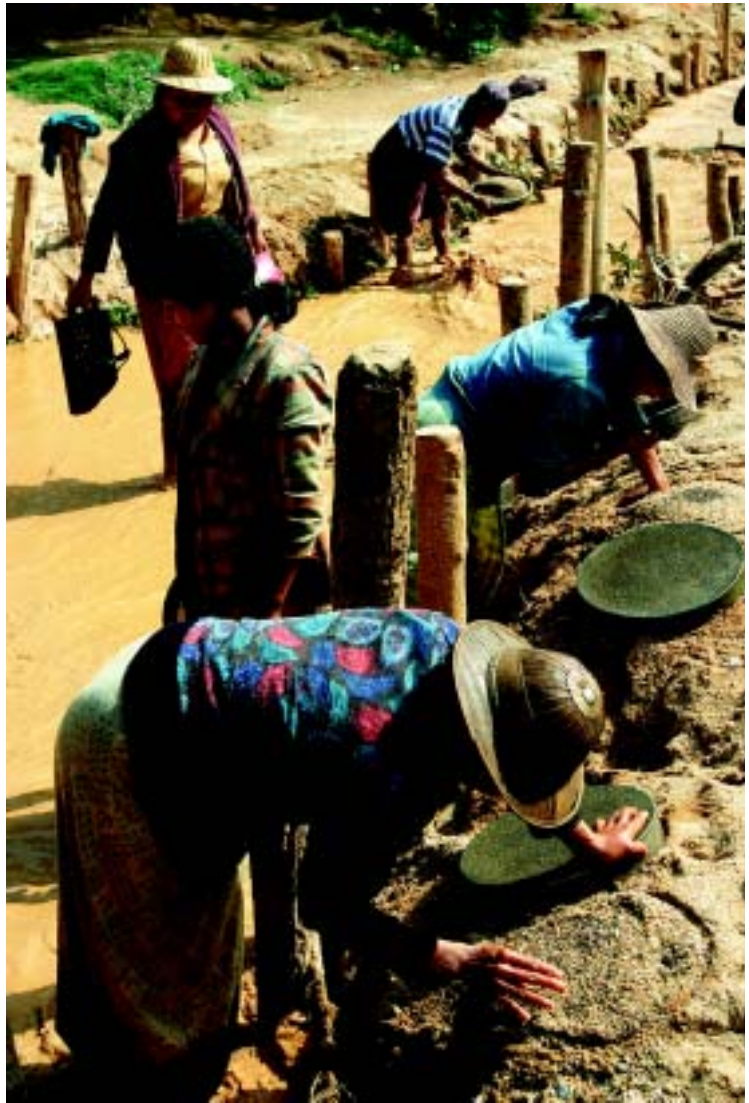
Moguk is a provincial town one hundred seventy miles west of Mandalay, Burma's second largest city. Since antiquity the valley in which the town is situated has been famous as the legendary *Valley of the Serpents*. According to the ancient tale, somewhere in the mystic East was a nearly bottomless valley carpeted with glittering gems. Poisonous serpents stood guard over the gems. Merchants seeking the stones tossed the sticky carcasses of skinned sheep into the valley. The gems stuck to the meat and the great eagles circling the valley floor would swoop down, grasp the meat in their talons, and bring it back to their nests high on the rocks surrounding the valley, thus allowing the men to retrieve the precious stones. Among the stones found in or near this valley were ruby, sapphire, peridot, and tourmaline.

The valley today is still the stuff of legend: deep, enveloped in mist, and surrounded by rocky crags. The Burmese government has kept it closed to foreigners for over thirty years, and in that time the modern world has all but

passed it by. Special government permits are still required to travel in this area. Traditionally stones have been found on the valley floor, in the streambeds and catch basins, and in the limestone caves that honeycomb the mountainsides surrounding the town.

It was on the sultry afternoon of our second day in Moguk town that I got my first glimpse of a legend. I was with my friend Joe B., one of Asia's premier gem dealers. We had just finished lunch at an outdoor restaurant where the customer chooses his noodles and condiments. The partially cooked noodles are plunged into a cauldron of boiling stock, ladled into a bowl, and the condiments added. The dealer approached our table.

He was a thin, dark-haired Burmese in his forties dressed in a Western shirt and the traditional cotton skirt, or *lungyi*. He had a rectangular face and high prominent cheekbones. He apparently knew our agent and they greeted each other with extravagant courtesy. The dealer had heard that we were in town and apparently had something special to show us.



R. W. Wise

*Kanase women in Moguk, Burma, work the tailings in a stream coming from a large mechanized mining operation. They sieve through the gravel looking for ruby, hoping to find small gems overlooked in the washing process. This privilege, the Burmese version of social security, is restricted to the widows and orphans of miners.*

After the introductions and ritual pleasantries, the dealer escorted us to his office, about two blocks along the dusty main street. We passed through an open-fronted food market. At the back of the store, we ascended a staircase of dark teak. The workroom of a bakery was visible below the stairwell and the smell of the baking accompanied us up to the second floor. We entered a room with walls and floors richly paneled in polished teakwood. The market noises and the westering sun filtered through open casement windows overlooking the street.

After sitting down around a low wooden table we were offered tea and delicacies still warm from the ovens below. Two stone parcels were placed before us. My friend opened the first paper and after a brief look handed it to me without comment. Inside was a two-carat cushion-shaped ruby of the finest color I had ever seen. I looked at Joe, our eyes locked briefly, his glance confirmed the insight that had tripped off like a flashbulb in my mind. In my twenty years' experience this was my first glimpse of the Pigeon's Blood!

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*Asking to see the pigeon's blood is like asking to see the face of God.*

Anonymous nineteenth-century Burmese trader

*The true pigeon's blood red is extremely rare, more a color of the mind than the material world.*

R. Hughes, 1997

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The color was new to me yet somehow I knew it for what it was, perhaps because I had seen everything but! The stone was a primary red, the hue and tone like a rich tomato sauce that has simmered for hours on the stove: a deep-

toned pure red with just a hint of blue added to it. I composed myself, breathing deeply to control my rapidly beating heart. My friend reflected for a moment, then asked the price. The asking price was, of course, astonishing! Negotiations continued for about an hour, but in the end our offer was not accepted. The next day proved luckier.

Sapphire comes in many colors. Sapphire is one of two varieties of the gem species corundum. If it is red, it is ruby. If it is any other color it is called sapphire.

# Blue Sapphire

*The characteristic color of the Sapphire is a clear blue, very like to that of the little weed called the "corn flower," and the more velvety its appearance, the greater the value of the gem.*

W. E.. Streeter, 1879

They say you never forget your first love. Gemologically speaking, blue sapphire was mine. I remember my first date with a Kashmir . . . ah! that velvety blue, that sleepy bedroom glow. It was in Bangkok that I met my first Burmese sapphire, a saucy royal blue, deep hued with just a touch of violet. That vivid saturation gave me a thrill. I didn't know just how lucky I was; it took me ten years to find another as fine.

By the early 1980s sapphires were mostly from Australia, Thailand, and Sri Lanka. Kashmir stones were a fading legend, and except for a trickle across the Thai border, Burma blues just a pleasant memory. Thai stones were available but were dark or black, often opaque. Australians were greenish; Sri Lankans were the best: heat treated, it's true; but the finest—just a step in saturation below Burmese—and with sleepiness, occasionally, almost like a Kashmir.

Beautiful sapphires are still to be found, but the cast has changed. Sri Lankan stones are still in reasonably good supply. Australia is reportedly producing better blues. Thai production, particularly at Kanchanaburi, is down significantly. Increasingly we hear about new finds

in Africa, from places unknown just a few years ago. Madagascar is the new big name in blue sapphire.

## Color: the two standards

Historically, blue sapphire has been judged based on two paradigms: the best



Jeff Scovil; courtesy of R.W. Wise, Goldsmiths, Inc.

A 3.05-carat natural Ceylon sapphire with a very slightly purplish "Kashmir" blue key color. Tone is eighty-five percent.

stones from Burma and the finest of Kashmir. The best of Burmese sapphire has a pure dark blue primary hue with a secondary hue of ten to fifteen percent purple. This is usually described as “royal blue.” Burma sapphire is set apart by its transparency (crystal) and the vivid crispness of its hue. Kashmirs, by contrast, are a purer blue hue of a slightly more open (seventy-five percent) tone, with just five to ten percent purple, a hue often described as “cornflower.”<sup>135</sup>

Kashmir stones often have what is described as a sleepy quality, a result of myriad numbers of microscopic inclusions known as *flour* which can be seen under the microscope. Light refracting through this microscopic Milky Way is diffused and this gives the stone an overall sleepy or fuzzy appearance. These inclusions also reflect light, dispersing it throughout the gem and thus reducing extinction. Kashmir sleepiness contrasts with the robust brilliance and transparency of a Burma stone.

Kashmir sapphire was found on one side of one hill in the Indian state it is named for, and was effectively mined out by the 1930s. Burmese sapphire has also been in short supply since the thirties. The new Burma ruby diggings at Mong Hsu produce almost no sapphire, and only a few stones per year find their way from the old mine areas of Moguk into the Bangkok market.

Which is the best? Connoisseurs disagree, perhaps due to rarity, but fine Burmese stones cost at least fifty percent more than Ceylon sapphires, and Kashmir stones more than twice the price of Burmese.

### Ceylon sapphire

Ceylon or Sri Lankan sapphire has been the quality standard bearer for the past half century. The Ceylon gem may look just like its Kashmir and Burmese brethren, appearing either cornflower or royal blue; some have a Kashmir-like sleepy appearance. However, the



Courtesy of © Christies Images

*The 62.02-carat Rockefeller sapphire, considered to be one of the world's finest Burmese gems, was reputedly purchased from the Nizam of Hyderabad in 1934 by John D. Rockefeller. It sold at Christie's on December 5, 2001, for \$3.5 million, almost \$57,000 per carat, the highest price ever paid, at auction, for a fine sapphire.*

135. The use of terms such as “cornflower” illustrates the problem of comparing the color of a gemstone to

another natural substance. Although cornflowers themselves have a violet component yet, in the gem trade,

cornflower is usually used to describe a pure blue hue. Powder blue is probably the more precise term.

relatively larger size of the inclusions causing the effect in Ceylon stones translates into a crisper sort of sleepiness that is qualitatively different, arguably less subtle than the same characteristic in stones from Kashmir. Ceylon sapphires can have a vivid royal blue like a fine Burma blue, but rarely show the crisp velvety transparent crystal and are a touch murkier than the best out of Burma.

When seeking a fine sapphire, the collector-connoisseur is advised to avoid labels and look at the gem on offer. Ceylon sapphire has its own distinct and beautiful look; the natural color stones often have a bit more of a purple secondary hue.

### **New contenders from Africa**

The Tunduru deposit has been described as the most important discovery in fifty years. Tunduru is in southeastern Tanzania hard against the Mozambique border. The best of the Tunduru stones have a deep royal blue color similar to Ceylon; however, in the words of Joseph Belmont, a dealer noted for his fine eye, "Tunduru stones have a much better crystal."<sup>136</sup> The best of Tunduru stones are a step up from Ceylon sapphire and only a half step down from fine Burmese sapphire.

The politics of Tanzania make for sporadic production. Small amounts of Tunduru rough are still finding their way to market in Nairobi. In addition, a few "brilliant blue" stones are to be found in

parcels coming into Nairobi from Rwanda and occasionally from Lodwar in northern Kenya.

At this writing blue sapphire from Madagascar is making a major impact on the market. These stones closely resemble Ceylon sapphire with perhaps a bit more of the purple secondary hue.

Australia remains a steady supplier of blue sapphire to the world market. Sapphire is found at a number of sources in Queensland and New South Wales. For many years Australian stones had the reputation of being greenish and overdark with tonal values of ninety percent or more. Sapphire, like ruby, emerald, and tsavorite garnet, is judged by the purity of its primary hue. A little violet is desirable, but green is the bane of blue sapphire. Thai dealers often bought the best of the Australian stones, heated them, and sold them labeled Ceylon in the Bangkok market — and still do. However, with new sources and advanced heating technology, a larger quantity of finer color stones are available today than in the recent past.

### **America the beautiful**

Alluvial sapphire deposits were first discovered in Montana's Missouri River in 1865. Three other sites — Dry Cottonwood Creek, Rock Creek, and Yogo Gulch — were added before the turn of the century. Yogo Gulch, the only hard-rock deposit, was mined steadily until the late 1920s, when it was abandoned; production resumed in the 1980s.

136. Joseph Belmont, personal communication, 1995.



Jeff Scovil; courtesy of R.W. Wise, Goldsmiths, Inc

*A matched pair of oval Madagascar natural (unheated) blue sapphires. The color is a vivid slightly purplish blue, eighty percent tone, fine crystal.*

Yogo sapphire is often described as “cornflower” blue, a rich purplish blue hue that has been erroneously compared to Kashmir. Generally, the finest of the Yogo stones have a distinctively crisp “steely” (slightly grayish) appearance. This steely quality is the result of a slight gray mask. These Montana beauties are of uniform color, relatively free of inclusions, and are not heat enhanced. Unfortunately, rough Yogo sapphire occurs in flat tabular crystals and rarely yields faceted stones in sizes above one carat. Seventy-five percent of current production consists of cut stones under one carat.

Sapphire from the three other

sources mentioned has been of little commercial importance until recently. Although huge quantities of sapphire have been taken from the Missouri River and both Rock and Dry Cottonwood creeks, these areas produced mostly colorless to pale-toned (twenty to thirty percent) stones of little beauty. Advanced heat treating technology has significantly altered the situation. These techniques have raised rough yields from Rock Creek from as little as eight percent to as much as eighty percent facet-grade gem material.

The best of these blue sapphires display a rich (eighty to eighty-five

percent) blue primary hue, with a pinch (five percent) of violet and a slight (ten to fifteen percent) gray to gray green modifier. Due to the apparent green secondary hue, Montana stones from these sources never approach the finest sapphire qualities. Blue Rock Creek sapphire most resembles high-grade commercial quality stones from Australia.

### The best of the blues: hue and tone

Blue sapphire, like ruby, is a primary color gemstone. The purer the primary hue the better. In practice this means that a dark-toned (seventy to eighty percent) primary blue hue with no more than a ten to fifteen percent secondary purplish hue is most desirable.<sup>137</sup> Some connoisseurs prefer a distinct purplish secondary hue because it adds a velvety richness to the blue; others prefer a purer, more “open” blue of slightly lighter (seventy-five percent) tone. This range of hues is to be considered the finest color in sapphire.

Green is the bane of blue sapphire. Any visible hint of green brings a stone’s value crashing down into the commercial range. The problem is that all blue sapphire has a greenish component when viewed at certain angles to the C axis. It is the cutter’s job to cut the stone so that this green is not part of the face-up appearance. Often this slight tint of green is difficult to see. Stone-to-stone comparison will often highlight the green secondary hue, as long as the viewer is not looking at a series of slightly greenish stones.

### Saturation

Gray is the normal saturation modifier in blue sapphire. Often it will be found mixed with green in lower-quality stones. A slight gray mask will introduce a cool or slightly “steely” quality in the normally warm hue of a sapphire. All pure chromatic hues are vivid. If the key color appears dull and cool, a gray mask is the probable culprit.

### Multicolor effect

Since blue sapphire is a primary color gem, the closer it comes to exhibiting a uniformly pure primary blue hue the better and more desirable it is. The face-up mosaic of a gemstone, however, is far from uniform; each facet may exhibit variations in the gem’s key color. Some facets may appear bright, some dull; some may display a dark tone, others a medium- or light-toned blue.

Multicolor effect has several causes (see Chapter 4). Sapphire is dichroic, i.e., light entering the gem divides into two rays, one violetish blue, one greenish blue. In addition, the stone may be zoned: colorless zones are juxtaposed against zones of color. Light rays passing through colorless zones lose color. Also, the pavilion facets of the gem cause a light ray entering the stone to reflect at least twice within the stone, absorbing color as it goes. Add to this the effect of light that shifts in color temperature from yellowish to bluish, accentuating or depressing the purplish secondary hue, and you have an idea why the face-up scene may be less than uniform.

137. C.R. Beesley, personal communication, 1990 and 1998. According to Beesley, the best sapphire in the world would have no

more than a seventy percent pure blue hue. The other thirty percent would be a combination of all

secondary hues, including some green. Beesley describes this color as “vivid purplish blue.” Minor hues

are not necessarily visible to the eye. See Beesley, *Colored Stone Training Manual*, p. 15.

In ruby and sapphire a negative type of multicolor effect is traditionally called *bleeding*, manifested as a lightening of tone and a loss of saturation when the stone is shifted from natural to incandescent lighting. At lighter tones, blue becomes pastel, less saturated, and washed out. Bleeding is a good analogy: the color is drained from the stone just as blood is drained from the body. The effect is similar: the stone becomes pallid, and its life, figuratively, is drawn out of it. Bleeding in sapphire may be described as weak, moderate, or strong. The more apparent or stronger it is, the greater the fault.

Kashmir sapphire contains little or no chromium, which appears to be one cause of the multicolor effect. What this means is that Kashmir sapphire, unlike Burma sapphire, for example, will not pick up a purplish secondary hue, but will maintain its hue as the viewing environment is shifted from daylight to incandescent lighting.

### Crystal

With gemstones there is one truth: no matter how fine the stone, somewhere there is a better one. Sapphire at its zenith — that is, a stone that seems to have everything: color (hue, saturation, and tone), clarity, and marvelous make — still requires a velvet transparency to reach the very pinnacle of quality.<sup>138</sup> Blue sapphire often will close up in incandescent lighting. This may have little effect on color, so it can't be described as *bleeding*; the *crystal*

simply becomes turbid, dark, and murky as the lighting environment is shifted from natural light to the light of the bulb.

Some stones will have the three Cs (color, clarity, and cut), but very few also have the diaphaneity, the good crystal — the fourth C, imparting a quality that is rich, crisp, and velvety all at the same moment. It is this quality that finally separates the very finest from the rest of the herd. Fine stones that fit this description may come from any source. Beauty is its own best pedigree.

### Texture

Color in sapphire often occurs in zones that follow the hexagonal outline of the sapphire crystal. Zones of rich color will alternate with colorless areas. This is particularly characteristic of gems from Sri Lanka. Due to zoning, sapphire will often show what experts call texture. This means that the zones are sometimes visible face up, causing the color to appear uneven. Even color is very important in sapphire; it is the cutter's job to integrate the zones so that the face-up color *appears* to be even. What is seen through the side or back of the stone is of little importance. Sometimes the lapidary's attempt to even out the texture by eliminating the effect of the natural zoning in the crystal leads to poor symmetry.

However, stones that appear lopsided below the girdle or that have off-center culets are more tolerated in sapphire than in most other gem

138. Kashmir sapphire is something of an exception. The diffused *sleepy* effect, together with the tiny

inclusions that produce it, reduce transparency somewhat in Kashmir and Kashmir-type sapphire. In such

cases, the beauty of this unique phenomenon makes up for some loss of crystal. Although Kashmir

sapphires can hardly be described as *limpid*, the best still retain a moderate degree of transparency.

species. Symmetry faults that would be considered major flaws in diamond are accepted in sapphire so long as they occur below the girdle and do not create a lopsided girdle outline.

### Heat enhancement

No one is quite sure how long heat-enhanced sapphire has been in the market — perhaps a hundred years, probably much longer.<sup>139</sup> Heat treatment, known as burning, was reported in India as early as 2000 BC.<sup>140</sup> However, it was not until the 1970s that the technology to achieve very high temperatures became available, and heat treating began to be practiced on a grand scale. Some lighter Ceylon stones (thirty to fifty percent tones) are unheated. But most of the finer Ceylon and Tunduru stones, as well as a good portion of the Madagascar stones currently in the market, are heat enhanced.

Heating has a negative effect in sapphire. Heat-treated blues have generally poorer crystal than unheated stones. The heating process tends to reduce transparency or muddy the

crystal.<sup>141</sup> If all other factors are equal, the very best natural color sapphire will be more beautiful than the very best burned sapphire. For example, of the top ten blue sapphires in the world, two through nine may be heat enhanced, but number one will be natural color. The exact opposite occurs when ruby is subjected to heat treatment. In general, natural color sapphire will sell at a premium of approximately thirty percent above the price of a comparable heat-enhanced stone.

With regard to gemstones in general, all factors are rarely equal. Sapphire, like all other gems, should be considered stone by stone. Heat treatment improves the appearance (hue, saturation, tone, clarity) of a vast majority of sapphires; otherwise, it would not be done.

### The rarity factor

Exceptional blue sapphire is rare in any size. Stones over twenty carats are available: however, as with most gem species, stones larger than those readily usable in jewelry on a per carat basis tend to decrease in price.

139. Tagore, *Mani Mala*, vol. 1, pp. 243, 455.

140. Nassau, *Gemstone Enhancement*, p. 25.

141. Joseph Belmont, personal communication, 1997.