

RUBY  
THE KING OF PRECIOUS STONES

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## I. INTRODUCTION

"The price of wisdom is above rubies" so said Job in the Bible, implying that even then this red variety of the corundum species was extraordinarily valuable and highly esteemed.<sup>1</sup> Ruby is from the latin "ruber" meaning red. Throughout history ruby has been praised for its virtues and the superlatives that have been used to describe it are seemingly without end. In Sanskrit, it had many names, all of which showed clearly that this stone was more valued by the Hindus than any other: "ratnaraj" (king of precious stones) "ratnanayaka" (leader of precious stones) and "padmaraga" (red as the lotus) were just a few of the many complimentary terms applied to ruby.<sup>2</sup> In our society, ruby still holds a position of pre-eminence and finds wide use as the July birthstone, as it has for many generations. According to an ancient verse of uncertain origin:

"The gleaming ruby should adorn  
All those who in July are born,  
For thus they'll be exempt and free  
From lover's doubts and anxiety."<sup>3</sup>

A multitude of legends and strange beliefs surrounded the ruby in ancient times. Among other things, it was thought that the wearer of a ruby was blessed with health, wealth, wisdom and outstanding success in affairs of the heart. Ruby was valued not only by the Burmese for its beauty, but because it was thought to confer invulnerability to the wearer.

Large gem quality rubies have always been uncommon; therefore, only a few specimens have gained historical importance. However, some magnificent stones are on view in various museums and collections around the world.

A 167-carat translucent crystal of fine color, called the Edwardes Ruby in the British Museum of Natural History. The American Museum of Natural History displays one of the largest star rubies in existence: the 100-carat Edith Haggin de Long Star Ruby.<sup>4</sup>

## II. PHYSICAL AND OPTICAL CHARACTERISTICS.

Ruby belongs to the mineral species corundum, chemically considered corundum is pure alumina expressed by the formula  $Al_2O_3$ . The red coloring in ruby is due to small traces of chromium oxide. Ruby is second only to diamond in hardness and has a hardness of 9 on the moh's scale of relative hardness.<sup>\*</sup> The Specific Gravity<sup>\*</sup> of ruby varies between 3.95 and 4.05. The characteristic inclusions of the ruby are (1) "Silk," this is the silvery shimmering streaks disposed in certain areas of the stone, and generally mars the appearance of the stone (2) "Clouds," these are muddy or cloudy patches of a different shade of red, they generally impair the beauty of the stone (3) "Feathers," they are the cracks and fissures present within the stone, they may be large or small and always impair the the beauty of the stone.<sup>5</sup> The degree of transparency of the ruby runs from transparent to opaque. The refractive index<sup>\*</sup> of ruby varies between 1.762 and 1.770. The luster<sup>\*</sup> of the fractured surfaces are vitreous<sup>\*</sup> and of polished surfaces is from vitreous to subadamantine.<sup>\*</sup> The dispersion<sup>\*</sup> of the ruby is .018.

\* A glossary for these technical terms is at the back.

VARIETIES

Only transparent corundum of medium-light to dark tones of red to purple-red hues is properly called ruby. The American jewelry industry has been using several terms to describe different colors of ruby according to the usual product of certain ruby producing countries:-

1. Burmese Ruby.

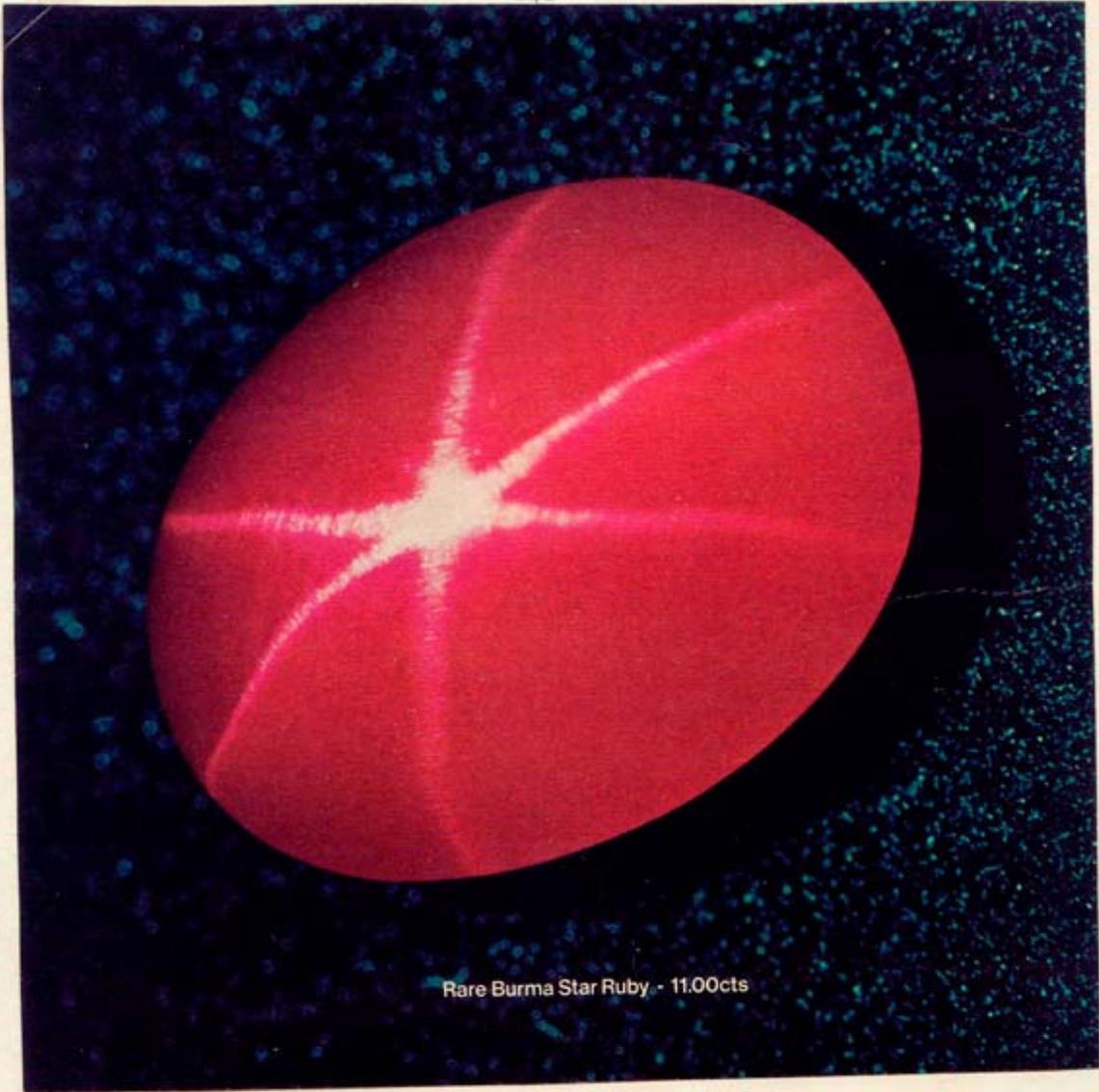
The finest blood-red rubies ("pigeon's-blood" red is the term often applied to the finest) are called Burma rubies, despite the fact that some very dark and some pale-colored stones also come from Burma. There is no doubt that the finest rubies are found almost exclusively in Burma; however, there are Burmese rubies that are lower in quality than some of those found elsewhere.

2. Siamese Ruby.

The usual output from the Thai mines is deep red to purple-red, sometimes resemble garnets. However, some very nice red stones resembling Burma rubies have also been found here.

3. Ceylon Ruby.

Light to very light red or mauvish red stones are mined in Ceylon. Because of their lighter tone, these stones are usually more brilliant than Burmese or Siamese stones.

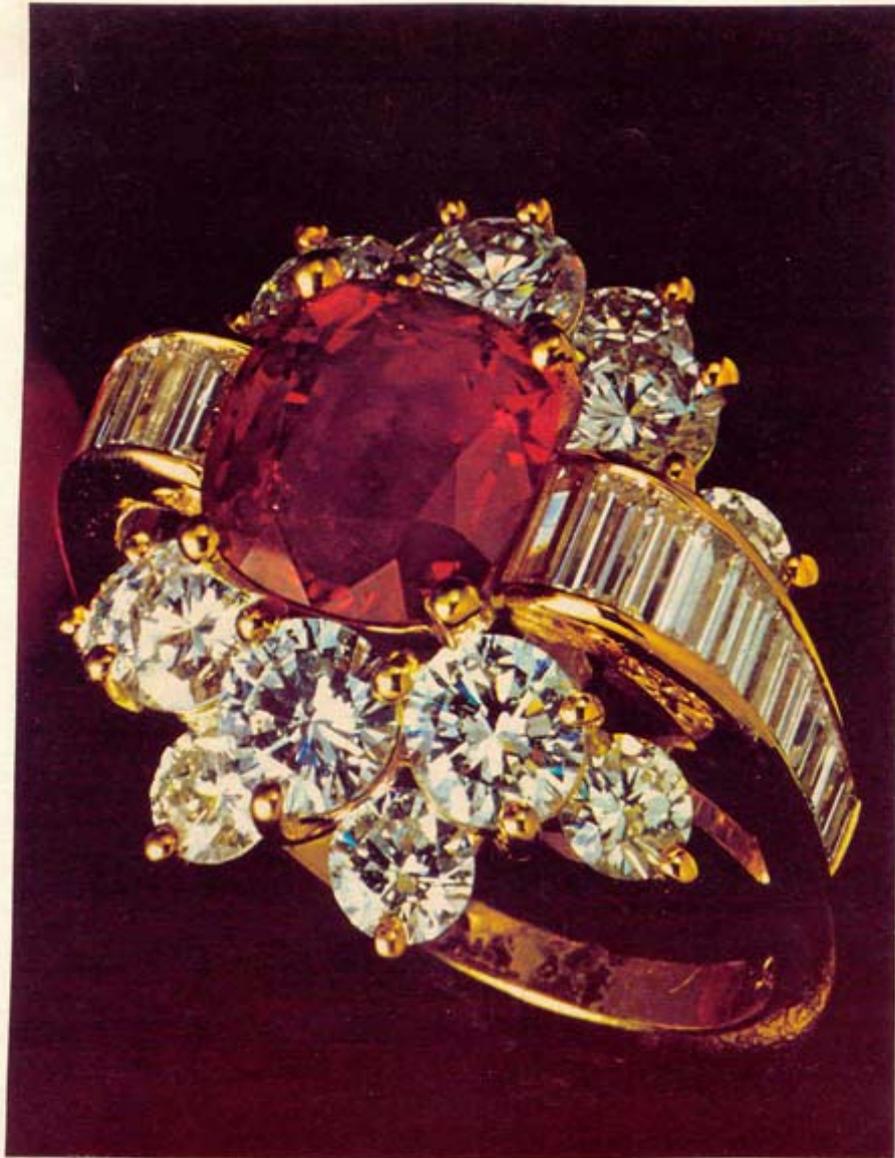


Rare Burma Star Ruby - 11.00cts



should state actual size! Burma Star Ruby, very nice red color, the ideal color. ↑

← Burma ruby, the best pigeon-blood red this is a top quality stone



A very nice deep red siam  
Ruby set with diamonds



A top quality Ceylon ruby is  
depicted in this 5 Rupee stamp.

#### IV. SOURCES AND MINING METHODS

Burma:- By far the most important source of fine rubies in the world is the region around Mogok in Upper Burma. The valley in which Mogok is located is approximately twenty miles long and two miles wide. Mogok is an area of heavy rainfall and is at an elevation of approximately 4000 feet.<sup>6</sup> The population is around 20,000, almost all of whom are engaged in the gem industry in some way or another. The most widely exploited deposits are within an eight mile radius of the town, but some mining goes on as far as 30 miles north and some at 60 miles west of Mogok. Mining has been carried on in Mogok for many centuries up until 1888 the mines were worked by the native laborers. In 1889 they were taken over by the Burma Ruby Mines Ltd., an English company. The Burma Ruby Mines Ltd., continued to operate the deposits through many hardships, finally closing them in the middle of the depression or around 1935. Since that time to the present the mines have been worked by small individual operators.<sup>7</sup>

The mines were worked and still are being worked by primitive methods, most work was done by hands with the aids of a pick and a shovel. Tunnels up to 15 feet deep are dug and the ruby rich soil is hoisted up in baskets, the soil is later washed and sifted and the gemstones picked out by hand. Rubies are also found as red pebbles in the gravels of stream beds or at the bottom of a thick layer of soil. Because of the method of marketing, reliable figures for the ruby production of Burma are impossible to obtain, but looking at the huge gem industry one can tell that Burma is still producing large quantities of medium to better quality goods.

IV. SOURCES AND MINING METHODS (Cont.)

Thailand:- After Burma turned Socialist in 1964 Thailand has become the world's largest producer of the commercial to medium quality goods, on the other hand exceptionally good stones approaching and in some instances even surpassing the Pigeon-blood red, have been found in the gem-rich gravels of Chantaburi. On the average Thai rubies are somewhat darker and contain a purple or brownish hue making the considerably less desirable.

The mines are situated in the province of Chantaburi, located approximately 320 Kms. south east of Bangkok. The town has a population of around 100,000 of which about 25,000 are engaged in the gem industry. Most of the mines are situated deep in the tropical jungles at a radius of about 50 Kms. from the town.

A Thai ruby mine is usually owned by a family or a group of partners, they are usually Thai rural types, that is each family or partnership is content to make a small but sufficient income as long as they remain their own masters. A typical operation, a group of workers dig twenty to thirty feet into the ground, they then load a bucket with the gravel that they have hand scraped from the bottom of the mine shaft, another member of the team then hoists the buckets up, once the soil is up they wash the gravel and separate the ruby pebbles from the useless mud, this is usually done by the women folk.<sup>8</sup>

On the weekends the miners gather in Chantaburi town and sell their whole week's production to the dealers and the visiting customers from Bangkok. These dealers are the ones who will later get these stones cut and make a good profit by selling in Bangkok.

## V. CUTTING

The process of cutting the rough ruby aims at giving each stone such a form as will best display its natural lustre and beauty. Faceting of rubies is accomplished on diamond impregnated copper discs and polishing is done on tin or copper discs with grit diamond powder and oil.

The Indians were the first to master the art of cutting for color, that is of cutting a stone that was patchily or unevenly colored. By using depth, light, facets and angle they increased the spread of the color until to the naked eye the whole stone looks a crimson red.<sup>9</sup>

Most Asian cutters cut rubies to keep weight - since this is how the stone is going to be sold, that is by weight as well as color. European cutters ~~are~~ generally unanimously agree that a flawed specimen should be cut so as to attain the highest possible degree of perfection and beauty even if this should involve considerable loss of weight.<sup>10</sup> In Europe a small stone, all the beautiful features of which are displayed to their full advantage, is more highly prized than a larger stone, the beauty of which is less perfectly developed.<sup>11</sup>

Gem cutting calls for the utmost in patience, an intense belief in beauty for beauty's sake, a willingness to take pains over the most tiny details, and deep personal joy in an intricate job carried out exactly to specifications.

Thailand is fast becoming the world's leading gem cutting center, the labor here is cheap and the people more suitable for this intricate job.

V. CUTTING (Cont.)

To have a ruby of gem quality US\$1,000-2,000 per carat cut in Thailand will cost for labor alone about US\$30.00 and delivery can be promised within two days. The same ruby cut in Idar Obergstein, Germany will cost in the neighbourhood of US\$250 and delivery may take 2 months or more.

VI. VALUE

Although a sufficient quantity of rubies are mined annually to satisfy the usual world demand, only a fraction of one percent of these are larger than 3 carats and of top quality. The principal reason for this is that clouds, cracks, milkly spots, silk and other imperfections are usually present. Color, however, is much more important than relative perfection. The most valued color is the deep crimson red known as the "pigeon's-blood ~~bold~~" red. Mauvish red and brownish red is much less desirable in transparent stones. The cutting quality of a ruby also affects price, insofar as it affects color, brilliance and apparent "spread" of the stone.

A perfect specimen of a ruby must have a deep crimson red color of a high intensity, it must be free from cracks and fissures in its interior, its lustre and polish must be uninterrupted over the whole stone. A ruby with the above mentioned qualities is indeed very rare and such stones of over 3 carats command exceptionally high prices. A top quality 5 carats Burma, pigeon's-blood red, clean, well cut, ruby can fetch up to US\$25,000 per carat or US\$125,000 for the stone. "Rare as fine Rubies" an old cliché is no floundering generality but a hard fact.<sup>12</sup>

VI. VALUE (Cont.)

Scarcity, is a big factor for larger rubies, fine ruby crystal just does not form in large crystals therefore the larger ruby is, carat for carat, more expensive than a diamond of the equivalent caliber.<sup>13</sup>

A US\$20,000 investment stone could be 1) A 2 carats Burma stone, fine color, with some inclusion and as little silk as possible. 2) A 4-5 carats Ceylon ruby, very brilliant, and pinkish red. 3) A 4 carats Thai ruby, slightly purplish red, should be relatively free of internal inclusions.

Says a dealer who has bought and sold stones in London's Hatton Garden, the ordinary looking London street, which is one of the world's main centres in the jewel trade and frequently called "the richest street in the world".

"A man comes in here with nice quality rubies and names a price," he said "and you say but yesterday the price was only such and such. And he says, yes, but that was yesterday".

"People are getting wise to the fact that stones don't go off, they won't go rusty like a yacht or wear out like a fur coat. People want to put their money into something solid. They believe a stone's value will go up and up, and so far they have been right. Even junk has come up now".<sup>14</sup>

VII. DISTINCTION FROM OTHER RED STONES

It is very natural that attempts should be made to substitute for the costly ruby, usually some less valuable stone of similar color. The two stones most frequently passed off as, and mistaken for, rubies are spinel and garnet.

The easiest way to distinguish garnets and spinels from rubies is by using the refractometer.\* Garnet has a reading of 1.746, ruby has a reading of 1.762, and spinel much lower at 1.718.

The situation gets a bit more difficult when one wants to separate natural ruby from its man-made counterpart the synthetic ruby. The major basis for separation is provided by magnification, to determine whether inclusions are spherical or elongated gas bubbles and curved striae,\* characteristics of a synthetic, or the angular inclusions and straight striae associated with a natural ruby.

If the stone is somewhat warm to the touch ( compared to the cold feel of the crystalline materials) then the stone could an amorphous\* material such as glass and plastic imitations.

*Interesting  
reading  
B*

GLOSSARY OF TECHNICAL TERMS

Hardness:- Resistance a material offers to scratching or abrasion.

Specific Gravity:- The ratio of the weight of a substance to that of an equal volume of water at 4 degrees Celcius.

Refractive index:- The ratio of the velocity of light in air to its velocity in a substance.

Luster:- The appearance of a gem. More specifically, the quality and quantity of light reflected by a gem.

Vitreous:- A glassy sort of luster on fracture surfaces.

Subadamantine:- A luster one grade less than that of a diamond.

Dispersion:- The separation of white light into its component colors.

Refractometer:- An instrument that measures refractive index.

Curved Striae:- The curved banding caused by the flux material when the synthetic ruby crystal was produced.

Amorphous:- Without form. Material that has no regular arrangement of atoms, hence no crystal structure.

FOOTNOTES

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*Alphabetical  
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