




**Warning: this version has been completed with Google Translate , it certainly contains errors or inaccuracies.**

## Technical sheet - general: **Ruby**

<b>Gemma - names</b>	( <b>Italian</b> - Ruby) ( <b>English</b> - ruby ) ( <b>French</b> - Rubis ) ( <b>Spanish</b> - Rubí ) ( <b>Portuguese</b> - Rubi) ( <b>Thai</b> - ทับทิม th ą bthim )	( <b>German</b> - Rubin) ( <b>Arabic</b> - ربي ruby ) ( <b>Russian</b> - Рубин Rubin) ( <b>Mandarin</b> - 红宝石 Hó ngb ă osh í ) ( <b>Swahili</b> - Ruby) ( <b>Hindi</b> - माणिक maanik )	<p style="text-align: center;"><b>photo</b></p> 
<b>Colors (GIA)</b>	<p>According to most gemological authorities, the ruby must show a <b>dominant red chromatic component</b> which typically ranges from <b>orange - red to strongly purplish red</b> . However, on the market this agreement is not always so uniform. The tone (chiaroscuro) of the gems must also fall within certain parameters (from medium. Pink <b>corundum</b> is usually referred to in gemological terminology as <b>pink sapphire</b> rather than ruby.</p>		
<b>Cause of Color</b>	<p>Corundum is an <b>allochromatic mineral</b> , i.e. a mineral whose color is not constantly due to its chemical composition, but can vary due to the presence of chromophoric ions, structural defects of the crystal lattice (dislocations or color centers) or very fine inclusions and comes in all colors. The coloring depends on chromophoric chemical elements which however do not alter its chemical composition. To have the ruby variety, Red, <b>Cromo-Cr<sup>3+</sup> must be present</b> in octahedral coordination with minor contributions or presence of Vanadium-V<sup>3+</sup> and Ferro-Fe<sup>3+</sup> in octahedral coordination. If 1% of the aluminum ions are replaced by chromium in the ruby, the yellow-green absorption results in a red color for the gem. <b>If 1% of the aluminum ions are replaced by chromium in the ruby</b> , the yellow-green absorption results in a red color for the gem.</p> <p style="text-align: center;"><b>The Red Sapphire</b></p> <p>Strictly speaking, there is no " <b>bone sapphire</b> ", as all red corundum gemstones are referred to as <i>ruby</i> in the gem and jewelry trade. All other colors of corundum are referred to as <i>sapphire</i> . There are however some exceptions to the red rule. Some exceptions may apply, such as corundum gems which are <b>red-orange or pink-red</b> (approximately 50% of each color). These can often be referred to as <i>sapphires</i> or <i>rubies</i> as it is more of a judgment. If the stone is predominantly red with only a pink or orange secondary hue, the gemstone should be considered ruby. Another exception for "red sapphire" applies when the red color is the result of an enhancement process involving beryllium heat treatment ( also used to create the highly sought-after orange-pink variety called <i>Padparadscha</i> ). If corundum is " <b>heated</b> " through lattice diffusion, the material should simply be traded as sapphire rather than ruby, although many gem dealers have come up with their own creative marketing names, such as "sunset ruby". Most of these treated rubies are mined from Songea, in southwestern Tanzania, and are sometimes referred to as "Songea Sapphire".</p>		
<b>Classification</b>	<b>Mineral class</b> Oxides	<b>Species - Mineral group</b> Corundum - hematite	<b>Variety</b> Ruby
<b>Optical properties</b>	<b>Specific Gravity:</b> 3.95 to 4.10 common <b>4.00</b>	<b>RI:</b> 1,768-1,772 or 1,760–1,763 <b>Polariscope</b> :DR <b>Double refraction:</b> 0.008 - 0.010	<b>Characte r optical</b> Negative uniaxial <b>Pleochroism</b> Dichroic: purple red - orange red
	<b>Luster (luster) - luster of the fracture</b> Sub-adamantine, vitreous - vitreous, pearly (along the twin planes)		<b>Dispersion (fire)</b> 0.018
<b>Light</b>	<b>Fluorescence</b> <b>SWUV</b> : from red (Myanmar) to inert (Thailand) <b>LWUV</b> : from intense red (Myanmar) to inert (Thailand)		<b>Phosphorescence</b> No

<b>Form</b>	<b>Crystalline dress</b> Prisms or hexagonal plates, rhombohedrons <b>Melting point:</b> 2,030–2,050 ° C	<b>Phenomenal optical effects</b> Catitude, asterism	<b>Crystalline system</b> Trigonal Scalenoedral hexagonal <b>Crystal class</b> 
<b>Chemical formula</b>	Aluminum oxide  $Al_2O_3 (+ Cr)$		<b>Spectrometer image</b>  2 wide violet and yellow-green absorption bands and a narrow absorption band at the wavelength of 694 nm.
<b>Fracture</b>	<b>Flaking</b> No real flaking plan	<b>Breaking- Parting</b> Baseline (infrequent)	<b>Fracture</b> Concoidal, chipped
<b>Durability</b>	<b>Hardness (Mohs); Absolute</b> 9; 400	<b>Toughness</b> Fragile	<b>Stability</b> (heat, light, chemicals) Stable
<b>Clarity - characteristics</b>	<b>Typical inclusions:</b> Small rods and tubes, repeatedly twinning to form feathers (growth lines), in addition, Fingerprints, cavities, color zones, twin planes, halo / discoid fractures, "fire marks" (small wavy cracks, approximately parallel, often visible at or near the edges of natural or synthetic corundum veneers), including crystals (calcite, boehmite, mica, spinel, apatite, garnet, pyrochlor, uranium, hematite, pyrite, zircon, calcite, rutile and spinel) dots and clouds, liquid inclusions, negative crystals, biphasic inclusions, silk / rutile needles (along planes parallel to the hexagonal prism at 60 ° and 120 °).		
	<b>Type II</b> Normally included	<b>Transparency (commercial) - transparency</b> From transparent to opaque	
<b>Deposits - types of rocks</b>	<p>The host rocks of the ruby are metamorphic dolomitic marbles, gneiss and amphibolite. The return of rubies from such primary deposits is not economically viable. Rather secondary alluvial deposits are processed. Due to its high density, ruby is normally separated by washing gravels, sands and river soil, then concentrated and finally hand-picked.</p> <p>There are some types of main deposits linked to particular geological phenomena. Depending on the type of formation, the crystals found have specific properties that give the gems added values (such as the presence of fluorescence) or influence their aesthetic appearance (greater inclusions, darker color, etc.). Major categories include:</p> <ul style="list-style-type: none"> <li>• Stones originating from deposits of <b>metamorphic genesis associated with marble</b>, such as those of <b>Myanmar ( Mogok )</b>, <b>Afghanistan</b>, China (Yunnan), Kenya ( Machakos-Thika area ), Macedonia ( Prilep ), Nepal, Pakistan, Tajikistan, <b>Tanzania</b> (Mahenge, Morogoro ), Vietnam (Yen Bai, Quy Chau ), typically iron deficient, <b>do not respond to heat treatment</b>.</li> <li>• Rubies associated with <b>amphibolite</b> (one of the most frequent types of host rocks), such as the deposits of Greenland, Kenya, Madagascar ( Ilakaka , Nosy Be, Ambato and Ambondromifehy ), Malawi, <b>Mozambique</b>, Tanzania ( Longido , Winza ) and India, they are susceptible to this process.</li> <li>• Finally, those related to <b>magmatic / igneous deposits</b>, of basaltic-alkaline type, such as those of Chanthaburi, Trat (Thailand), Pailin (Cambodia), <b>Mong Hsu (Myanmar)</b>, Australia, Cambodia, Cameroon, <b>Ethiopia</b>, France, Kenya ( Mangari , Taita Taveta), Israel, Madagascar ( Ankaratra - Antsirabe area - Antanifotsy ), New Zealand, Nigeria, Rwanda, Scotland and Vietnam ( Dak Nong ), show evident response, often due to the iron content, to cooking in an oven.</li> </ul> <p><b>Age</b> : 3 billion to 50 million</p>		

<p><b>Characteristics of rough stones</b></p>	<p>Rubies like to grow in a <b>flat, hexagonal</b> (sometimes bipyramidal) shape. If the uncut gem shows this natural growth characteristic, along with parts of the host rock (marble or alkaline basalt) still attached, it is very likely that it is <b>a true ruby</b> . Rubies are also very heavy for their size. Nature almost never uniforms anything, especially precious stones. Most of them form in a superheated slurry of various elements that make oddly shaped inclusions and roughness very common. Rubies can also appear in places like Sri Lanka as water-worn pebbles, making identification from the crystal's original shape nearly impossible. Although they have been altered and broken over time, they can appear superficial even in this form. Unfortunately, only first-hand experience and general training can help definitively identify the gem at this point. Thankfully, there are other ways to control gemstones.</p>
<p><b>Main deposits</b></p>	<p><b>Main deposits: Mozambique</b> (district of Montepuez - province of Cabo Delgado, province of Niassa, province of Tete), <b>Myanmar / Burma</b> ( Mohnymania ) / District of Myitkyina-State of Kachin, District of Pyin-Oo-Lwin (Mogok) -Region of Mandalay, Momeik Township / Loilen District / Mu Se District-Shan State), <b>Madagascar</b> ( Didy-Alaotra-Mangoro , Ambodimangavalo / Sarambana-Analanjirifo , Tranomaro / Isoanala-Anosy , Atsimo-Andrefana , Vatomandry-Atsinanana , Ranohira / Zazafotsy-Ihorombe , Ambohitsimanova-Vakinankaratra ), <b>Sri Lanka</b> ( Elahera District - Central Province, Polonnaruwa District - North Central Province, Sabaragamuwa Province , Colombo District - Western Province),</p> <p><b>Other commercial depots : Afghanistan</b> (District of Ishkashim -Badakhshan, District of Surobi / District of Sorobi -Kabul), <b>Australia</b> ( Barrington Tops / Tumberumba / Mudgee - NSW, Ambalindum Station Spriggs -Northern Territory , Williamstown - South Australia, Central Highlands Region -Queensland, Alpine County / Cardinia Shire / East Gippsland County / Amphitheater- VictoriaPoona / Upper Gascoyne Shire-Western Australia), <b>Brazil</b> ( Juina - Mato Grosso, Minas Gerais), <b>Cambodia</b> ( Samlot , Ba , Pailin <b>camp</b> ), Kevenland ( Nuuk- Sermersooq ), <b>Kenya</b> ( Kiambu County, Taita-Taveta County), <b>Pakistan</b> ( Neelum Valley -Azad Jammu and Kashmir, Nagar District / Shigar-Gilgit-Baltistan District , Kaghan Valley - Khyber Province Pakhtunkhwa ), <b>Tajikistan</b> ( Rangkul / Pyandzh River Valley - Gorno-Badakhshan), <b>Tanzania</b> (Lake Manyara / Longido District -Arusha Region , Mpwapwa District -Dodoma Region , Manyara Region , Morogoro Region , Chala village-Rukwa Region , Songea Urban District / Tunduru District-Ruvuma Region , Korogwe Rural District -Tanga Region ), <b>Vietnam</b> (province of Ngh ê An, province of Yên Bái ( Luc Yen)),</p> <p><b>Minor deposits : Antarctica</b> ( Lützow -Holm Bay -East Antarctica), <b>Austria</b> ( Drosendorf-Zissersdorf ), <b>China</b> ( HOshan -Anhui, Penglai -Hainan, Akesu -Xinjiang, Yuxi-Yunnan), <b>Colombia</b> (Department of Cauca), <b>Czech Republic</b> ( Jizerka -Liberec region ), <b>France</b> (Saint- Privat - du -Dragon Feneyrolles - Auvergne - Rhône -Alpes, Glen-Center-Val de Loire , Kembs -Grand Est, Marvejols / Viala - du -Tarn- Occitanie ), <b>Germany</b> (Waldheim -Saxony), <b>Greece</b> ( Paranesti -East Macedonia and Thrace), <b>India</b> (District of Anantapur -Andhra Pradesh, District of Lokkanahalli / Dakshina Kannada / Kodagu District - Karnataka, Tiruppur-Tamil Nadu District ), <b>Israel</b> (Mount Carmel District-Haifa), <b>Italy</b> (<b>Lugo di Vicenza-Veneto, Terminillo-Lazio and Val Sessera -Piedmont</b>), Japan ( Saiki City- Oita Prefecture ), <b>Liberia</b> ( Lofa County), <b>Malawi</b> (central region of Ntcheu , southern region of Mwanza), <b>Nepal</b> (District of Ganesh Himall Massif-Rasuwa / Dhading District ), <b>New Zealand</b> (Westland District-West Coast Region), <b>North Macedonia</b> ( Sivec Mountain Municipality- Prilep ), <b>Norway</b> ( Froland-Agder , Troms og Finnmark <b>Poland</b> ( Gmina Świdnica - Lower Silesian Voivodeship), <b>Russia</b> ( Kochkar District - Chelyabinsk Oblast , Kovdor Massif - Murmansk Oblast, Loukhsky District - Republic of Karelia, Shilovka River / Rezhevsky District - Sverdlovsk Oblast , Oblast 'di Tyumen ), <b>Rwanda</b> ( Rusizi District - Nyamasheke District - Western Province), <b>Somaliland</b> ( Molis area ), Switzerland (Bern, Roveredo-Grigioni, Leventina / Bellinzona-Ticino), <b>Thailand</b> ( Chantabury Province , Bo Rai- Trat Province ) , <b>USA</b> (Alabama, San Bernardino Co-California, Pine Mountains-Georgia, Indiana, Rock Creek Mining District -Montana, New Jersey, Elf School area / Lincoln Co./ Alarka / Cowee Valley North Carolina, Ophir -Utah, Riverside-Washington, Graham Ranch-Wyoming), <b>Zimbabwe</b> ( Chiredzi-Masvingo Mining District, Beitbridge District - Matabeleland South, Gweru-Midlands District)</p> <p><b>Geological age</b> : from 3 billion to 20 million years</p>
<p><b>Year of discovery</b></p>	<p><b>Ancient, date unknown</b> . Certainly from the first centuries before the Christian Era.</p>

## History

**The Old Testament** of the Bible mentions the ruby many times (along with a catalog of other precious stones) in **the Book of Exodus** , and many times in the Book of Proverbs, as well as various other times (for example in Revelation 4: 3, Revelation 4: 3 and 21:20, Isaiah 54:12, Ezekiel 27:16 and 28:13)

An earliest documented transportation and trade of rubies emerges in literature on the Northern China Silk Road , around **200 BC** . the rubies were transported along this ancient track that moved west from China.

In **the 1st century AD** , the Roman scholar Pliny mentions **12 types of rubies** in his work **Historia Naturalis** (Natural history), describing their hardness and density and

Burma / now Myanmar has been a significant source of rubies since at least 600 AD Burmese rubies are still among the most prized ruby gems.

The most documented of the miniature tales is that of the **luminous or ruby carbuncle of the king of Ceylon**, first mentioned by the Greek traveler *Cosmas Indicopleustes* in **the 6th century** and later described by many travelers, the latter from the **17th century** . According to Indicopleustes , it was "as big as a large pine cone, fiery red, and when seen flashing from a distance, especially if the sun's rays play around it, being an unparalleled sight"

**In medieval times** , it was believed that the unicorn had a precious ruby at the base of its horn. It is said that this idea can be traced back to medieval stories, or novels, about the life of Alexander the Great and to a chapter about his meeting with Queen Candace of Meroe . Unicorns weren't the only legendary animals carrying rubies . It is said of a Peruvian fox capable of illuminating the night with a carbuncle embedded in the forehead. This animal was called the **carbuncle** , and its glowing gem was only visible at night when it was said to guide the spirits of the dead. If people looked directly at the beast, they were temporarily blinded. Beliefs in carbuncles were taken very seriously. Sources indicate that the Spanish viceroy had given special instructions calling for his capture with the utmost urgency.

Mogok, the world's most important ruby mine, is believed to have been founded in **1217** by three lost Shan hunters who discovered red crystals at the base of a collapsed mountain. After the third Anglo-Burmese war of **1885** in which the British conquered and annexed the hitherto independent Upper Burma, in **1886** the British launched a military expedition to "open" the Mogok ruby mines and make them available to merchants. British.

In 1261, Albert the Great described this stone, in his work *Book of Minerals*, as the most powerful of all: the " *Carbunculus, which in Greek is anthrax, and is called rubinus by some , is an extremely clear, red and hard stone. It is to other stones as gold is to other metals. It is said to **have more powers than all other stones** , as we have already mentioned. When it is really good, it glows in the dark like a burning coal, and I myself have seen one like it "*

**Bartolomeo Anglico** ( Bartholomaeus Anglicus , 1190-1250), declared around the middle of the 13th century: "After the serene blue of the sapphire, the **royal red of the ruby was prized** , which shines so much in the night " .... "that it sends flames into the eyes".

The real ruby was relatively rare, although in the fourteenth century it rose above the sapphire, the emerald and the diamond; much more common and less expensive was the *balas ruby* whose translucent red showed a tinge of blue and therefore was believed to be extracted from sapphire veins.

**Albert the Great** was one of the many serious scholars who delighted in the study of lithotherapy (medicine linked to precious stones). The Dominican monk believed that ruby had superior healing powers compared to all other precious stones.

According to legend, the Chinese Emperor Kublai Khan, who ruled the Mongol Empire from **1260 to 1294** , **offered an entire city in exchange for a ruby** of exceptional quality.

And Marco Polo, a famous explorer who often had interactions with Kublai Khan, observed the mining of rubies in Ceylon during his travels, often describing in his writings the appearance of the mines and the methods for extraction. The Venetian traveler also brought news of a fantastic red gem in the possession of **Sendemain** , king of *Angamanain* , a mysterious island south of Burma and west of Malaysia, probably corresponding to the Andaman, but confused with Serendib (which later became Ceylon and today known as Sri Lanka).

"And the king of this island has a ruby which is the most beautiful and the largest in the world; I'll tell you how it is. It is about a **palm long and as thick as a man's arm** ; to look at, it is the brightest object on earth; it is quite free from defects and red like fire. Its value is so great that a money price could hardly be indicated. You must know that the Great

Kaan has sent an embassy and pleaded with the King, as a favor much desired by him, to **sell him this ruby** , offering to give for it the ransom of a city, or indeed what the King would have liked. . But the king replied that he would never sell it, because it came from his ancestors. "

In the 15th-16th centuries, rubies were thought to counteract poison. When rubbed into the skin, they were also thought to restore youth and vitality.

Court rubies during the Renaissance were widespread and often found in some of the most famous jewels of the time. For example, the **English King Henry VIII** wears a conspicuous necklace with rubies and pearls in his most famous portrait of the time.

In **1568** , the famous goldsmith and artist **Benvenuto Cellini** , gives some information on what was known about this gem at the time:

*"We will start with rubies, of which there are various types. The first is the **oriental ruby** , which is found on our side of the Levant and close to home; this part of the Levant, in fact, produces the rarest and most beautiful jewels of any other land. These rubies from the Levant have a mature color, are deep and very fiery. The **rubies of the West** , on the other hand, even if still red, tend to the color of the peacock and are a little sharp and rough. Northern **rubies** are even sharper and coarser, while **southern rubies** are quite different from others, but so rare that they are rarely encountered. It is true that these southern rubies do not always possess this unsightly quality, but they are so pleasing to the eye, that your good Jew easily distinguishes them from others, the name **carbuncle / carbunculus** is, however, only applied to the very **rare ones and those that shine in the dark** . "*

Cellini also tells us what the prices were in his time for these gems, indicating that

1. Ruby 800 gold shields
2. Emerald 400 gold shields
3. Diamond 100 gold shields
4. Sapphire 10 gold shields

In Indian archery, archers wore rings to protect their thumbs. However, this archer's ring, made of jade inlaid with gold, rubies, and emeralds, may have worked more as a costume accessory or status symbol. India, **17th-18th century**.

Ivan IV Vasilyevich ( **1530 - 1584**), commonly known as **Ivan the Terrible** of Russia declared that: *".. this (the ruby) is better for the heart, the brain, the vigor and the memory of man, it clears up the frozen and corrupted blood. "*

At the end of the 17th century, the great French merchant and traveler **Jean Baptiste Tavernier** , who in his six travels was often involved in bringing and selling diamonds and precious stones to the court of Louis XIV, described the caves of Burma as places where rubies were found. more valuable. He told of a specific mine in which "a ruby the size of a walnut" had been produced. According to Tavernier, rubies were often mined **next to the bones of large animals of a prehistoric nature**.

#### **Mogok and the European settlers**

When the first Europeans visited Burma in the 15th century, the country's gem wealth was well known. In **1597 AD**, when the Burmese monarch, Nuha-Thura But has Dhama-Yaza , tired of getting his second-hand rubies, limited himself to annexing the district of Mogok, exchanging a small piece of its territory with the unfortunate Shan saopha (prince), who was practically forced to accept the barter. Even today, a glance at a map of Burma illustrates the remnants of this one-sided agreement. The border separating the Sagaing Division from the Shan State makes a sudden rush to enclose the Mogok area.

After AD 1597, the Mogok Stone Tract was run as the private province of whoever had the strongest army. Mostly, these were the Burmese kings, who decreed that all stones above the value of Rs2000 were the property of the crown. Hiding was punishable by torture and death. This rule was so harsh that, by the time of the British annexation of Upper Burma in 1885, much of the local population had fled.

A 13th-century recipe for treating liver problems called for powdered ruby.

After his third visit to Persia in **1686** , the French jeweler and traveler John Chardin wrote that the **Egyptian carbuncle** was "most likely just an **oriental ruby** of a higher color than usual.

Josiah Wedgwood, in **1792** , found phosphorescence from the rubbing of two pieces of quartz or agate, and wrote that **ruby** gives "a beautiful red light of short duration".

The British Victorian writer **Charles William King** , a great gem collector, spent most of his life in Italy during the mid-1800s. In the Bel Paese, the English author also investigated engraved precious stones. In his time, he was considered a gemological authority. In

one of his works entitled *The Natural History, Ancient and Modern , of Precious Stones and Gems, and of The Precious Metals* (1865), he wrote:

"Real and good colored rubies, uncut but with their finely polished natural surface, are found both in old jewels, and set in rings dating back to ancient times."

**In 1878** , Sir Mourinho Tagore, in his Book *Mani Mala*, describes the **Kalpa Tree** , a symbolic offering to the Hindu gods. Made entirely of sapphires, diamonds, topazes, emeralds and other gems, this magnificent tree would bear **rubies as fruit** .

Manly Palmer Hall, Canadian author, lecturer, astrologer and mystic, best known for his **1928 work** *The Secret Teachings of All Ages* , wrote: " Paracelsus , Agrippa, Kircher, Lilly and numerous other magicians and astrologers, in the past have tabulated the gems and stones corresponding to the various planets and zodiac signs: The sun was assigned the carbuncle, the **ruby** and the garnet".

In **1960** , Theodore H. " Ted " Maiman, designed the first ruby **LASER** , the first device of this type used in medicine. Maiman's prototype laser is still functional, however over time it has been gradually replaced with dye, Nd: YAG and argon lasers which have proved more versatile.

Between **1960 and about 1990** , the mining of rubies and sapphires intensified in Thailand (the deposits had been known for at least a century earlier). This process was triggered by **the Communist military coup in Burma** (now also known as Myanmar) which made that country's gem deposits largely inaccessible to world markets from **1962 to 1988** . As a result, Thailand was ideally placed to assume the role of the world's first commercial source of rubies. Later, in the 1990s, Thai-Cambodian deposits ran out and new sources, mostly African, were discovered. Since then, activity has declined and most of the mines have been abandoned. Although current production is sporadic, gems from these once commercially important deposits are present on the market and in jewelry. Furthermore, a very important legacy of those decades of prominence has remained: today Bangkok is one of the most important centers (if not the most important of all) for what concerns the trade, cutting and treatment of sapphires, rubies and many other colored stones.

#### **2009 - Mozambique:**

Although corundum was discovered in the 1500s and was known to exist during the colonial period, until very recently there had been no commercial exploitation. In the spring of 1991, a sporadic sale of cabochon rubies from Mozambique was reported at the Tucson Fair (USA). In 2008, news came of **a deposit of rubies in Mozambique** . near the village of M ' sawize , within the Niassa National Reserve. The gems were extracted illegally and the field was closed by the authorities in the summer of 2009. The closure of that deposit led to illegal miners, known as *garimpeiros* , to move to Montepuez (near the village of Namahumbire , in the province of Cabo Delgado), where a few months earlier, again in 2009, another deposit had been discovered. The latter proved to be one of the most important in the world and is still in full production.

**Name:** The word ruby comes from *rebeus / ruber* , a Latin term that means **red** . IN ancient times it was difficult to distinguish different gems of the same color, such as garnets, spinels, sometimes red tourmalines or other red gems. A word often used was **balascio** (from the Arabic balahš ), the name of the Persian province of **Balahšān** , which was used to indicate that "sort of red, pale, violet-colored precious stone, which supposedly could have been the matrix of rubies" .

This gem was known under many other names - **Padmaraga** (Sri Lanka, which means "of the color of the lotus") , **ántrax / anthrax** (Greece, which meant "coal") , **ratnaraj** (the "King of Gems", in Sanskrit, India) , **carbunculus** (ancient Rome, "hot coal") , **acaustoi** (Ancient Rome, rare), **red corundum and Mäëikya (also in Sanskrit)** ) and was for millennia the most important of all gems .

The word **corundum** (the mineral , **on the** other hand, derives from " corinvindum " introduced in **1725** by John Woodward and derived from the Sanskrit, kuruvinda ("Ruby"). Richard Kirwan used the current spelling "corundum" in 1794.

In the ancient Sanskrit language, ruby is called **ratnaraj** , the "king of precious stones". Early cultures valued rubies for their deep red hue that mimicked the flush of blood and believed that rubies held the power of life and represented the strongest emotions on both sides of the spectrum: love and fury, ardor and anger.

**Other Names** : The Burmese term for ruby is padamyā ("abundance of mercury"). Other terms for ruby derive from the word for pomegranate fruit seeds.

**Variety** : Sanguis di Piccione ( Pigeon's Blood in English): common trade name -

Traditionally, for the inhabitants of modern-day Myanmar (formerly Burma) they referred to the higher shade of ruby with the word **ko- twe** meaning "pigeon blood". The exact

	<p>origin of this lemma is not known, it is thought that it may derive from Chinese or Arabic. A 14th century text, written by the Muslim physician and encyclopedist Ibn al -Akfani (Odierno Iraq ,? -1349), reports:  <b>Rummani</b> has the color of fresh pomegranate seed or a drop of blood (drawn from an artery) on a highly polished silver plate .  al- Akfani , ca. 1348 AD  Rumman ( رمان ) is the Muslim / Islamic / Urdu / Arabic term that refers to the pomegranate. Ruby is indicated with روبي ( rwbi ) and red gems with جوهرة حمراء , ( jawharat hamra ).  Some have compared this color <b>to the center of a live pigeon's eye</b> . Sometimes described as a rich crimson with no trace of blue undertones. Others believe it is the color of the first two drops of nosebleed from a freshly killed Burmese pigeon. However, writer James B. Nelson, in an article written for the Journal of Gemmology in 1985, stated that the bird and the red color were not related:  <i>In an attempt to find a more quantitative description of this mysterious red color known only to hunters and the lucky few owners of the best Burmese rubies, the author sought help from the London Zoo. Their research department was quick to obey and sent in a fresh, lysed, aerated pigeon blood sample. A sample was readily spectrophotometer.... The Burmese bird can finally be safely removed from the realms of gemology and returned to ornithology.</i>  In reality, pigeon blood cannot be completely excluded, given that there are at least 27 different species (between indigenous and otherwise)  The second best color in Burma is called <b>yeong-twe</b> which translated means "rabbit blood", and indicates a strong intention to bind the color of the stone to the body fluid. It is a slightly darker, more bluish red.  The third best is a deep pink called <b>bho-kyaik</b> or "English preference", probably from the ruby tastes of an unidentified Anglo-Saxon trader named ACD Pain.  The fourth best is the <b>leh-kow-seet</b> (literally "bracelet quality" ruby), a light pink.  At the bottom of the ruby red scale is the <b>ka- langoh</b> , which would stand for "Indian quality crying" or for "an Indian crying", (even Indians would have screamed in despair at this quality) perhaps because 'darker than an Indian's skin or because' dark rubies were sold in Mumbai or Chennai (formerly known as Bombay and Madras), India.</p>
<p><b>Property attributed</b></p>	<p>3000 BC The story of <b>Syamantaka</b> appears in the Vishnu Purana texts and in the Bhagavata. The jewel originally belonged to the sun god, Surya, who wore it around his neck. Some speculate that the legendary Syamantaka Mani may actually be the famous Koh-i-Noor diamond, currently one of the crown jewels of the United Kingdom, but with mysterious origins. The Koh-i-Noor, of course, does not match the superlative descriptions of the Syamantaka and considerable poetic license should be assumed.  It is said that it could produce 3,700 grains of or nearly 80 kg of gold every day and that it was also the source of the sun god's dazzling appearance. Any kingdom that owned this jewel never encountered calamities such as drought, floods, earthquakes or famines and he was always kissed by prosperity and fullness. In the past, some believed that Syamantaka was a sapphire (the gem of Saturn), but according to more recent theories, it could <b>be a ruby since</b> it is the gem of the Sun in Navaratna (Hindu sacred gems).  Ancient Indians (Hindus) believed that the gems were born from a demon called <b>valäsura</b> , who had been killed <b>by Indra</b> . After his death, his body parts had turned into different stones. His bones had turned into diamonds, his teeth into pearls, <b>his blood into rubies</b> , his bile into emeralds, his eyes into sapphires and bodily fluids into cat's eye and so on.  <b>The four castes</b>  The Hindus divided rubies into four castes ( as they had also done for diamonds), combining the beauty and impeccability of the stone with the perceived caste with similar qualities. Rubies considered to be of inferior quality could not mix with a superior stone because it would have contaminated its nature, diminishing its powers of strength and protection. The true oriental ruby was called <b>Brahmin</b> and it was believed that those who possessed a Brahmin were always protected and in perfect safety.  Le Navarathna / navaratna  A traditional Hindu astrological belief considers rubies as "<b>the precious stone of the Sun and also the celestial deity Surya</b> , the leader of the nine celestial bodies ( Navagraha connected with the Navaratna , the nine gems that appear in Hindu, Buddhist and Jain texts)." The belief is that worshiping and wearing rubies causes the Sun to be favorable to the wearer. This belief was also reported by a famous Thai astrologer Horacharn Thep</p>

	<p>Sarikabutr . Horacharn gave the nine gems the meaning in his Parichad- Jataka : " <b>The first quality and flawless ruby is the gemstone for the Sun</b> , the natural pearl for the Moon, the red coral for Mars, the emerald for Mercury, the yellow sapphire for Jupiter, the diamond for Venus, the blue sapphire for Saturn, the hessonite for Rahu (ascending lunar node) and the cat's eye for Ketu (descending lunar node). " This interpretation probably derives from the Sanskrit text " Brihat Jatak " and is also mentioned in the 1879 work" Mani-mala "by SM Tagore.,</p> <p>Among the ceremonial offerings that Hindus left in various temples were sometimes gems and jewels. Regarding those <b>who gave away rubies</b> , the ancient text Xarita Smriti (possibly 5th-3rd century BC) one of the Dharma Shastras (Law Books for ancient Indian society), the Sage Harita reports that: <i>He who worships Krishna with a large ruby will be reborn as a mighty emperor. If with a small ruby, he will be born king .</i></p> <p><b>Pliny</b> reported that the <b>carbunculus</b>:  <i>... it was divided into male and female, the former was of a surprising brilliance, while the brightness of the latter was not so strong. Even in the male varieties we see some in which the focus is clearer than in others; while others, still, are darker in color, or have their brilliance more deeply ingrained and shine with a more powerful luster than others when viewed in the sun .</i></p> <p>In a 13th century missing work, <b>The Book of Wings</b> , the author, the mysterious Ragiel (quoted by the famous Tiffany gemologist George Kunz, in 1913) wrote: <i>"The beautiful and terrible figure of a dragon. If this is <b>found on a ruby</b> or any other stone of similar nature and virtue, it has the power to increase the goods of this world and make the wearer joyful and healthy. "</i></p> <p>Ruby is one of the <b>traditional cardinal gems</b> , along with amethyst, sapphire, emerald and diamond (first 5, when they included amethyst, then 4, when the gem became too common due to the discovery of South American deposits).</p> <p>Other properties attributed to rubies included protection from lightning, storms, worms, sadness and jealousy. Rubies signaled danger by turning black and regaining their original color once the danger passed. Sorcerers.</p> <p>The stone is commonly used to <b>relieve physical ailments such as fever and irregular blood circulation</b> . It <b>restores vitality</b> , balanced health and general state in a person's body. It is believed that it can revive the physical state and protect against unwanted diseases. promoting <b>wealth, possession and peace</b>.</p> <p>For those who wear it and choose its deeper shades, any feelings of laziness or discouragement are removed. Ruby also has strong <b>aphrodisiac qualities</b> that go beyond the simple ideas of touch and desire. As the vibrant deep red hues suggest, it's a <b>bloodstone</b> , meaning it can encourage everything from circulation to menstrual pain, sexuality, fertility issues, and can even help the body detox, as well as help heal the kidneys. , lymph and adrenal glands.</p> <p>This gem can also exude opulence, and is firmly connected <b>to the themes of love</b> , encouraging to overcome old wounds and balancing sensitivities. For this reason, it is thought that it can help rebuild trust as well, particularly when it comes to love and loss. Ruby also helps the heart. It is often used as a symbol for those who have been married for 40 years, this means that it goes beyond the boundaries of romantic love and delves into issues of compassion, protection and perseverance. The stone is not associated with risky business, so for those who are making financial decisions.</p> <p>Spiritually, it represents a burning light in the dark. For those who feel that the world has turned cold and cannot commit, this gem ignites the inner engine.</p> <p>It is the gem of the <b>15th wedding anniversary</b>.</p> <p><b>Today</b> : Facilitates circulation, vitalizes blood, strengthens immunity, gives courage, consistency, altruism, joy, eliminates the sense of limitation.</p> <p><b>Planet:</b> Sun</p> <p><b>Month:</b> July ( official stone)      <b>Zodiac sign:</b> Capricorn</p> <p><b>Chakra:</b> root and heart</p>
<b>Treatments</b>	<p>Among all the techniques to enhance the beauty of the ruby, the most ancient is certainly that of heat treatment. This method is still applied today to a large number of precious stones. According to some sources, red agates and carnelians found in archaeological sites in <b>India and dating back to the second millennium BC</b> . show traces of this very intervention. Also in the tomb of the famous <b>pharaoh Tutankhamun</b> (1342-1325 BC) gems were recovered whose color was altered through the targeted application of heat. Over two thousand years later, the great Persian scholar, <b>Al Biruni</b> (973-1050 AD) was perhaps the first to describe the "heating" process of the ruby. He says</p>



this was done using a small semicircular chamber designed to melt 50 mithqal (212 grams) of gold. Since gold melts at 1064 ° C, it can be inferred that the furnace used must have been capable of reaching temperatures of at least 1100 ° C.

Also from the Middle Eastern world, we receive confirmation that this method was still in vogue since 1240 AD **through the writings of Tefaschi / Tifaschi** (1184-1253).

Also in Italy there are reports of color-induced alterations of gems; **Giovanni Battista Porta** [1535–1615] of Naples does it in the sixth book of his work "**Natural Magic**". In this important work, the author discusses various ways of counterfeiting and adulterating the precious stones of his time, including heat treatment.

In the 19th century, improvements in experimental sciences led to a continuous updating of technical resources, **allowing the development of furnaces that could easily reach and maintain temperatures of 1500 ° C or even higher**. However, until the first systematic studies, conducted in the early 1930s, not much was known about the real effect of heat on precious stones. Since then many things have changed, today (2020) it is estimated that over 90% (GIA figures) of these gems are subjected to this process.

#### **The deposits, the characteristics of the rubies and the interventions to modify them**

Until the end of the 1980s, known ruby deposits were limited to a few areas of Southeast Asia: **Myanmar** (Burma until 1989), **Thailand** and, to a much lesser extent, **Sri Lanka** (which until 1948 known as Ceylon). Burma had been the largest producer for hundreds of years, but after the 1962 military coup, it had "passed the scepter" to Thailand. For about 3 decades, Bangkok and the surrounding area were the main source of these gems, but their deposits ran out rather quickly. In the 1990s, at the same time as the end of large mining operations in Thailand, extensive territorial exploration led to a **boom in new fields**.

Since the end of the outgoing millennium, the producing states of these stones have multiplied enormously. While this has restored a stable and prosperous trade in ruby, it has made it more complicated to determine their geographical origin. There is no official data on its global extraction (mostly coming from small artisanal businesses from secondary deposits), but there is general agreement on the fact that today **Myanmar and Mozambique** are the 2 primary exporters of these intense red stones. It is important to understand the origin of the material because, apart from the prestige deriving from some renowned places (and the relative price), some types of treatment can be envisaged on the basis of it.

Stones originating from deposits of **metamorphic genesis, associated with marble**, such as those of **Myanmar ( Mogok )**, **Afghanistan**, China (Yunnan), Kenya ( Machakos-Thika area ), Macedonia ( Prilep ), Nepal, Pakistan, Tajikistan, **Tanzania** (Mahenge, Morogoro), Vietnam (Yen Bai, Quy Chau), typically iron deficient, **do not respond to heat treatment**. Rubies associated with **amphibolite** (one of the most frequent types of host rocks), such as the deposits of Greenland, Kenya, Madagascar ( Ilakaka, Nosy Be, Ambato and Ambondromifehy ), Malawi, **Mozambique**, Tanzania ( Longido, Winza ) and India, they are susceptible to this process.

Finally, those related to **magmatic / igneous deposits**, of basaltic-alkaline type, such as those of Chanthaburi, Trat (Thailand), Pailin (Cambodia), **Mong Hsu (Myanmar)**, Australia, Cambodia, Cameroon, **Ethiopia**, France, Kenya ( Mangari, Taita Taveta), Israel, Madagascar ( Ankaratra - Antsirabe area - Antanifotsy ), New Zealand, Nigeria, Rwanda, Scotland and Vietnam ( Dak Nong ), show evident response, often due to the iron content, to cooking in an oven.

#### **The methods**

Until the 1990s, heat treatment was not applied to Burmese rubies (then predominantly from Mogok, Mong Hsu only began large-scale production in 1991), but was common in those of Sri Lanka and Thailand. To improve transparency, the ruby was "cooked", for several hours, at **temperatures between 1000 ° C and 1900 ° C**, that is up to values close to the melting point of rutile (1843 ° C, which however begins to melt at 1650-1700 ° C and bears a blue color) and to that of corundum (about 2044 ° C). To increase the heat of these rudimentary furnaces, the "blowers" could blow into a pipette 2 times per second for several minutes. The traditional fuel used for these still quite simple processes was coal obtained from the woody part of the coconut. In more modern workshops, on the other hand, gas cylinders or electrical appliances are used. The fact that this form of treatment is not always applied is not linked to the feelings of honesty of these "sophists", but rather to the awareness that this form of manipulation does not have the same effect on all stones. Some rubies can react to high temperatures with noticeable

changes, while others, with different chemical characteristics, are completely inert to this intervention.

This form of alteration of purity and color of rubies occurs in a myriad of variations, some of which are still unknown, but all these systems have some characteristics in common, for example, the need to act on:

1. The **temperature-time relationship**
2. The conditions of **oxidation reduction** (presence or absence of oxygen)
3. The presence of **chemicals** that can interact with the gemstone

The heat treatment of corundum can affect the presence of chalking or asterism.

#### **The main types of heat treatment**

##### **At low temperatures (800–1200 ° C)**

Despite being known for centuries, this system has had a recent spread, triggered by the exploitation of new deposits, in particular those of Mozambique. The temperatures reached normally vary from **550 ° C to 750 ° C** (but can reach up to 1000 ° C) approximately and, while they cause a noticeable reduction of the blue component in many samples, they do not involve the melting of a large part of the minerals included within the gems. This limited impact on the internal characteristics therefore makes it difficult to detect this intervention with standard gemological analysis tools. However, this intervention can be revealed by specialized laboratories through FTIR spectroscopy.

##### **At high temperatures (1200 ° C +)**

This is the most "conventional" treatment (generally above 1300 ° C), already mentioned above and is used to change the color of the stones from brown or purple to red (and sometimes from red to orange) by triggering the **reabsorption of the rutile mineral**. and sometimes also improving the transparency of the "heated" stone.

An important step in this direction was provided, in the early 1980s, by the introduction of electric *muffle furnaces* (which can reach up to 1800 ° C).

In addition, since 1997, the German company LINN has started selling low pressure autoclaves for the treatment of corundum (up to 25 bar), many of which have been sold in Asia. Prolonged heating treatments assisted by increased pressure can produce color mutations without triggering the explosion of the negative fluid-filled crystal inclusions present in part of the gems.

**Treatment Disclosure** : For all these forms of surgery, the primary tools for gemological testing (if you don't have a laboratory with advanced equipment) remain the jeweler's lens, microscope, and inclusion analysis.

#### **Filling of cracks and cavities**

##### **With glass**

Ordinary glass (silicon dioxide) has been used extensively to fill cavities and fractures in rubies since the 1980s (it was described as early as 1984). This system is intended to improve the appearance of rubies (particularly when viewed face up) and can add weight (if the crevices are hollow).

##### **With lead glass**

This treatment dates back to the early 2000s and normally increases the transparency and luminosity of gems which, when altered, can appear to be more expensive rubies. The process is not permanent and can be damaged when the stones are not handled and cleaned carefully. These stones normally have no value and are not classified as rubies by the major gemological analysis laboratories.

##### **With other materials**

After removing the evident impurities, the ruby is brought to temperatures between **900-1,400 ° C** (this process can, at times, also improve its color). When the stone reaches the desired heat value, special **powders are poured onto it ( especially lead and silica** but also sodium, calcium, potassium and metal oxides such as copper or bismuth) and the compound obtained is brought back to about **900 ° C** , to let additives penetrate its fractures. The gem is then cooled and cut.

##### **Borax**

Always since the beginning of the 80s, also another substance has entered to increase the already large array of treatments: borax (or sodium tetraborate decahydrate). The addition of this type of melting material ( **flux** ), melted during the heating phase, helps prevent fractures caused by thermal shock and lowers the melting point of the introduced material. Subsequently, through the addition of submicroscopic quantities of synthetic corundum, which solidify when the gem cools, the cracks are closed and covered and thus "healed". This material is now very common and easy to find.

##### **With oils, dyes and polymers**

	<p>Oiling is another way to fill surface fractures and improve the color of the gem. This was once a practice typically associated with emeralds, but has recently become quite popular for <b>low-quality rubies and spinels as well</b> . Oil fillers are less stable than glass. The oils evaporate over time, leaving an unattractive gem with very visible fractures. Most of the stones that exhibit this form of manipulation <b>come from Myanmar</b> , where many vendors consider lubrication to be a standard procedure . In addition to simple oils, there are also tints, red liquids commonly used to enhance the <b>color of stones</b> (in Chanthaburi, Thailand, it is sold under the brand name " <b>King Ruby Red Oil</b> ").</p> <p><b>Treatment disclosure</b> : Normally, all these treatments are highlighted through visual examinations with the aid of magnifying tools (difference in color, luster, transparency, presence of air bubbles).</p> <p style="text-align: center;"><b>Diffusion</b></p> <p>In the mid-1990s, an innovative system was quietly introduced to create red hues in colorless or light-colored faceted corundum. This method went unnoticed for some time before gemological laboratories discovered its presence on the market. The material made to penetrate through the surface of the stones (less than one mm thick), is not the one responsible for the color of the ruby, i.e. chromium III or Cr<sup>3+</sup> , but chromium oxide (CrO<sub>3</sub>, which replaces the atoms of aluminum). The selected samples are immersed in a solution containing 3 - 6% of this inorganic compound and placed in an aluminum crucible. They are then subjected to temperatures ranging <b>between 1600 ° C and 1850 ° C</b> , in an oxidizing environment (capable of releasing oxygen atoms in an oxidation-reduction reaction). The heating time can vary greatly ( <b>2 to 200 hours</b> ) . It has been known for a decade that chromium penetrates deeper into corundum samples irradiated with electron beam, but specimens appear to be treated do not appear to be on the market. The type of surface modification itself is relatively infrequent in ruby, but more <b>common for sapphire (blue) and Padparadscha sapphire (orange-pink)</b>. Iron is 26 on the periodic table, titanium is 22 , <b>and beryllium is 4</b> . This is why Orange Beryllium Diffuse Sapphire exhibits better color penetration than Blue Sapphire. It is also the reason why <b>chromium (24 on the periodic table) is not popular for diffusion</b>.</p> <p><b>Treatment disclosure</b> : With the proper knowledge, this intervention is not difficult to identify: the use of diffused light and immersion can help; through the meticulous observation it is possible to see color combinations in spots and / or along the edges of the veneers. Non-homogeneous fluorescence can also be measured by laboratory instruments (for example X-ray or XFR), but not standard gemological ones. In some cases, the gems treated in this way show double refractive index (RI); that typical of corundum (1.762-1.770) combined with another series of shades whose values of 1.779-1.789 are anomalous for this stone.</p> <p>While simply "cooked" rubies can be very expensive, all those altered with the systems listed above <b>have a very low value</b> .</p> <p style="text-align: center;"><b>Stability of treatments and gem care</b></p> <p>Stressing heavily embedded (low quality) starting materials can cause cracks and cracks (durability problem), regardless of the treatment method. Despite its hardness (9 on the Mohs scale, 400 on the absolute scale), the ruby must be handled with some care, as <b>it can be internally</b> fragile (due to the presence of inclusions) and further weakened by these artificial modifications.</p>
<p><b>Synthetic counterpart</b></p>	<p>In 1837 Gaudin made the first synthetic rubies by melting high temperature potassium alum with a little chromium as a pigment. In 1847 Ebelmen created white sapphire by melting alumina in boric acid. In 1877 Frenic and Freil made crystal corundum from which small stones could be cut. Frimy and Auguste Verneuil produced artificial rubies by blending BaF<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> with some red-fired chromium. In 1903 Verneuil announced that he could produce synthetic rubies on a commercial scale using this flame melting process. By 1910, Verneuil's workshop had expanded into a manufacturing facility of 30 kilns, with annual gemstone production reaching 1,000 kg (2,205 lb) in 1907.</p> <p>Grown Ruby - A synthetic ruby grown from alumina dissolved in a molten flux.</p> <p>Geneva Ruby - The first synthetic rubies (circa 1885) created in Geneva.</p> <p>Verneuil Ruby - A synthetic ruby created using the flame casting process. Factories in Germany, France and Switzerland today can contain nearly 1,000 ovens operating simultaneously, day and night. Massive production also exists in China, Thailand and elsewhere. The output of such factories is <b>measured in tons rather than carats</b> , and the cost of raw synthetic corundum can be as low as a few cents per carat. The crystals thus produced, called boules, are cut in standard workshops, sometimes by machine or by hand where labor is inexpensive.</p>

<p><b>If can be confused with</b></p>	<p>Some gemstones that are commonly or historically referred to as rubies, such as the Black Prince's Ruby in the British Imperial State Crown, are actually spinels. These were once known as " Balas / Ballas rubies" (but also balascia , or balascio). Other imitation stones can be red garnets, red tourmaline (rubellite), colored glass and synthetic stones such as CZ and YAG (an artificial garnet). The imitations date back to Roman times and already in the 17th century techniques were developed to color a sheet red - by burning scarlet wool in the lower part of the furnace - which was then placed under the fake stone. r can mislead unsuspecting buyers.</p>		
<p><b>Indicative gemological tests</b></p>	<p>In the case of rubies, all the gemological tests can be indicative, given the number of imitations, synthetic stones, composite and treated stones. Microscopic examination is often vital, but not sufficient for secure identification. In many cases, tests with common gemological tools are not enough for a conclusive determination /</p>		
<p><b>Value (2021)</b></p>	<p><b>High:</b> 100K-1M + \$ / ct <b>below the carat</b></p>	<p><b>Medium:</b> 10k-50k \$ / ct <b>1-3 carats</b></p>	<p><b>Low:</b> \$ 500-1000 / ct <b>3 carat +</b></p>
<p><b>Typical cut</b></p>	<p>Calibrated cuts are often used for standard value stones, especially stepped oval. Gems of superior color or clarity impose individualized facet lines, to preserve the maximum of the stone.</p>		
<p><b>Famous stones</b></p>	<p>The Smithsonian National Museum of Natural History in Washington, DC has some of the largest and most beautiful ruby gems in the world. The <b>23.1 carat (4.62 g)</b> Burmese ruby , set in a platinum diamond ring, donated by businessman Peter Buck in memory of his late wife Carmen Lúcia . On December 13 and 14, 2011, Elizabeth Taylor's entire jewelry collection was auctioned at Christie's. Several ruby-set pieces were included in the sale, most notably a ring with an <b>8.24 ct gemstone</b> that sold for USD 4.2 million or USD \$ 512,925 per carat. The Sunrise Ruby is the most expensive ruby in the world, the most expensive colored gemstone and the most expensive gem apart from a diamond. In May 2015, it was auctioned in Switzerland to an anonymous buyer for \$ 30 million.</p>		
<p><b>Record stones</b></p>	<p>Eminent Star 6,465.00 ctsIndia Ecce Homo Star Ruby 2,890.00 ctsMozambique Edwardes Ruby 167.00 cts Rosser Reeves Star Ruby 138.70 cts Sri Lanka Anne of Brittany's 105.00 cts Liberty Bell Ruby is the largest mined ruby in the world. It was stolen in a robbery in 2011.</p>		