

**GEMS AND STONES OF SHERLOCK HOLMES**  
**TOUR OF THE AMERICAN MUSEUM OF NATURAL HISTORY**  
Developed by Judith Freeman

Hall of Meteorites – First Floor of the American Museum of Natural History, NY

Cape York Meteorite (Ahnighito) from Cape York, Greenland: brought to the museum in 1897 by Adm. Robert Perry at the cost of \$40,000. It took 14 teams of horses to pull it from the pier to the museum.

Adventures: ENGR & VALL

Composition: 90% iron & 10% nickel

Weight: 34 tons or 68,000 pounds

Age: 4 to 4.5 billion years old



The following explains the difference between asteroids & comets, and meteors & meteorites

- A. Asteroids – are extra terrestrial chunks of stone and/or metals. Believed to be either leftover material from when the solar system formed or fragments of planets or planetoids that exploded.
- B. Comets – have a rocky core surrounded by ice and gases. They are more primitive than some asteroids. They have hair-pin elliptical orbits with the tail always pointing away from the sun.
- C. Meteor – When either an asteroid or comet enters the earth's atmosphere, it becomes a meteor. The earth's atmosphere starts at about 50 miles above the surface of our planet. There is often a flash or streaks of light visible when this happens, popularly called a shooting star.
- D. Meteorite – is any part of the meteor to survive passage through the atmosphere. Many don't survive as they burn up in transit. Many of those that do survive fall into the oceans. Meteorites contain a wealth of information about the solar system and the interior of our own planet.

Iron is actually mentioned in many more adventures than just ENGR and VALL, too many to list. There are numerous uses of iron referred to in the Canon; such as iron bars, beds, chests, clamps, gates, hinges, pipes, spanners and safes.

The Harry Frank Guggenheim Hall of Minerals - First Floor of the American Museum of Natural History

A mineral is a naturally occurring solid, inorganic substance with an ordered atomic structure and a chemical composition that varies within fixed limits. A mineral is made up of one or more elements. There are 100 plus elements. Each element has a particular atom connected to it. Those atoms form a regular, repeating 3-dimensional atomic structure called a crystal. Almost all minerals are crystalline. It is the nature of that atomic structure or crystal and the kind of elements that differentiate one mineral from another.

### Gypsum

Adventures: ENGR, NORW, RETI, SIGN, SIXN, STUD, SUSS & 3GAR (monograph on footprints, casts of statues & skulls, patched walls, lath & plaster walls and ceilings)

Composition: Calcium sulfate hydrate

Hardness: 2 on the Mohs scale

Gypsum is used extensively in the building industry to make lath and plasters walls, wallboard and also orthopedic casts. It's called plaster of Paris because it was originally mined by the Romans under the old city of Paris.



### Petrified or Fossilized Wood (Quartz)

Adventures: DEVI, HOUN, 3GAR (flint arrow heads) 3GAR (fossil bones)

Composition: Silicon dioxide

Hardness: 7 on the Mohs scale



The photo shows a section of tree that has been fossilized; where minerals replicated a tree. The organic matter has been replaced by quartz and other minerals, like iron oxides. Quartz is one of the most common minerals in the earth's crust. Quartz varieties include agate, amethyst, chalcedony, chert, citrine, flint, jasper and rock crystal. Chalcedony also comes in a number of varieties, including carnelian and onyx. Flint can be flaked in shell shaped fractures that results in a sharp cutting edge, as in tools used by Stone Age peoples.

Wood could be fossilized when a great flood washed the trees down a river. They may have be lodged against a sand bar and covered with layers of silt over time. The silt cut off the oxygen, thereby slowing the rate of organic decay. Water percolated down through the silt carrying dissolved elements, which then precipitated out and crystallized forming a duplicate of the tree.



## Crystallized Gold

Adventures: Mentioned in 49 of the 60 tales.

Hardness: 2 ½ to 3 on the Mohs scale

Symbol: Au (Aurum)

In the Canon there are gold mines in Africa, America & Australia. Gold jewelry including coronets, earrings, Masonic rings, rings with gold nuggets, twisted snake rings, wedding rings, and watch chains. There are golden pince-nez, gold leaf and plates of beaten gold. There is gold in payment for treason, gold bullion, gold coins, gold Napoleons from the bank of France, gold sovereigns, gold wire for a silver lamp. Not to mention in an old gold snuffbox with an amethyst and a U.S. Senator known as the Gold King. (Okay, the last one is organic, not mineral.) With so much gold in the Canon, it's worth taking a closer look at this mineral.



Four and one-half billion years ago the earth's crust cooled and changed slowly from liquid to solid. Most of the metals in our planet segregated into the earth's core. Water, heated by volcanic activity, traveled along cracks in the mantle and rose toward the surface carrying dissolved gold with it. As the solution neared the surface, the gold separated out

and collected in cracks or veins. Rarely, such veins may have enlargements or cavities along their course within which the gold can slowly crystallize. That is why the specimen pictured above is so rare.

Many millions of years of erosion have exposed some of the veins. Further exposure to weather elements could cause chunks of gold to wash downhill and downstream. Because gold is very dense it will collect at the bottom of a river or stream in a concentration called a placer or nugget. It was the finding of such nuggets that set off the California gold rush.

In order to reach the gold deposited beneath the surface of our planet you have to mine 5 tons of earth for one ounce of gold. There's been an estimated 95,000 tons of gold mined to date.

Gold is one of a group of 25 minerals that are considered a "native element"; a mineral that is found in a free, uncombined state. Gold is relatively inert and resists weathering and corrosion. Because it does not corrode it is used in various connecting devices in electronic equipment.

Gold is malleable, and can be hammered into thin sheets for use as gold leaf. It is also highly ductile. One troy ounce of gold can be pulled into a fine wire one mile long.

Throughout history gold has been valued by many cultures, and is a symbol of wealth and power. Religious symbols are often made of or adorned with gold. It is believed people first used gold as early as 5,000 years ago. The search for gold was motivation for exploration of much of the world. The largest remaining deposits are primarily in the Witwatersrand of South Africa and the Ural Mountains of Russia, where it is very difficult to access. There are also approximately 10 million tons of gold under the ocean floors, which are even more difficult to access.

Copper – with inclusions of malachite and/or azurite which are copper carbonates  
Adventures: DANC, SCAN, SHOS, TWIS, VALL (Coins, filings and copper shells for a revolver)  
Hardness: 2 ½ to 3 on the Mohs scale

Symbol: Cu (Cuprum)



Copper is one of the first metals used by humans. Small, rough pieces were used to decorate clothing as early as 7,000 BCE. It was first smelted about 5,000 BCE. Copper has been mined in many places. The Bronze Age in China developed about 1,700 BCE.

Bronze is the alloy of copper and tin; an alloy of copper and zinc make brass. When Europeans first arrived in North America they found the native people wearing necklaces of copper beads. And copper coins were first used by the ancient Greeks.

Some of the first metal tools were made of copper, such as axes, adzes, awls and chisels. It was also used for decorative and ritual objects such as mace heads, crowns and scepters. In the Hall of South American People at the American Museum of Natural History there is the Copper Man; an Andean miner presumably trapped when the mine he was working in collapsed and he became mummified with copper.

Copper, like gold, is malleable and ductile and is used to make wire and coins today.

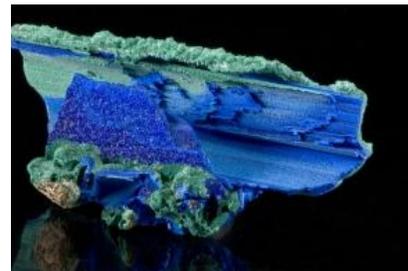
### Azurite & Malachite

Adventure: SIGN (...and other stones, the very names of which I did not know at the time)

Composition: basic copper carbonate

Hardness: 3 ½ to 4 on the Mohs scale

Azurite and malachite are both used to make jewelry and objects d’art. The ancient Egyptians ground up malachite, mixed it with oils and used it as eye shadow.



### Amethyst – a form of quartz

Adventure: IDEN (old gold snuffbox with a great amethyst)



Composition: Silicon dioxide with trace of iron

Hardness: 7 on the Mohs scale

Amethyst is the most valuable of the quartz gems. It ranges in color from pale violet to dark purple, depending on the amount of iron in it. It is often found in geodes, which are globular stones having a cavity lined with inward-growing crystals. Geodes form in fissures or open areas of rocks where bubbles of liquid with dissolved elements are trapped.

Amethyst is said to have many supernatural powers: it brings luck, ensures constancy, and protects against magic and homesickness. Named by the ancient Greeks, it was believed to be an amulet against drunkenness.

A Greek myth relates that the god Bacchus, to avenge an insult, declared that tigers would devour the first person he met. This person happened to be Amethyst, on her way to worship at the shrine of Diana. As the tigers sprang, Diana turned the girl into a clear, transparent crystal. Repenting, Bacchus poured juice of grapes as a libation over the stone, thus giving the gem its beautiful purple color.

The color comes from a trace amount of iron that mixed into the quartz as it crystallized. Trace elements are a little like food coloring. The trace amount of iron doesn't really change the properties of the quartz, just the color.

J.P. Morgan Hall of Gems - First Floor of the American Museum of Natural History

### Silver

Adventures: ABBE, DANC, DYNI, EMPT, ENGR, FINA, HOUN, LADY, SIGN, SILV, STUD, TWIS, VALL, YELL (Cigarette case, many coins, a dove shaped lamp, trim on a lady's handbag, old Spanish jewelry, locket, watch, silver plated coffee pot, prospecting, silver bands to mend a pipe stem and flatware)

Hardness: 2 ½ to 3 on the Mohs scale

Symbol: Ag (Argentum)

Silver is yet another of the native elements. Like gold and copper, it is extremely ductile and malleable; it is also capable of a high polish. Unlike gold, silver is constantly reacting with its environment, which results in tarnishing.

Silver has many uses, such as silver flat ware, silver teapots, trays, candle sticks and silver utensils of all kinds. It is used in making all manner of jewelry. Silver salts are used in photography. It is also used in dentistry; as much as two thirds of the silver mined today ends up in people's mouths. Last, but far from least, silver is used as money, as in silver coins. 4500 years ago the Mesopotamians may have been the first to have a silver standard, creating ring money that could be worn like bracelets and that was easily portable.

Silver usually occurs as a wiry aggregate or mass (see picture), and the finest examples come from the Kongsberg mines in Norway.

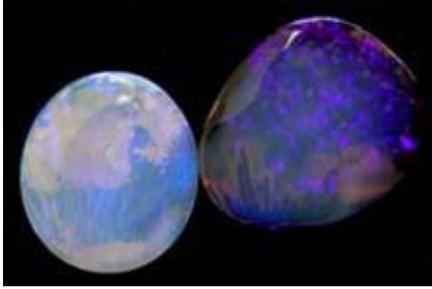


### Opals

Adventure: SPEC (Tiara)

Composition: Hydrrous silicon dioxide

Hardness: 5 ½ to 6 ½ on the Mohs scale



Opals do not have a crystalline structure and therefore do not technically fit the definition of a mineral. Examined through a scanning electron microscope, an opal contains crystalline structures within it. These structures are microscopic and form little masses or spheres something like caviar with water molecules incorporated into them. The little spheres cause the light interference that gives the opal its beautiful play of color or light diffraction.

This makes opals fragile, a sharp blow or a sudden change in temperature may cause opal to fracture. This fragility may explain the belief, dating from the early 19<sup>th</sup> century that opals are unlucky. Opals can be kept hydrated by being worn frequently; the body's natural oil retains water in the stone.

Queen Victoria helped to popularize opals by giving opal jewelry to all of her children. The Romans considered opal a stone of love and hope. The Arabs believed opals fell from heaven in flashes of lightning. The Australian aborigines consider the opal a devil, half serpent, half human, which lurks in a hole in the ground ready to lure men to destruction with flashes of wicked magic.

#### Amber – Fossilized tree resin

Adventures: PRIO, YELL (pipe stems)

Hardness: 2 – 2 ½ on the Mohs scale

Amber is an organic gem. It is fossilized tree resin, generally from coniferous trees. However there is no mineral replacement of organic material. The true definition of a fossil is “a fossil is any evidence of prehistoric life, ten thousand years old or older.”



Trees produce resin as a defense against boring insects or when a limb breaks off. Occasionally as the resin forms a scab over the wound, seeds, leaves, flowers, feathers, insects and small vertebrate animals will get trapped in the sticky resin. These inclusions give scientists perfectly preserved evidence of some of the flora and fauna from the past.

The process by which tree resin turns into copal and then amber is the result of constant pressure and temperature which gradually change its construction over time. These conditions cause resins several million years old or older to be sufficiently cross-linked and polymerized to be classified as amber.

While trace deposits of amber occur all over the world, there are only about 20 deposits found to date with enough amber to be mined. The most important sources of amber are the southeastern shores of the Baltic Sea and the Dominican Republic. Amber occurs in white, yellow (butterscotch), honey color, browns and red. Rarely green or blue fluorescent amber is found.

Amber is referred to as a semiprecious stone. It has been used for adornment for many millennia. Amber can be carved relatively easily. Pendants of amber have been found that date back to 7,000 BCE. Bronze Age artifacts have been found in the burial mounds near Brighton, England. The Etruscans, Romans and the ancient Chinese and Egyptians used amber for jewelry, objet d'art and sculpture.



The most ambitious work of amber, by far, was the amber room, commissioned by King Frederick I of Prussia in 1701, and it is this room that figures in a mystery worthy of a certain consulting detective.

All the walls were paneled with a mosaic of amber pieces, some of them carved with portraits. In 1717, Frederick William I gave the amber room to Czar Peter I to commemorate an alliance between them. The room was moved from palace to palace, and in 1763 amber paneled furniture was added.

In 1941, when the Nazis invaded Leningrad, attempts were made to disguise the panels by papering over them. In 1942, two German officers, who were art historians in civilian life, recognized the panels and moved them to a castle in Kaliningrad for safekeeping. In 1945, as the allied forces were bombing this city, the panels were presumably removed once again and hidden away. However that is uncertain, as fire and/or the bombing could have destroyed them. The last person known to know of their location was a S.S. commander, Erich Koch, who went to his grave in 1986 without revealing the location or fate of the amber room.

## Pearl

Adventures: ILLU, SIGN, SIXN – (Stickpin, large rare variety of pearl, pearls set in a gold chaplet and the Borgia's black pearl)

Composition: Calcium carbonate, organic substances and water

Hardness: 3 – 4 on the Mohs scale



Pearls are produced by both fresh water and marine mollusks. They consist of mother-of-pearl, which is mainly calcium carbonate and an organic horn substance (conchiolin). Pearls are formed when an irritating particle is caught between the organism's body and its shell. The irritant is rubbed against the shell, gradually coating it with nacre or the mother-of-pearl. This reduces the irritation and creates a lustrous natural gem. The luster is often called "orient."

Black pearls are rarer, thicker and on average bigger. The oysters that produce black pearls are four times larger than the Japanese Akoya pearl oyster which is the source of most today's pearl jewelry. Black pearls are also richer in orient or luster, which is the reflection of light beneath the surface.

Some of the best black pearls came from the Tuamotu Archipelago, in French Polynesia where you can find clear, unpolluted water of about 75 degrees Fahrenheit, which is best suited to growing pearl oysters. For cultured pearls a bead from a fresh water mussel is inserted into a young oyster next to the shell. They are returned to the water and left to grow for several more years before harvesting.

According to Hebrew legend, pearls are the tears of Eve when she was banished from Eden.

Garnet

Adventure: SIGN (40 carbuncles)

Composition of different species of garnet:

		Hardness		Color
Almandine	Iron aluminum silicate	7 ½ on the Mohs scale		Dark red to reddish purple
Demantoid	Calcium iron silicate	6 ½ to 7 on Mohs scale		Light to dark green
Grossular	Calcium aluminum silicate	7- 7 ½	“ “	Yellow, green, brown, pink
Pyrope	Magnesium aluminum silicate	7 – 7 ½	“ “	Dark red to almost black
Spessartit	Manganese aluminum silicate	7 – 7 ½	“ “	Yellow through red

Cleavage: Imperfect

In the world of gems, carbuncle refers to a red stone. The term can be applied to a garnet, ruby or spinel. The word carbuncle comes from the Latin “carbunculus,” a term that Pliny the Elder applied to transparent red stones. For the purposes of this tour we will consider garnets as carbuncles.



The name garnet comes from the Latin “granatus” because some forms of garnet resemble seeds, like those of the pomegranate.



There are actually several different species of garnet. The best known garnets are the dark reds popular with Victorians. These are mostly the almandine and pyrope varieties.

However, garnets come in many colors, including pinks, reds, yellowish orange, orange, browns and greens, but not blue. Collectors consider the rarer greens to be of greater value. These include the spessartite and demantoids.

It is possible people were wearing garnet jewelry as early as the Bronze Age. Ancient Egyptians, Sumerians and Aztecs also wore garnets. Red stones were often considered a remedy for hemorrhage and general protection from wounds. Conversely, there is evidence that one group of people believed that garnet bullets would be more deadly than lead bullets. Garnet bullets were used by the Hanzas people against British troops in 1892, during battles on the Kashmir frontier. Some are said to still exist.

## Beryl

Adventures: BERY, BRUC, SCAN & SIGN (Brooch, coronet, gemstones, ring and tie pin)

Composition: Aluminum beryllium silicate

Hardness: 7 ½ - 8 on the Mohs scale

Cleavage: None

Beryllium is a mineral that has several industrial applications. But if certain trace elements are added to this mineral when it forms, you get some gorgeously colored gem stones.

Aquamarine – Picture a golden coronet set with 39 aquamarines. It is a trace of iron that creates this beautiful blue color. Aquamarine is considered a symbol of happiness and everlasting youth. The name comes from the Latin word meaning seawater, and legend has it that an aquamarine amulet carved with the image of Poseidon would protect a sailor at sea.



Heliodor/Golden Beryl – This gem is the perfect candidate for that “flaming” beryl brooch worn by Count von Kramm. The name comes from the Greek words “helios” (sun) and “doran” (gift). Golden beryl varies in color from lemon to gold. The trace element that gives this gem its color is uranium oxide.

Morganite/Rose Beryl – Also referred to as pink emerald. Morganite’s color is due to trace amounts of lithium and manganese. It was named to honor the famous financier, J. P. Morgan, whose generosity provided the American Museum of Natural History with much of its gem collection. It is also a possible candidate for the stone in the King’s brooch.



Emerald – Where to begin with emeralds? Cleopatra loved emeralds, and so did actress Elizabeth Taylor, who portrayed her. Emeralds were mined near the Red Sea by the Egyptians as early as 1650 BCE. They have been prized by many throughout history, from the Egyptians, to the Romans, the Celts and Incas.



Emerald is the most valuable of beryl’s gemstones. The extraordinary green color is due to trace amounts of chromium or vanadium. Often there are minute inclusions or gas bubbles and/or healing cracks in emeralds. These are not considered flaws but evidence of their genuineness. But the finest emeralds are clear, transparent and of a deep green color.

Emeralds are formed during violent geologic activity, when the lighter crust elements such as beryllium are drawn deep into the earth to mix with heavier elements like chromium or vanadium. This can happen during earthquakes when sedimentary rocks containing lighter elements are pulled deeper into the mantle along subduction zones. There the elements can combine and form emeralds.

Today the finest emeralds are found in Colombia and they are the clearest, biggest and greenest anyone has ever seen. Mines in Colombia account for 60% of the world's production. Emeralds are rarer than diamonds.

### Corundum – Ruby

Adventures: SIGN, STUD (170 rubies & a gold bulldog's head pin with ruby eyes)



Composition: Aluminum oxide

Hardness: 9 on the Mohs scale

Both ruby and sapphire are gemstone qualities of the mineral corundum. Let's start with ruby, which is red due to a trace of chromium oxide. Rubies have no cleavage and are therefore less delicate to cut and facet and less subject to damage than a diamond. They are in very short supply, and are valued, in part because of their rarity.

The name ruby comes from the Latin word for red, Rubeus. It was not until about the beginning of the 19<sup>th</sup> century that rubies and sapphires were recognized as belonging to the corundum group. Before that, red spinel and garnet were also called ruby. As you may know the "Black Prince's ruby" in the English State crown is really a spinel.



Important deposits of rubies are found in Burma, Thailand, Sri Lanka and Tanzania, with lesser deposits in such places as Afghanistan, Australia, Brazil, Cambodia, as well as Montana and North Carolina. Large rubies are very rare.

In Marco Polo's "Book of Marvels" he tells the story of a Sinhalese king, who owned a huge ruby, some 4 inches long. The Chinese Emperor

Kublai Khan offered the king an entire city in exchange for this ruby. But the king refused, saying he would not give up his prize for all the treasure in the world.

The De Long Star Ruby is pictured here. It weighs 100 carats and its color is called "pigeon's blood" red, which is red with a hint of blue and it is the most desirable color for rubies.



One of the many legends about rubies is that they can warn their owner of impending misfortune by becoming dull and dark. Catherine of Aragon is said to have foretold her fate by the darkening of her ruby.

### Corundum - Sapphires

Adventure: SIGN (210 sapphires)

Composition: Aluminum oxide

Hardness: 9 on the Mohs scale

Sapphires come in every color except red, including yellow, pink, purple, violet, blue and orange. The spectacular orange color is also referred to as Padparadscha which is the name of a

lotus flower of the same color found in Sri Lanka. The violet blue and purple stones are typical of “yogo” sapphires from Montana. The word “yogo” is the Native American term for big sky.

It is trace amounts of titanium and iron oxide that turn corundum into a sapphire. One of the most famous sapphires is the Star of India, which weighs 563 carats and is on display at the American Museum of Natural History. Stars in rubies and sapphires are the result of a trace amount of the mineral rutile which forms needle-like crystals.

The Star of India was mined 300 years ago in Sri Lanka, which was then part of India. It is one of the many gifts of J. P. Morgan and was acquired by gemologist George Kunz. Of its past history, Kunz would only say “(it) has a more or less indefinite historic record of some three centuries and many wanderings.” Rumor has it that Kunz got the stone when a royal owner needed cash without publicity.



The Star of India and the De Long ruby were involved in a notorious crime. In the spring of 1964 a movie titled “Topkapi” was released. It was a story about a gang of thieves who plot to steal emeralds from the Topkapi Palace Museum in Turkey. It is said to have been the inspiration for a crime that took place at the American Museum of Natural History on October 29<sup>th</sup> of the same year.

In September of that year three men (Jack Murphy aka Murph the Surf, Allan Kuhn and Roger Clark) came to New York City from Miami Beach. They came to see the World’s Fair, and while they were here they took in a movie. You guessed it – Topkapi.

Inspired they cased the Museum. At that time the Hall of Gems and Minerals was located on the 4<sup>th</sup> floor. They noted the locations of the windows, the exits, the fire escapes and the schedule of the guards. Then they waited for a rainy night because those people that are out in bad weather are generally in a rush to get home and not paying attention to others around them.

So, after dark this trio climbed up an old fire escape, into the museum and methodically broke into the display cases of the choicest items. When they grabbed the Star of India suddenly everything changed. A little pin popped up, evidence of a silent alarm system. At this point they knew they had three minutes to smash, grab and run. What they didn’t know was the alarm’s battery was dead.

They high-tailed it out of the museum and back to Miami. They turned the jewels over to a fence and waited to reap the rewards. Now, this might have been a case worthy of a certain consulting detective. However, the F.B.I. located and arrested the men within two days of the theft. As a result of this crime, the collection of gems and minerals were relocated to a hall on the museum’s first floor which is reputed to have the best security of anyplace along the East Coast, except where they take the President in case of nuclear attack.

## Diamond

Adventures: BLUE, CHAS, IDEN, LADY, MAZA, SIGN, SOLI, VALL

(A blue gastrolith for a goose, a ring with a remarkable brilliant, a diamond tiara, old Spanish jewelry, a yellow crown diamond, the finest diamonds in London, 143 diamonds of the first water, including the Great Mogul, and a diamond-bedecked body master)



Composition: Crystallized carbon

Hardness: 10 on the Mohs scale

Cleavage: Perfect in four directions, defining an octahedron

Diamond is the archetype mineral for colorless gems, having high brilliance, ideal dispersion or play of colors and supreme hardness. Diamond is formed 90 miles or more beneath the earth's surface over a long period of time under extreme conditions of temperature and pressure. They are brought to the earth's crust through violent volcanic activity.

Most diamonds are mined from kimberlite, a rare type of volcanic rock. Because some kimberlites yield diamonds, all kimberlite volcanoes have been closely studied. The largest known kimberlite volcano, Mwadui in Tanzania, has a surface area of 360 acres. Non-kimberlite volcanoes, like Mt. St. Helens are more than 150 times that size.

Diamond is composed of carbon and it differs from graphite, which is also carbon, due to its internal arrangement of its atoms or crystal structure. It is the hardest known substance. On the Mohs scale, the scale most commonly used to measure hardness, graphite registers about 0.5 while diamond is 10. However that really doesn't measure the distance between diamond and all other minerals accurately. If we look at another scale, the Knoop, graphite is about 1 and diamond is 8000.

Before the 10<sup>th</sup> century, India was the major source of diamonds. And, until the early 18<sup>th</sup> century, there were no non-Oriental diamond mines. In 1725 diamonds were discovered in Brazil and that country became the world's major supplier. As Brazilian production waned, diamond deposits were discovered in Africa. The first found was the size of a marble. It was found near the Orange River in South Africa in 1866.

Not all diamonds are dug from mines. There is a 180 mile stretch of beach along the Atlantic coast in Namibia, called "Diamond Area No. 1" or the "Forbidden Area", a beach where diamonds lay in the sand. The gems erupted to the earth's surface nearly 3 million years ago. As the volcano that spawned them eroded, the diamonds washed down the Vaal & Orange Rivers. According to a story in the New York Times of April 27, 1998, the area is an ecologically pristine desert with fossil beds containing giant bear-dogs and proto-elephants. However this area is very strictly controlled by De Beers. Nonetheless, the criminal mind is ever inventive. In one attempt to smuggle out stones, someone hand made a tiny jacket for a homing pigeon with 123 carats of diamonds sewn inside.

Diamonds were valued as gems in India as long ago as 800 BCE. Ancient Romans wore uncut diamonds as talismans. For a very long time, in Europe, the wearing of diamonds was limited to royalty. Cutting and polishing of diamonds began in the 14<sup>th</sup> century. The first diamond engagement ring was given to Mary of Burgundy by Hapsburg Emperor Maximilian in 1477.

The quality of a diamond depends on how clear and translucent it is; the more like water, the higher the quality. "First water" means most clear, second or third water is less desirable.



There are colored diamonds as well. Colored diamonds are also referred to as



fancies. Diamonds come in a rainbow of colors: brown, yellow, orange, red, pink, purple, blue, green and black. Sometimes the color is the result of irradiation or hydrogen-related defects. Sometimes, as with other minerals, it is a trace element that creates the color. Blue diamonds, like the Hope, are the result of a trace of boron. And a trace of nitrogen can turn a diamond, like the Mazarin, yellow.

It has been said that the histories of the famous and notable diamonds read like adventure stories. There is a yellow diamond, named The Sancy, that actually did belong to a man named Mazarin. The Sancy is a pale yellow diamond weighing 55.23 carats discovered in India. Its checkered history began when it was acquired by French diplomat Nicholas Harlay de Sancy (1546-1627). It changed owners several times until it finally came to rest in the collection of Cardinal Jules Mazarin (1602-1661), the powerful chief minister to Louis XII of France.

While the yellow diamond belonging to Cardinal Mazarin was not the Mazarin stone of the story we know; there really was a stone called the Great Mogul. Found in India in the mid 17<sup>th</sup> century, the Great Mogul was originally 787 carats and is faintly bluish-green. It belonged to Mogul Aurangzeb (1618-1707). We know what the Great Mogul looks like because Jean Baptiste Tavernier, a 17<sup>th</sup> century jeweler, merchant and traveler made a sketch of it after it had been cut down to 189.6 carats and shaped like a pigeon's egg. The reign of the Moguls in India ended with their defeat by the Persians in 1739.

What a coincidence it is that, in 1739, when the history of the Great Mogul ends the history of the Orlov begins. There are several incredible stories about how the stone got from India to Amsterdam where it was purchased by Count Orlov in 1775 as a gift for Russian Empress Catherine the Great. The Empress gave the diamond Orlov's name and had it set in the imperial scepter. It can now be seen at the Kremlin State Museum (and pictured here).



FYI: Finally we should discuss the difference between carat and karat. Carats with a C measure the weight, not size, of gems. The word may come from the use of carob seeds in ancient India to balance the scales when weighing gemstones. Carob seeds are extremely uniform in weight.

During the Raj, the British adopted this unit of measure and it became the universal standard in 1907.

Karat with a K measures purity in gold. A karat is that part in twenty-four, by weight, that is pure gold. The word karat may derive from the Greek "keration", little horn, and is related to a cornucopia, a goat horn symbolizing abundance. 24 karat gold is too soft for use as jewelry, so it is alloyed with other metals, such as silver, palladium and rhodium. This reduces the purity and results in 14 karat gold, 18 karat gold, etc. Alloy gold with copper you get pink gold.

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