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Chapter 1 : A list of Precious and Semi Precious Gemstones and their Treatments | Gem Rock Auctions

Rocks, minerals, and gemstones have fascinated people through the ages. They have been used as decoration, and have often been attributed special powers. This book, arranged in alphabetical format, describes different rocks, minerals, and gems.

Igneous rocks are those that solidified from magma molten rock. Sedimentary rocks are made up of particles of sediment cemented together. In Arkansas, the overwhelming majority of surface and near-surface rocks are sedimentary rocks. There are a few igneous rocks and some very low-grade metamorphic rocks, but these occupy little area. In the Ozark Plateau and Ouachita Mountains , there are indications of some very low-grade metamorphic effects on the rocks in restricted areas, but because their degree of alteration is slight, geologists still treat them as sedimentary rocks. A few true metamorphic rocks are found due to the alteration of the rocks immediately surrounding and in contact with the igneous intrusions. All rocks are composed of mineral grains. A mineral is a chemical compound that has certain specific characteristics: Over different minerals are found in Arkansas, either as discrete deposits or as the mineral grains making up the rocks themselves. Only a handful of these minerals are common. The bedrock of the Ozark Plateau portion of Arkansas is made up of sedimentary rocks. Most of these rocks fall into just six major types: A few conglomerates, breccias, and other types may occur in limited places. Few rock layers are pure, so many mixtures and combinations of these types will be found, such as shaly limestones or dolomitic sandstones. The sediments that make up these rocks were deposited in an ocean basin on a continental shelf. The limestones are composed primarily of the mineral calcite CaCO3 , derived predominantly from the shells and skeletons of the various animals and plants that lived in those ancient oceans. Dolostones are quite similar to limestones and are generally found in older rock layers middle Ordovician period, about million years ago, and earlier. Dolomite CaMg CO3 2 is the principal mineral of a dolostone. It is thought that most of the dolostone was once limestone that has been altered over time. Chert is a cryptocrystalline silica SiO2 usually occurring as nodules or thin beds in certain intervals of limestone or dolostone. However, in a few places, chert has replaced the original bedrock and may make up a notable portion of the rock sequence. Sandstones and siltstones are very similar rock types, just differing in grain sizes that, in turn, reflect the different energy environments of the depositional setting. Almost all of the sand and silt making up these rocks are fragments of quartz SiO2. The shales are very fine-grained rocks composed mostly of clay and silt mud. Shale is finely stratified and readily splits into thin layers. All of these rocks are composed of sediment grains cemented together. The most common cements are calcite, dolomite, quartz, clay, and iron oxide. As the hot water solutions cooled, they deposited the various minerals dissolved in them. In places scattered across the region, small deposits of galena PbS and sphalerite ZnS , along with quartz and traces of pyrite FeS2 and chalcopyrite CuFeS2 , are present. As these hot solutions moved through the host rock, they dissolved some of the minerals making up the rock only to re-deposit them later upon cooling, leaving crystalline calcite and dolomite. Weathering and erosion have added some rock and mineral deposits to the region as well. Manganese and iron minerals concentrated by these processes occur in a few places. Groundwater has also left its mark by dissolving the limestones and similar rocks and then redepositing the dissolved calcite as crystalline calcite or aragonite chemically the same as calcite but with a different molecular structure as travertine, the rock of cave formations. The Arkansas River Valley is underlain by sandstones, siltstones, and shales of Pennsylvanian age â€” million years ago. A few coal beds are contained in this sedimentary sequence. Deeper in the rock sequence, natural gas is present and is being produced. The flood plains and adjacent terraces of the Arkansas River and its tributary streams have deposits of gravel, sand, and mud of fairly recent origin. Although the Paleozoic rock layers are folded and faulted in this region, few minerals are found outside of those making up the rocks themselves. The Ouachita Mountains are composed of sandstones, siltstones, shales, cherts, novaculites, and a few limestones. These sedimentary rocks were deposited in a deep ocean basin under thousands of feet of water. Novaculite is somewhat unique

to the Ouachitas. It is a very dense, even-textured cryptocrystalline rock composed of microcrystalline quartz bound together. Novaculite is the rock that makes the very best whetstones knife-sharpening stones. Continental collision toward the end of the Paleozoic era complexly folded and faulted the rocks and pushed up the Ouachita Mountains. Hydrothermal fluid and contact alteration products associated with the uplift of the Ouachitas are common. The most famous of these is quartz, the official state mineral, widely present in the Ouachitas. Millions of years later, igneous intrusions during the Cretaceous period to 65 million years ago introduced several unusual rock types such as syenite, ijolite, jacupirangite, carbonatite, lamproite, peridotite, and metagabbro. In general, these once-molten rocks are referred to as alkalic igneous rocks because of their relatively high alkali metal content. Over minerals have been reported from the Magnet Cove area. Many of the mineral crystals in that area are very small. Mines in the region have produced barite, vanadium, and titanium in the past, but all mines are currently closed. Just south of the Ouachita Mountains in southwest Arkansas, along the northern margin of the West Gulf Coastal Plain , occurs an area underlain by Cretaceous-age sand, gravel, clay, marl, chalk, limestone, volcanic tuff and ash, and gypsum. These rocks and sediments were deposited in the shallows of the ancient Gulf of Mexico. The sands and gravels are composed of fragments of novaculite, chert, sandstone, and quartz eroded from the Ouachita Mountains during the Cretaceous age. Sections of this shallow depositional sea occasionally became isolated from the open ocean and dried out. As the sea water evaporated, the various minerals dissolved in the sea water were precipitated into beds of salt NaCl and gypsum, sometimes with nodules of celestine SrSO4. The salt was quickly dissolved and removed by rain and groundwater, leaving only impressions of its crystals in the mud as evidence that it was once there. The gypsum, however, accumulated in thick beds that are mined today to make sheetrock. This allowed igneous rocks to intrude the Paleozoic and early Cretaceous rock sequence. These rocks usually occur as small dikes, sills, and pipes, but a handful of the emplacements are larger and cover a few square miles. The smaller intrusions tend to be difficult to find because the rocks have often weathered to clay near the surface. These intrusions also generated a degree of alteration of those rocks surrounding the original magma and developed a wide variety of unusual rock types and minerals via contact metamorphism. These same cracks allowed these magmas to reach the surface and cool into the rock lamproite before the diamond crystals had time to be altered to other carbon minerals. Diamond is the official state gem. Some volcanoes spewed ash that rained down and left beds of tuff now found in the rock sequence of southwest Arkansas; however, most of these intrusions failed to reach the surface and solidified into intrusive igneous rock masses. The largest deposit of these intrusive igneous rocks is the nepheline syenite, now exposed, making up the area around Granite Mountain in central Arkansas. It should be noted that there is no granite on Granite Mountain. As erosion exposed the syenite to surface environments during the Paleocene epoch 65 to 55 million years ago , the rock weathered down to become bauxite, the ore of aluminum. Bauxite is the official state rock and was mined, primarily in Pulaski and Saline counties, through much of the twentieth century. Several other igneous intrusions are present throughout the Ouachitas, Arkansas River Valley, and in at least one place in the Ozarks, but they occupy less than. These tend to be of rare and unusual rock types. Many rare minerals are found associated with them or in the altered zones of the immediately surrounding rocks. The post-Cretaceous age deposits of the Western Gulf Coastal Plain and the Mississippi River Alluvial Plain of southern and eastern Arkansas are underlain by sand, silt, clay, and gravel. Most of these deposits are not lithified, but there is some limonite iron oxides cementation of some layers and nodules in places. The thickest exposures of loess are toward the southern end of the ridge. In a few places on the northern end of the ridge on the west side, sandstone with quartz cement called quartzite also occurs. Thirteen minerals were first discovered in Arkansas. Most of these minerals were named for the people who found them or were important in their discovery. All are somewhat rare. Geologic Map of Arkansas. Arkansas Geological Commission, Mineral Species of Arkansas, A Digest. Arkansas Geological Commission Bulletin Colton, and William L. Stratigraphic Summary of Arkansas. Arkansas Geological Commission Information Circular McFarland, John David, and J. Mineral Resources and Industries of Arkansas. Bureau of Mines

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Chapter 2 : List of minerals - Wikipedia

Encyclopaedia of Rocks, Minerals and Gemstones by Russell, Henry Paperback Book See more like this The Complete Encyclopedia of Minerals (Rocks, Minerals and Gemstones) Brand New.

In addition to gold, silver, and platinum, the precious materials most widely used in jewelry are gemsâ€”any precious or semiprecious stone. By definition this group also includes some animal and vegetable products with precious characteristics, such as amber, pearls, and coral. Conventionally, the followingâ€¦ Gemstones have attracted humankind since ancient times, and have long been used for jewelry. The prime requisite for a gem is that it must be beautiful. Iridescence, opalescence, asterism the exhibition of a star-shaped figure in reflected light , chatoyance the exhibition of a changeable lustre and a narrow, undulating band of white light , pattern, and lustre are other features that may make a gemstone beautiful. A gem must also be durable, if the stone is to retain the polish applied to it and withstand the wear and tear of constant handling. In addition to their use as jewelry, gems were regarded by many civilizations as miraculous and endowed with mysterious powers. Different stones were endowed with different and sometimes overlapping attributes; the diamond , for instance, was thought to give its wearer strength in battle and to protect him against ghosts and magic. Vestiges of such beliefs persist in the modern practice of wearing a birthstone. Of the more than 2, identified natural minerals, fewer than are used as gemstones and only 16 have achieved importance. These are beryl , chrysoberyl , corundum , diamond, feldspar , garnet , jade , lazurite , olivine, opal , quartz , spinel , topaz , tourmaline , turquoise , and zircon. Some of these minerals provide more than one type of gem; beryl, for example, provides emeralds and aquamarines, while corundum provides rubies and sapphires. In virtually all cases, the minerals have to be cut and polished for use in jewelry. Except for diamond, which presents special problems because of its very great hardness see diamond cutting , gemstones are cut and polished in any of three ways. Agate, opal, jasper , onyx , chalcedony all with a Mohs hardness of 7 or less may be tumbled; that is, they may be placed in a cylinder with abrasive grit and water and the cylinder rotated about its long axis. The stones become polished but are irregular in shape. Second, the same kinds of gemstones may instead be cut en cabochon i. Third, gemstones with Mohs hardness of more than 7 may be cut with a carborundum saw and then mounted in a holder dop and pressed against a lathe that can be made to revolve with extreme rapidity. The lathe carries a point or small disk of soft iron, which can vary in diameter from that of a pinhead to a quarter of an inch. The face of the disk is charged with carborundum grit, diamond dust, or other abrasives, along with oil. Another tool used to grind facets is the dental engine, which has greater flexibility and sensitiveness than the lathe. The facets are ground onto the stone using these tools and then are polished as described above. Of decisive significance for the modern treatment of gemstones was the kind of cutting known as faceting , which produces brilliance by the refraction and reflection of light. Until the late Middle Ages, gems of all kinds were simply cut either en cabochon or, especially for purposes of incrustation, into flat platelets. The first attempts at cutting and faceting were aimed at improving the appearance of stones by covering natural flaws. Proper cutting depends on a detailed knowledge of the crystal structure of a stone, however. Moreover, it was only in the 15th century that the abrasive property of diamond was discovered and used nothing else will cut diamond. After this discovery, the art of cutting and polishing diamonds and other gems was developed, probably in France and the Netherlands first. The rose cut was developed in the 17th century, and the brilliant cut , now the general favourite for diamonds, is said to have been used for the first time about In modern gem cutting, the cabochon method continues to be used for opaque , translucent, and some transparent stones, such as opal, carbuncle , and so on; but for most transparent gems especially diamonds, sapphires, rubies, and emeralds , faceted cutting is almost always employed. In this method, numerous facets, geometrically disposed to bring out the beauty of light and colour to the best advantage, are cut. This is done at the sacrifice of material, often to the extent of half the stone or more, but the value of the gem is greatly increased. The four most common faceted forms are the brilliant cut, the step cut , the drop cut ,

and the rose cut. In addition to unfaceted stones being cabochon cut, some are engraved. High-speed, diamond-tipped cutting tools are used. The stone is hand-held against the tool, with the shape, symmetry, size, and depth of cut being determined by eye. Gemstones can also be made by cementing several smaller stones together to create one large jewel. In some cases, the colour of gemstones is also enhanced. This is accomplished by any of three methods: In recent times various kinds of synthetic gems, including rubies, sapphires, and emeralds, have been produced. Two methods of fabrication are currently employed, one involving crystal growth from solution and the other crystal growth from melts.

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Leaders of states in the U.S. which have significant mineral deposits often create a state mineral, rock, stone or gemstone to promote interest in their natural resources, history, tourism, etc.

C 10 ions, which produce a blue color, ranging from very pale to very dark blue. Also, as in the case of rubies, there are star sapphires, which exhibit a 6-pointed star. Pure corundum white sapphire was the first gem to be produced synthetically. It was a poor substitute for diamond, however, because of its low refractive index. Even star sapphires and rubies that rival natural stones can be made synthetically. Emerald is a variety of beryl, a beryllium silicate, with a hardness of 7. It has a beautiful deep green color, and it is one of the most expensive gems, sometimes outranking diamond in value. The green color results from small amounts of chromic oxide Cr2O3. The oldest emerald mines were in Egypt near the Red Sea , but the best emerald mines today are in Colombia. There are others in Brazil , Pakistan , and Africa; synthetic emeralds of excellent quality have also been manufactured. Aquamarine, like emerald, is a transparent variety of beryl, or beryllium silicate. Its light blue to blue-green color results from small amounts of iron in the crystal. Like most beryl stones, it measures 7. Most aquamarine gemstones come from Brazil. It comes in many colors from yellow to pink to purple to blue, depending on what ions are present in the crystal. It can even be colorless. However, the favorite variety is orange to brown in color and called "imperial topaz. The gem called London blue topaz can be made from the colorless variety by treatment with heat and radiation. Although not as hard as diamond, cubic zirconia has much fire and brilliance, and it is popular as an imitation diamond. Ordinarily, it would revert to the monoclinic structure on cooling, but the addition of yttrium oxide Y2O3 or calcium oxide CaO can stabilize the zirconia so that it retains the cubic structure at room temperature. Cubic zirconia has optical properties very close to those of diamond, and it is clearly the best of all the various diamond imitations. The tetragonal crystals are usually brownish yellow in color. Also known as jargon or jargoon, zircon is a stable and durable silicate crystal. Small crystals of zircon are among the oldest mineral grains ever found on Earth. Opal is a hydrous silica SiO2 , sometimes thought of as an amorphous silica gel. It is relatively common in nature except in its "precious" form, which comes mainly from Australia. In Switzerland , since , opal of precious quality has been made synthetically. Usually cut in the cabochon shape to permit its rainbowlike display of color, opals come in white, black, and fire varieties. Amethyst is a variety of quartz SiO2 that is violet to purple in color, probably because of iron and manganese impurities. It should not be confused with oriental amethyst, which is a purple native variety of alumina Al2O3. Spinel is a colorless magnesium aluminate MgAl2O4 of cubic structure. It is hard and durable, but, like white sapphire, it is not a good diamond substitute because it has a low refractive index and lacks brilliance. However, it is readily doped to produce other gems of various colors. Artificial ruby, for example, is often natural red spinel, and most synthetic blue sapphires on the market are actually blue spinel. Peridot is the gem variety of olivine, a magnesium silicate containing iron about 9 Mg atoms for every Fe atom. Peridot is usually transparent, with a color ranging from greenish yellow to brownish green. Much peridot comes from an island in the Red Sea , but it is also found in Myanmar and an Apache reservation in Arizona. Garnet is actually a group of related silicates containing various amounts of magnesium, calcium, aluminum, iron, manganese, and chromium. Garnets have a hardness of 6. The popular dark red garnets are found in many gem sites in the Czech Republic , but garnets of many colors are also found in other parts of the world, such as India, Tanzania , Russia, and Brazil. Tourmaline is a highly complicated silicate, with a wide range of compositions and colors. It probably exhibits more colors than any other kind of gemstone. Sometimes there are several different colors in the same crystal. Lapis lazuli is a deep blue gemstone that is a complex copper silicate mineral varying widely in composition. It often contains sparkles of iron pyrite or calcite. The best source is probably Afghanistan. A pale blue variety is found in Chile. Some material sold as lapis lazuli is actually artificially colored jasper from Germany. Onyx is a striped variety of the common silicate mineral called agate, with alternating black and

white bands. It comes mainly from India and South America. Sardonyx is a variety of onyx with brown and white bands. However, there are some gems that come from once living material. Pearls are little spheres of calcium carbonate CaCO3 that form in mollusks invertebrate shellfish such as oysters, usually because of some sort of irritation. They are normally white or off-white in color, but they can have bluish or pink tints, and sometimes they are dark gray. Although many pearls form naturally, pearl production has been greatly increased by the "cultured" pearl industry, which raises beds of oysters into which irritants are routinely introduced. The irritants are usually bits of mother-of-pearl, the lining that forms inside oyster shells. Amber is fossilized tree resin that hardened over millions of years and now is valued as a gem. Baltic amber is thought to be hardened sap from pine trees. It is normally yellow-brown in color, but the shades vary from almost white to almost black. Although sometimes completely clear, amber often contains inclusions of insects or other matter, often considered desirable. Much amber is obtained along the shores of the Baltic Sea , but it is also found along the coasts of Sicily, Romania , and Myanmar. Coral, like pearls, is calcium carbonate CaCO3 derived from living matter. It is the outer shells of small marine animals. It occurs in many colors, from white to deep pink and red. The greatest demand is for red coral. The best coral comes from the Mediterranean Sea , along the coasts of Algeria and Tunisia. Ivory is a bonelike material that comes from the tusks of animals elephant, walrus, hippopotamus. It has become such a highly prized material that there are unscrupulous poachers who kill these animals in order to steal their tusks. The pale cream color of new ivory becomes darker with age and turns yellow. Ivory is brittle, but it does not peel as do its plastic substitutes. Jet is actually just a very hard and dense kind of lignite coal. It was probably plant material millions of years ago that has become fossilized and blackened over time. It often comes from northeast England , where it is derived from fossil driftwood buried under the sea. Its primary drawback as a gemstone is that it will burn since it is basically just highly polished coal. When they rubbed it with a cloth, it became charged and attracted bits of paper. The word "electricity" derives from the Greek word elektron.

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Gemstones There are several thousand known minerals in nature (with estimates ranging from 2, to 7,), but fewer than a hundred are considered gem minerals.