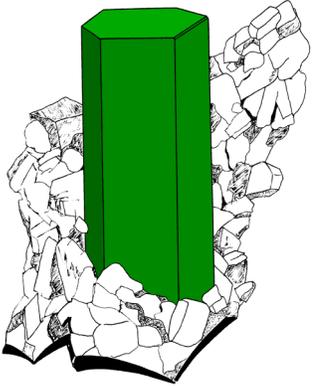
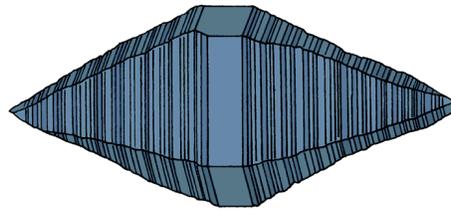


“And he carried me away in the spirit to a great and high mountain, and showed me that great city, the holy Jerusalem, descending out of heaven from God, having the glory of God. And her light [was] like unto a stone most precious, even like a jasper stone, clear as crystal.” -- Revelation 21:10-11 KJV



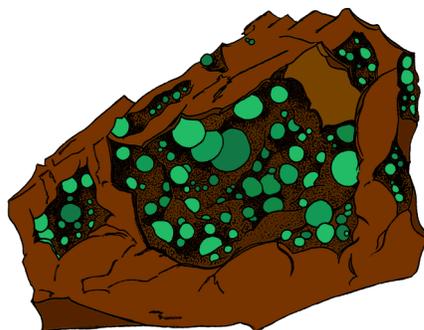
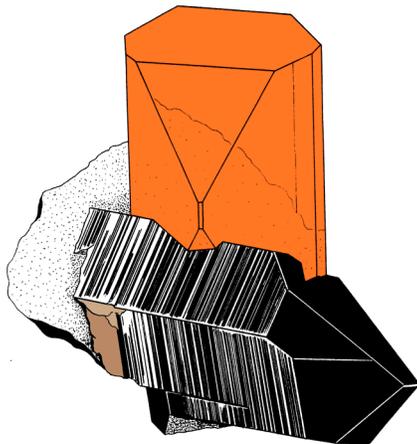
Minerals of



the Bible



by Darryl Powell

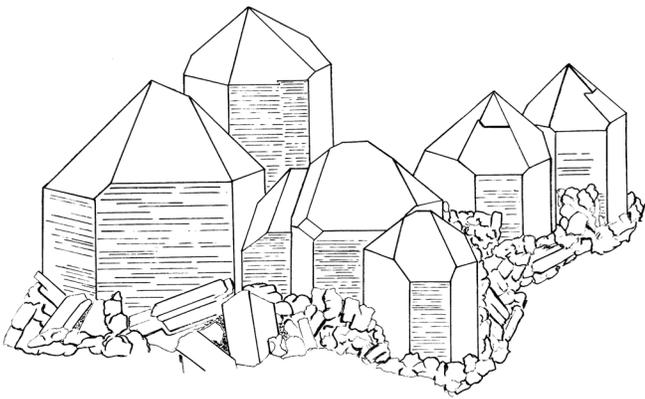


Minerals of the Bible...

is an interesting look at some of the minerals that are named in God's word. As you go through this book you will learn about minerals, their physical properties, their forms, their uses and the meanings of their names.

Most mineral names used in modern mineralogy were created rather recently. Only some of the ancient mineral names that we find in the Bible are still used today. Some of the mineral names in the Bible have changed and we know what the modern names are. On the other hand, some of the mineral names in the Bible are so ancient that we are not really sure which modern mineral names apply today.

This book is a great resource to get you into God's word. With your class, your teacher or your family, look up *all* the passages in the Bible that contain mineral names. The



easiest way is to find an on-line version of the Bible that has a search feature. One excellent resource is www.biblehub.com. Type the mineral name into the search box and then look up the passages that it finds. You will find some interesting results. For example, a lot of the mineral names are from the books of Daniel, Ezekiel and Revelation and refer to precious minerals that will be used by God to build the New Jerusalem. You will discover that most of the metals mentioned in the

Bible, like gold, silver, brass, and bronze, are used in the construction of the Temple.

Use this study as a chance to practice your art skills. Based on the descriptions in the scriptures, draw the New Jerusalem or the Temple or Aaron's Breastplate. Also take time to draw pictures of mineral specimens like the ones in this book. If you search for mineral and crystal pictures on the internet, you will discover thousands of beautiful mineral specimens. Who knows . . . this may lead to a passion for mineralogy and science. Or maybe you'll become a gemologist. Or maybe a dealer in mineral in crystal specimens.

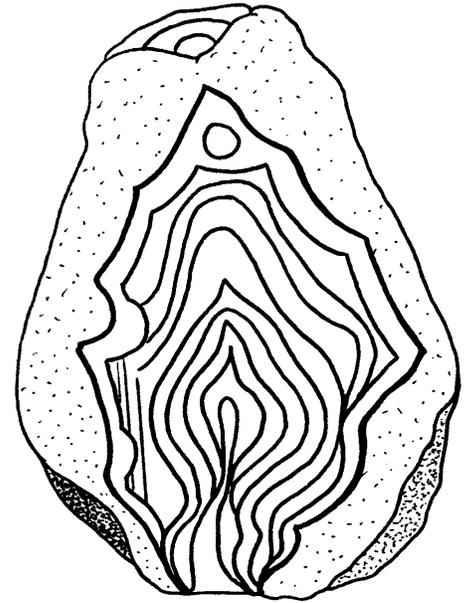
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Agate

Syria [was] thy merchant by reason of the multitude of the wares of thy making: they occupied in thy fairs with emeralds, purple, and brodered work, and fine linen, and coral, and **AGATE**.
(Ezekiel 27:16)

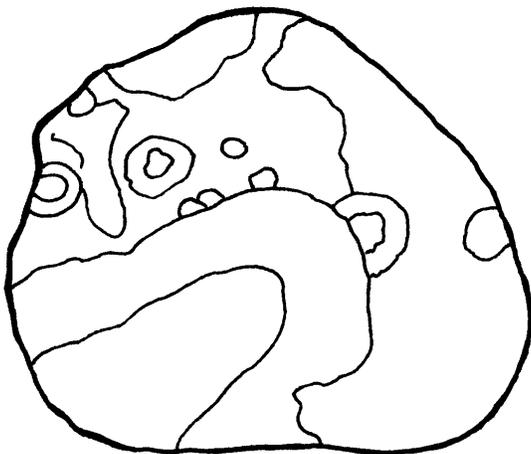
And the third row a figure, an **AGATE**, and an amethyst.
(Exodus 28:19)



Agate is a variety of *chalcedony* which is a variety of the mineral *quartz*. The varieties of chalcedony (which include agate, jasper, carnelian, heliotrope or bloodstone, chrysoprase and flint) are what mineralogists describe as *cryptocrystalline*. This means that their crystals are so small they can only be seen by very powerful microscopes. Agate is the banded variety of chalcedony.

Agate has been admired and used since before ancient Biblical times. Ancient Sumerians and Egyptians, as well as the ancient Hebrews, used agate for jewelry and decoration and for practical uses. For example, it was carved to make small cups and for making seals. Agate was much desired because it is colorful, soft enough to carve and at the same time hard enough to be durable and last many years of careful use.

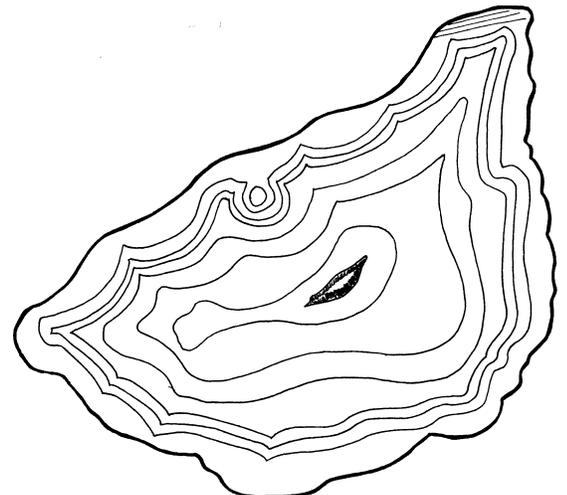
One Hebrew word that is translated as *agate* in the King James Version is *shebho*. This word means to flame or to sparkle (like a gem). In Isaiah 54:12 and Ezekiel 27:16, the Hebrew word *kadkod* is translated as *agate*. This word means *sparkling*. In modern mineralogy, the word *agate* is used to refer to chalcedony that is banded. Sometimes these bands can be gray and white. In some cases they are multiple colors in the same specimen including white, red, orange, purple, pink, blue and more.



Above: Colorful, banded agate from California.

Left: Brown, red and orange agate from Australia.

Right: Colorful agate from Mexico. Color each band a different color (blue, red, orange, white, brown, yellow).



Amber

And I looked, and, behold, a whirlwind came out of the north, a great cloud, and a fire infolding itself, and a brightness [was] about it, and out of the midst thereof as the color of

AMBER, out of the midst of the fire. (Ezekiel 1:4)

Amber is the only entry in this book that is not a mineral. Amber is fossilized tree resin. Resin is made up of complicated molecules that contain the elements hydrogen and carbon.

To an insect, resin is sweet so they are attracted to it thinking they will have a tasty treat for dinner. The bad news for the insect is that it is also very sticky. So all kinds of insects fly or crawl to the resin, only to get their legs and wings stuck in it. Eventually more resin oozes over them and it all begins to harden, trapping the insects inside. Over time the tree and resin are buried under layers of sediment. The heavy sediments squeeze the resin and eventually it gets harder and harder as gases and other chemicals are pushed out. When it is completely hardened, it is called *amber*.

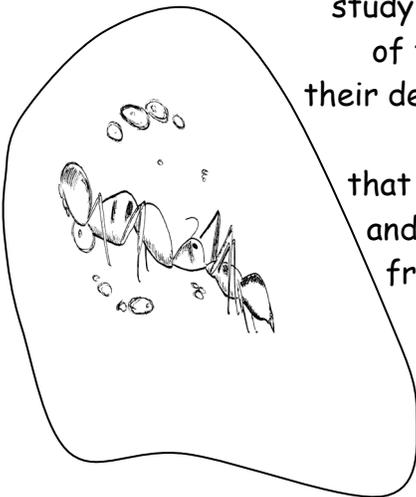
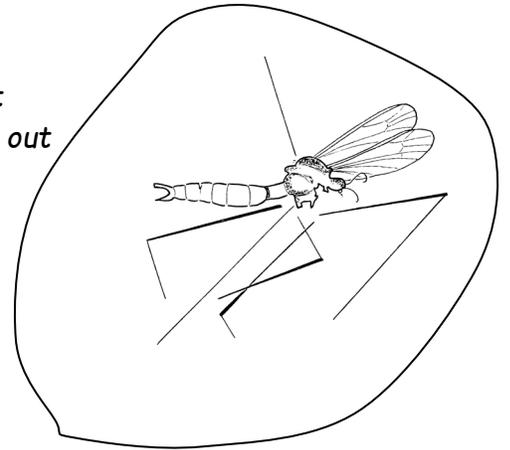
The color of the best-known amber is yellow-orange-brown. But it can also be white, brown, black, pale yellow, deep red and very rarely, blue. The amber mentioned in the Bible most likely came from the shores of the Baltic Sea. Because of its color, it is also called *sea gold*. Amber is fairly soft and therefore is easily cut, carved and polished to a high glossy shine.

The Bible does not mention the fact that amber often has insects (and sometimes even small reptiles) trapped and preserved inside it. Insects preserved in amber are fascinating to study under a microscope. Usually even the smallest, most delicate parts of their bodies are preserved, such as fine hairs and even the veins in their delicate wings.

In Ezekiel Chapter 1, Ezekiel describes God's glory (the whirlwind that came out of the north) in his vision with "the appearance of fire" and having the color of amber. In other words, the glory of God shining from the whirlwind was like the warm, yellow-brown of polished amber.

Top: A crane fly in amber from the shores of the Baltic Sea.

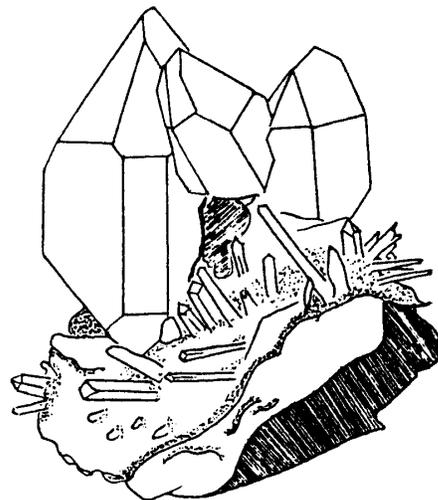
Above: Two ants and some gas bubbles trapped in a piece of amber, also from the Baltic Sea.



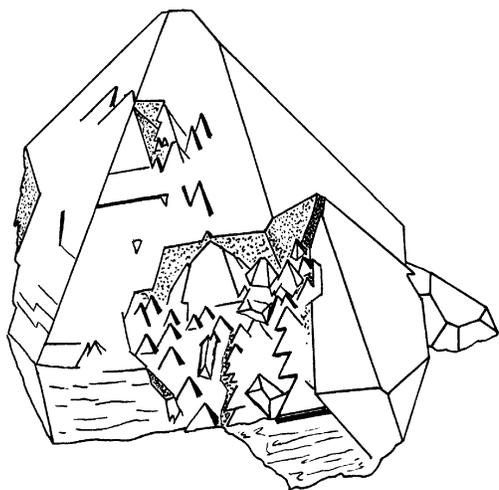
Amethyst

And the third row a figure, an agate, and an **AMETHYST**.
(Exodus 28:19)

The fifth, sardonyx; the sixth, sardius; the seventh, chrysolite;
the eighth, beryl; the ninth, a topaz; the tenth, a chrysoprasus;
the eleventh, a jacinth; the twelfth, an **AMETHYST**.
(Revelation 21:20)



Very often the ancient Hebrew and Greek names for specific minerals are difficult to translate with accuracy. As you can see in the entry for the mineral *beryl*, the ancient word might mean either *citrine quartz* or *topaz* or *beryl*. Yes, there is disagreement regarding the translation of some gems and minerals mentioned in the Bible. However, there is no disagreement regarding the words for *amethyst*.



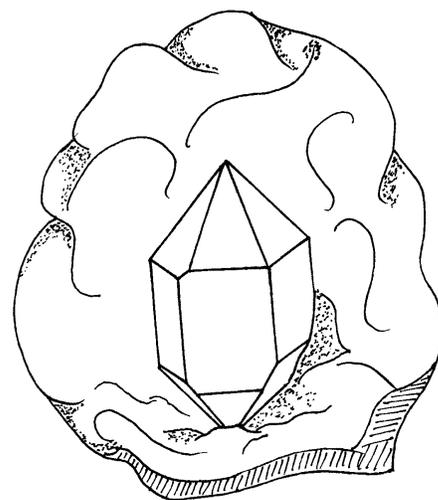
Amethyst is mentioned only three times in the Bible, twice in Exodus (28:19 and 39:12) as being part of Aaron's Breastplate and then in Revelation 21:20 as a foundation stone in the Great City, the Holy Jerusalem, coming down out of heaven. The twelfth foundation was decorated with amethyst.

In Hebrew, the word for *amethyst* is *achlamah*.

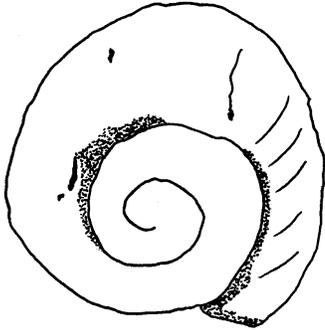
This word is probably from another word, *chalam*, which means *dream stone*, because in ancient days it was believed that amethyst gave a person pleasant dreams. The Greek word used for amethyst in Revelation is *amethystos*. The ancient Roman writer, Pliny the Elder, wrote that *amethystos* means *not drunken* because they believed that if a person drank wine from an amethyst goblet, that person would not become drunk!

Regardless of its supposed mystical properties, amethyst was valued in Biblical times (just like it is today) for its beautiful purple color and its ability to be polished into gemstones.

Amethyst is the purple variety of the mineral *quartz*. The intensity of the purple can vary from a very light lilac-purple to deep purple.



Bdellium (Opal... perhaps)



The gold of the land is good; there is *bdellium* and the onyx stone.
(Genesis 2:12)

If you discover a new mineral, you will have the privilege of naming your new discovery. Today, all new mineral names must be approved by a special committee whose task is to verify new mineral discoveries and approve their proposed names. This committee is the International Mineralogical Association's Commission on New Minerals and Mineral Names.

In Biblical days, mineralogy was not a science and naming minerals was done quite often by *describing* the mineral. In the King James Version we discover the mineral *bdellium*. Which modern mineral name should be given to "bdellium"? No one really knows. However, there are some very good guesses. The Hebrew word that is translated as *bdellium* is *bedolach* which probably comes from the root word *badal* which means *to divide* or *to separate*. Many Bible and language scholars have concluded that "bdellium" refers to the mineral we know as opal, because **white opal divides light** into red, blue and green colors. In addition, this variety of opal (which is called *precious opal*) was known from Egypt, Arabia, Cyprus, Galatia and India. The only problem with this thinking is that the idea that light is made up of a spectrum of colors that could be broken or divided into its colors was not known in Biblical times.

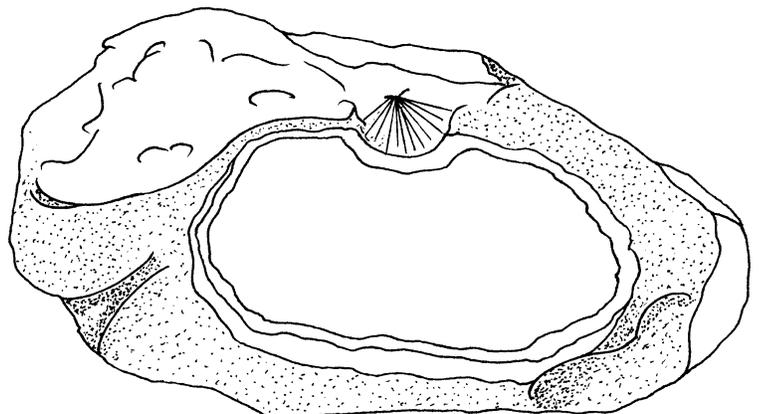
So, bdellium might have been precious opal. . . perhaps. Or, it may have been **pearl**. Or, it may have been a variety of crystal (that is the mineral **quartz**).

No one really knows!

Above: A gastropod (snail) fossil that is now completely precious opal.
From Australia.

Right: A nugget of precious opal in brown matrix. From Australia.

Color both specimens with flecks of green, blue, red, and purple.



Beryl

His body also [was] like the **BERYL**, and his face as the appearance of lightning, and his eyes as lamps of fire, and his arms and his feet like in color to polished brass, and the voice of his words like the voice of a multitude. (Daniel 10:6)

The fifth, sardonyx; the sixth, sardius; the seventh, chrysolite; the eighth, **BERYL**; the ninth, a topaz; the tenth, a chryso-prasus; the eleventh, a jacinth; the twelfth, an amethyst. (Revelation 21:20)

It is difficult to know exactly what mineral is being referred to in the book of Daniel (10:6) when it refers to Daniel's vision of a man in linen whose body "was like the beryl." The Hebrew word is **tarsheesh**. Though it is translated as *beryl* in the King James Version, biblical scholars conclude that this word more likely refers to the mineral that today is known as **topaz**. Some topaz crystals are reddish-brown, perhaps like the color of a person with dark or darker skin.

In the New Testament, the word translated as *beryl* is **berullos**. In the book of Revelation (21:20) it is mentioned as the eighth foundation in the Holy City, the New Jerusalem. In Revelation, the *berullos* is most likely the blue variety which we know today as **aquamarine** (which literally means **water of the ocean**, in reference to its blue to blue-green color).

Beryl can be colorless, green (emerald), blue (aquamarine), red (bixbite), yellow (heliodor), or pink (morganite).

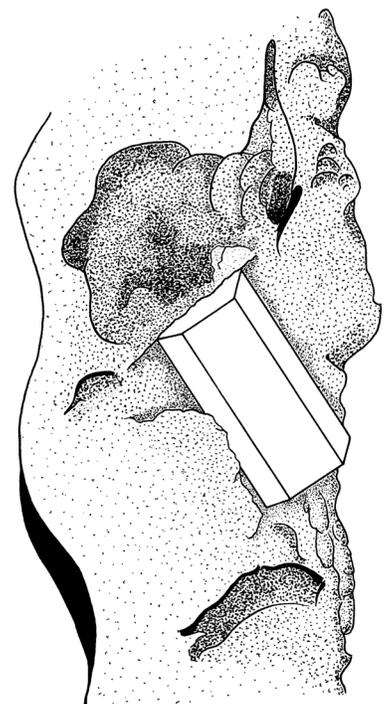
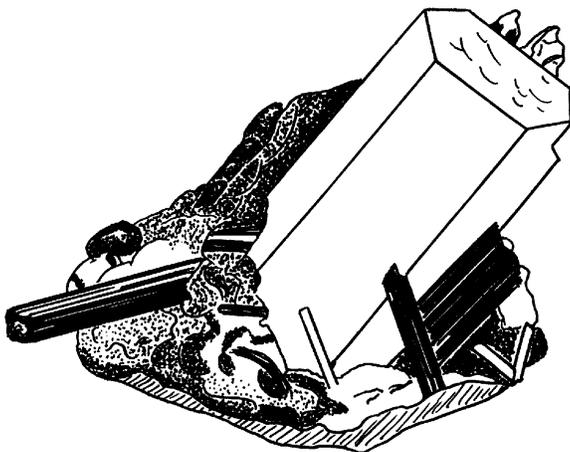
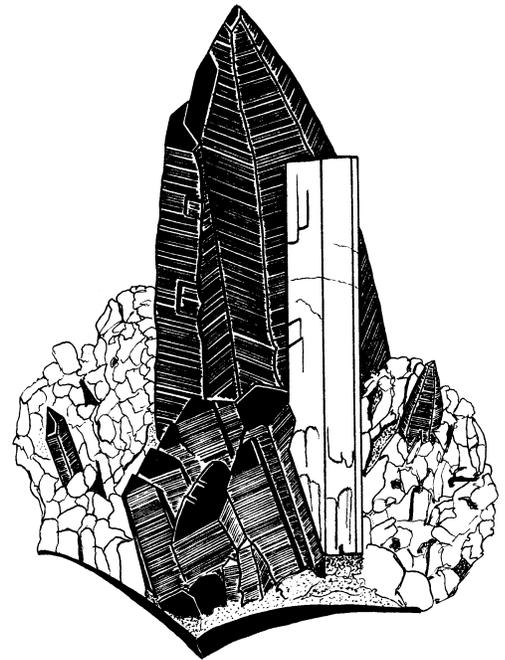
The ancient Roman writer, Pliny the Elder, recorded that magnificent emeralds and possibly other beryl gems were found in Egypt. In ancient days, beryl was also found in India, Ceylon and Upper Burma. (Remember that these are modern names for these regions.

It is important for you to go to a good Bible Atlas to discover the boundaries of these nations in Biblical times.)

Above: A large, deep blue aquamarine (beryl) from Colorado.

Below left: A blue beryl (aquamarine) from Africa.

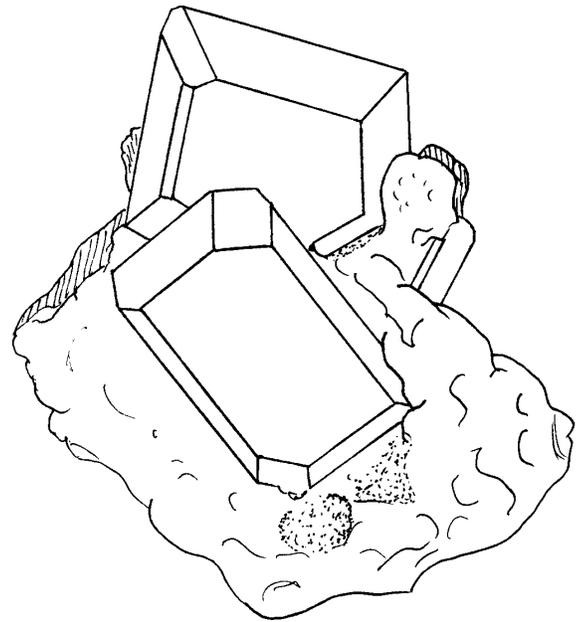
Right: A rare red beryl from Utah.



Brimstone (Sulfur)

And thus I saw the horses in the vision, and them that sat on them, having breastplates of fire, and of jacinth, and

BRIMSTONE: and the heads of the horses [were] as the heads of lions; and out of their mouths issued fire and smoke and **BRIMSTONE**. (Revelation 9:17)



The Bible never uses a word that specifically means *sulfur*. The Biblical word that is so familiar to us is *brimstone*. Around the Dead Sea there are hot springs and in this hot water is sulfur. Once brought to the surface, the sulfur would come out of the water and form crusts around the edge or **brim** of the pool. This is why it is called **brimstone**.

The Hebrew word that is translated as *brimstone* is *gophriyth* which means *resin*. It is believed that this word actually referred to the pitch or resin that comes from the Cyprus tree. This resin, much like the sticky resin that forms on pine trees today, is flammable. This yellowish, flammable resin can resemble sulfur, so it is logical that "gophriyth" was quickly connected to sulfur rather than Cyprus tree pitch. (Please refer to the entry for "Amber" which is actual petrified tree resin.)

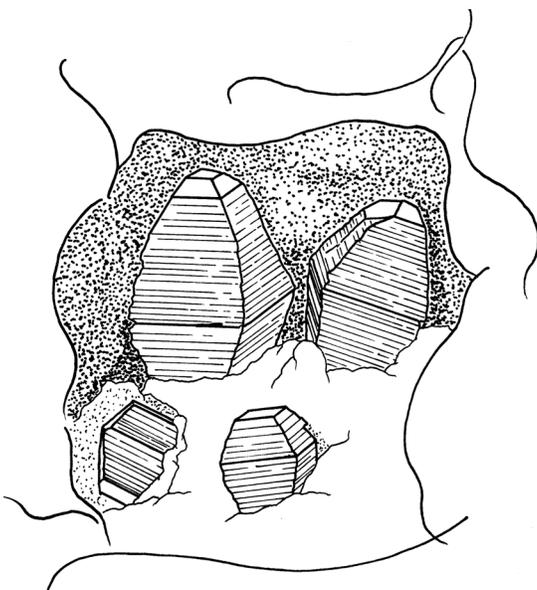
Brimstone (that is, sulfur) is almost always used in the Scriptures as a symbol or picture of God's punishment and of destruction. For example, God rained "brimstone and fire from heaven" upon Sodom and Gomorrah for their sinfulness (Genesis 19:24). Another example is Psalm 11:6, "Upon the wicked he shall rain snares, fire and brimstone, and an horrible tempest: this shall be the portion of their cup."

In the book of Revelation, John uses the image of brimstone a number of times to also describe God's wrath. For example, Revelation 14:10 says of those who worship the beast, "The same shall drink of the wine of the wrath of God, which is poured out without mixture into the cup of his indignation; and he shall be tormented with fire and brimstone in the presence of the holy angels, and in the presence of the Lamb..."

Natural sulfur crystals are actually very beautiful mineral specimens. They are well-formed and can range from bright lemon-yellow to amber in color. They are delicate and crackle when touched by a warm hand.

Above: Sulfur crystals from Sicily.

Left: Sulfur crystals in a vug (that is, a hole in a rock) from Michigan.



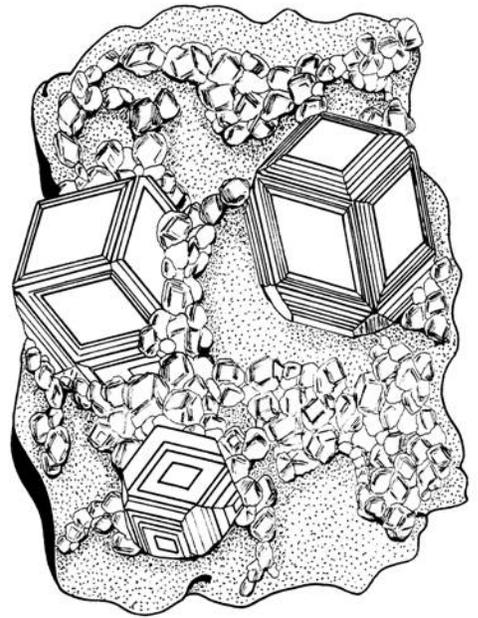
Carbuncle (Garnet)

The first row shall be a sardius, a topaz, and a **CARBUNCLE**.
... the second row shall be an emerald, a sapphire, and a diamond."
(Exodus 28:17&18)

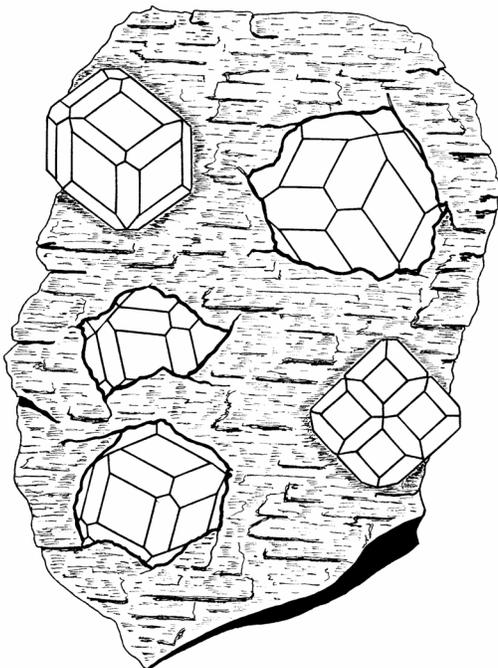
The ability to identify minerals accurately developed over the last two hundred years or so as the science of mineralogy developed. In ancient days, similar-looking minerals were given the same name. Such is the case for "garnet." In Biblical days, all round, red minerals and crystals were called *carbuncle*, a word which came to be associated with the mineral **garnet**. There are other deep red minerals that were probably considered to be "carbuncle" such as zircon, rubies, red tourmalines and spinel.

Carbuncle is not mentioned often in the Bible. In Isaiah 54:12, the Hebrew word *eqdach* is translated as *carbuncle*. It's actual meaning is *a burning, fiery gem*. When high-quality garnets are polished, they can be bright red and create flashes of "fire" as light passes through them. "Carbuncle" is actually the Latin word given to this gemstone. The Greek word is *anthrax* which means *a small, glowing coal*.

The modern word *garnet* comes from the Latin word *granatum* which means *pomegranate seed*. Garnet crystals are often found as groups of small, red crystals that resemble the seeds inside a pomegranate. Cut a pomegranate open and see for yourself!
(Then eat the tasty seeds. They are a real treat.)

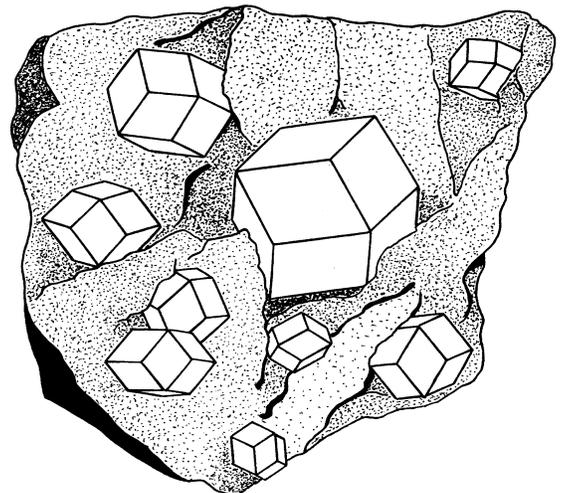


Above: A variety of garnet called "grossular garnet." It is cinnamon-red-orange and comes from Canada.



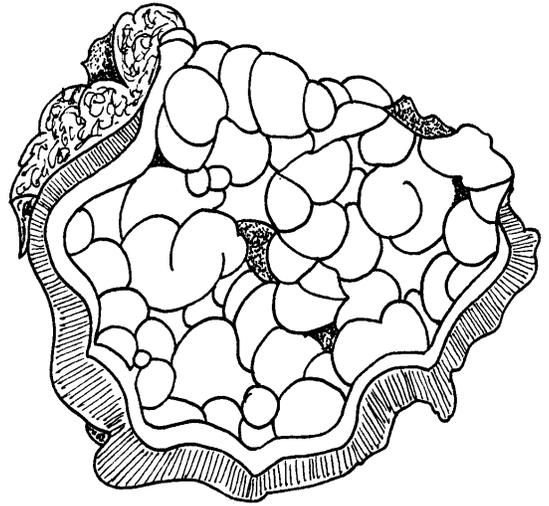
Left: Deep red almandine garnets from Alaska.

Right: Dark green garnets from Colorado.



Chalcedony

And the foundations of the wall of the city [were] garnished with all manner of precious stones. The first foundation [was] jasper; the second, sapphire; the third, a **CHALCEDONY**; the fourth, an emerald; (Revelation 21:19)



The name *chalcedony* is the name used for a group of similar, **quartz** minerals whose crystals are microscopic. The different varieties of chalcedony include *agate* (which is "banded," that is, it

has layers or bands of different colors), *chrysoprase* (apple green), *jasper* (red, yellow or a mixture of these two colors), and *heliotrope* or *bloodstone* (dark green with drops of red).

It is not possible to know exactly which variety of chalcedony John saw when he had his vision of the New Jerusalem sent from heaven. As you can see in the scripture above, the third foundation of the New Jerusalem was chalcedony. (You can also see that the first foundation was jasper which you now know is the red or yellow variety of chalcedony!)

The Greek word that is translated as *chalcedony* here in Revelation 21 is *chalkedon* which literally means *copper-like*. Mines with copper minerals were well-known in the ancient Biblical lands. Copper minerals are typically green or blue. One of these copper minerals is *chrysocolla*.

Chrysocolla can be found trapped inside chalcedony or quartz. This mixture has the beautiful, light-blue color of the copper mineral, *chrysocolla*, but also has the hardness of chalcedony.

This harder stone can be carved and polished into fine ornamental objects and jewelry.

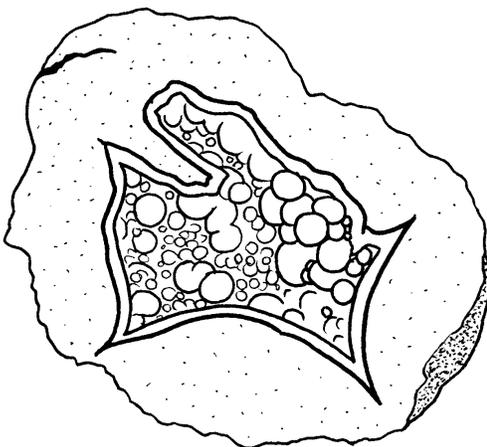
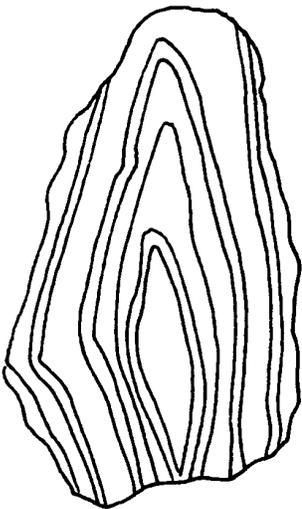
In Biblical times, chalcedony was found in Egypt, Greece and Asia Minor. It was often carved into seals that were used for identification and to seal letters or documents.

Above Right: "Botryoidal" or "grape-like" gray-blue chalcedony.

Above Center: Banded red Jasper, a variety of chalcedony.

Bottom Left: Light blue chalcedony in the center of a geode.

The "rind" of the geode is red-brown.



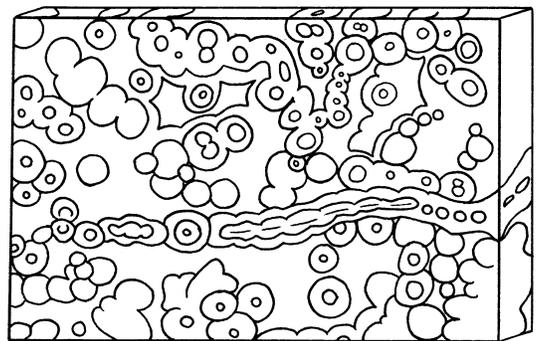
Varieties of Chalcedony Mentioned in the Bible

Chrysoprase (*chrysoprasus* in scripture) - A relatively rare, apple-green variety of chalcedony. *And the foundations of the wall of the city were garnished with all manner of precious stones. The first foundation was **JASPER**; . . . the tenth, a **CHRYSOPRASUS**. (Revelation 21:19-20)*

Flint - Gray to black chalcedony. Not used as a gemstone since its color is so unattractive. However, it can be chipped to make very sharp edges. Flint is therefore used by many cultures to make knives, spearheads and arrowheads. In the Bible, the Hebrew word *challamuysh* is translated by some as "flint." However, it is meant to speak not so much of the mineral called flint, but of the concept of *hardness*. In the scripture quoted below, God brought water out of "the hard rock." *Who led thee through that great and terrible wilderness, wherein were fiery serpents, and scorpions, and drought, where there was no water; who brought thee forth water out of the rock of **FLINT** . . . (Deuteronomy 8:15) Revised Standard Version*

Jasper - Red and Yellow chalcedony (sometimes found as a mixture of both colors).

*And thou shalt make the breastplate of judgment with cunning work; . . . And the fourth row a beryl, and an onyx, and a **JASPER**; they shall be set in gold in their inclosings. (Exodus 28: 15, 20)*



Right: Red jasper with yellow spots. From California.

Onyx - Chalcedony with parallel layers that are of different colors.

*The name of the first is **Pison**: that is it which compasseth the whole land of Havilah, where there is gold; And the gold of that land is good: there is bdellium and the **ONYX** stone. (Genesis 2:11, 12)*

Sard (*sardius* in scripture) - Brown to brownish-red or deep-orange variety of chalcedony.

*The foundation stones of the wall of the city were ornamented with all kinds of precious stones. The first foundation stone was jasper . . . the sixth **SARDIUS**. (Revelation 21:19-20) SG*

Sardonyx - A variety of chalcedony that has the parallel layers of onyx and the brownish-red or deep-orange coloring of sard.

*And the foundations of the wall of the city were garnished with all manner of precious stones. The first foundation was jasper . . . the fifth, **SARDONYX**; the sixth, sardius. (Revelation 21:19-20)*

Chalkstone

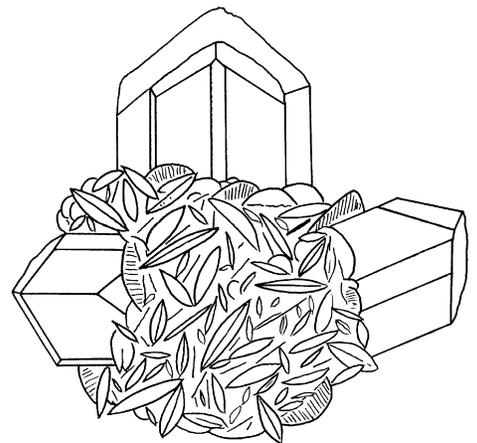
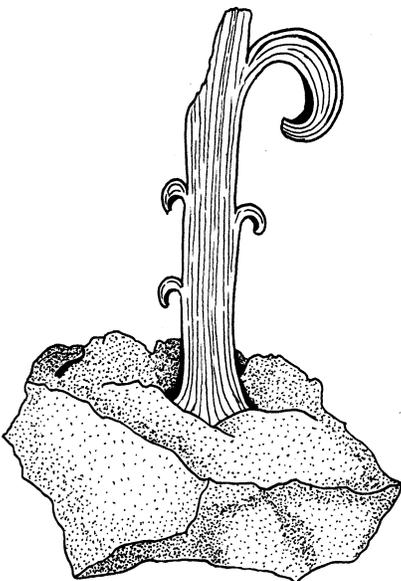
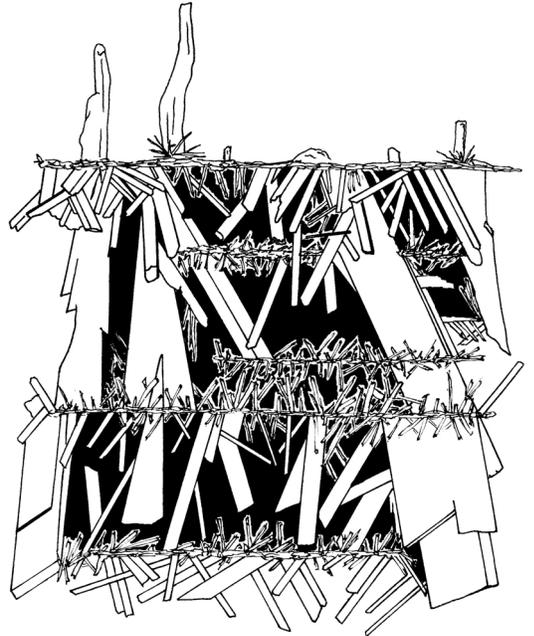
(Gypsum)

*By this way therefore shall the iniquity of Jacob be purged; and this is all the fruit to take away his sin; when he maketh all the stones of the altar as **CHALKSTONES** that are beaten in sunder, the groves and images shall not stand up. (Isaiah 27:9)*

*And it shall be on the day when ye shall pass over Jordan unto the land which the Lord thy God giveth thee, that thou shalt set thee up great stones, and plaster them with **PLASTER**. (Deuteronomy 27:2)*

Chalk or chalkstone probably refers to a number of different rock and mineral materials that were used for similar purposes. Natural chalk is the build-up of microscopic shells that accumulated on the ocean floor over time. The reference to chalk in the Bible, however, probably also refers to other materials. For example, it could refer to the sedimentary rock called **limestone** that was heated and crushed to a chalky powder. When water and sand is added to this powder, **cement** is created.

The same can be done with the mineral **gypsum**. When gypsum is heated, the water in its crystal is driven off. This heated material is then crushed to a powder. You know this powder as **Plaster of Paris**. When water is added to the powder, white plaster is created. This plaster can be used to cover over rocks and walls. It is possible that gypsum plaster was used to white-wash tombs. In Matthew, Jesus calls the Scribes and Pharisees "whitewashed tombs." The white-wash plaster made the tombs look clean and attractive on the outside, but inside they were full of bones and death.



Above: Golden brown gypsum crystals from Australia.

Left: A "Ram's Horn" gypsum formation on brown matrix from California.

Right: Yellow gypsum crystal cluster from Canada.

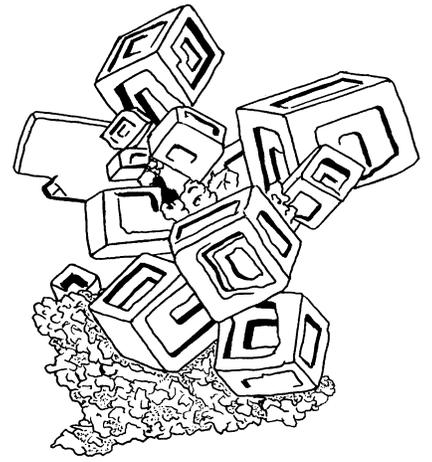
Minerals of the Bible Word Search Puzzle

This word search is packed with the names of minerals that are found in the Bible. The list of these mineral names is at the bottom of the page. The names can run left to right, right to left, top to bottom, bottom to top and diagonally. Some are very easy. Others are very hard to find.

B	D	E	L	L	I	U	M	C	A	N	E	L	A	G
M	R	H	A	L	I	T	E	B	Q	W	E	S	G	Y
A	D	I	A	M	O	N	D	U	I	C	O	R	E	P
G	C	C	M	J	A	M	A	G	A	T	E	J	J	S
N	E	A	W	S	E	R	T	S	A	L	T	O	A	U
E	R	R	P	O	T	O	P	A	Z	R	O	B	M	M
T	U	B	A	Z	G	O	L	D	M	E	N	S	E	D
I	S	U	H	E	B	R	N	B	E	W	S	E	S	L
T	S	N	J	B	O	A	M	E	T	H	Y	S	T	A
E	I	C	A	L	R	M	Z	R	U	B	Y	U	N	R
L	T	L	S	E	R	B	I	Y	T	H	E	L	I	E
U	E	E	P	A	R	E	V	L	I	S	M	F	L	M
K	E	P	E	D	N	R	I	S	A	I	A	U	F	E
N	O	C	R	I	Z	L	C	H	A	L	K	R	I	T
C	R	Y	S	T	A	L	E	T	I	T	A	M	E	H

Agate Amber Amethyst BdeUium Beryl Brimstone Carbuncle
 Cerussite Chalk Copper Crystal Diamond Emerald Flint Galena
 Garnet Gold Gypsum Halite Hematite Jasper Lead Magnetite
 Quartz Ruby Salt Silver Sulfur Topaz Zircon

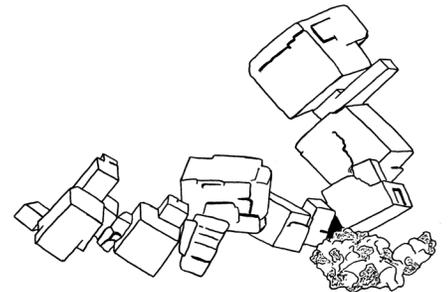
Copper



Also twenty basons of gold, of a thousand drams; and two vessels of fine **COPPER**, precious as gold. (Ezra 8:27)

"For the Lord thy God bringeth thee into a good land, a land of brooks of water . . . a land whose stones are iron, and out of whose hills thou mayest dig **BRASS**." (Deuteronomy 8:7, 9)

Copper has been removed from copper-bearing minerals for thousands of years. An archaeological discovery of one of the earliest uses of copper in the Holy Land was in ancient Jericho. Minerals that are some shade of green or blue typically contain copper. Earliest cultures discovered, quite by accident, that when these copper minerals (geologists call them *ores*) are heated to very high temperatures, pure copper is left behind. So, minerals like **malachite**, **azurite**, and **chrysocolla** have been mined for their copper content. Natural copper (called *native copper*) is rare. It is found in great masses, though, around Lake Superior in Northern Michigan on the Keweenaw Peninsula. Masses of copper weighing more than 8,000 pounds have been discovered there. The world's finest copper crystals are from this region, too, such as the specimens pictured on this page. In



Biblical times and places native copper was rarely found, but copper ores were plentiful. Copper, mostly ores but also some native copper, was mined on the island of Cyprus as early as 4000 B.C. The Romans called copper **cuprum** (a Latin word) in reference to its occurrence in Cyprus.

The actual word "copper" is only mentioned once in the Old Testament and that is in Job 28:2. The Hebrew word is **nechushah** which is also translated as *brass*. However, here the Job text says, "and brass is molted out of the stone." When a metal is removed from a stone (that is, its ore) it pours out as liquid metal (in other words, molted or melted). In this case, copper would come out of its ore minerals.

Brass, technically, is not pure copper. People discovered that when copper is mixed with other metals, a new metal could be created that is much harder than pure copper. Such a mixture of two or more metals is called an *alloy*. For example, when copper is mixed with zinc, the alloy *brass* is created. Brass is very hard and today is used for

machine parts like gears, valves and bearings and also for musical instruments.

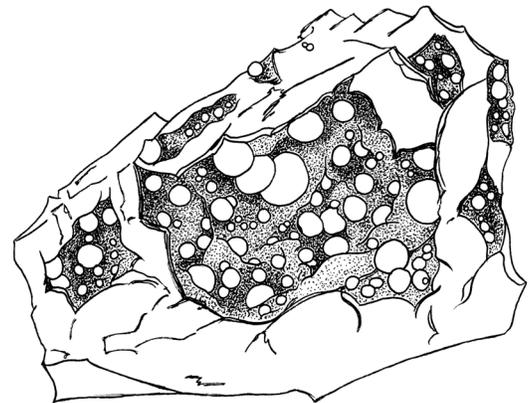
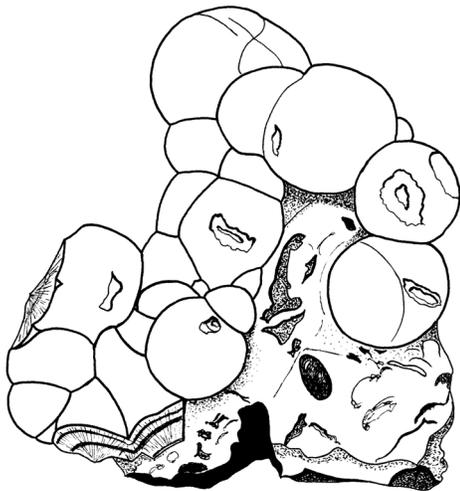
When copper is mixed with tin (and some other ingredients), the alloy *bronze* is created. In ancient times, bronze was used to make weapons, armor and various tools. Bronze was so important an invention that it marks a time of human history known as the **Bronze Age**.

Some zinc ore (sphalerite) was discovered in the Holy Land, but not in large enough quantities to make large amounts of brass. Though no tin ore (cassiterite) was known from the Holy Land, it is known that the Israelites traded goods for tin from the Phoenicians.

In the New Testament, copper itself is not mentioned. However, in II Timothy 4:14 the Greek word *chalkeus* is used. This means *copper worker*. Sometimes it is translated more generically as *metal worker*.

Items made of copper alloys (like bronze) were crafted for use in Solomon's temple (see I Kings 7:40-47). In Deuteronomy 8:9, Moses proclaims that the Promise Land had copper in its hills. It would turn out that King Solomon's copper mines were actually near

the Gulf of Aqaba, which is quite a long distance from the center of the Holy Land.



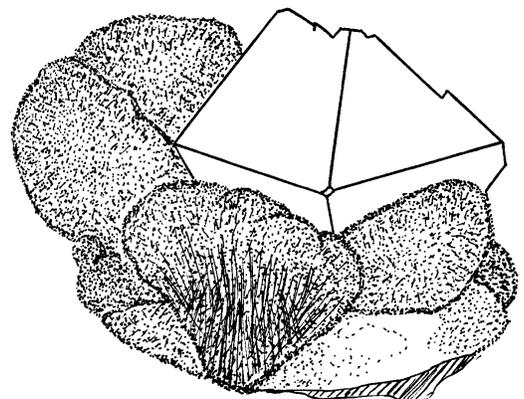
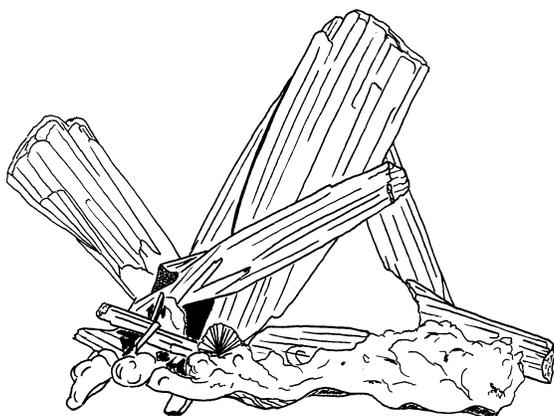
There are a number of different copper-bearing minerals that are mined for their copper content. Among these copper minerals are malachite, azurite, cuprite, bornite, chalcopyrite, and chalcocite. Pictured on these two pages are a number of copper and copper ore specimens for you to study and color.

Left top: Light blue azurite from Arizona.

Left bottom: Dark blue azurite from Africa.

Right top: Green malachite spheres on dark brown matrix. From Bisbee, Arizona.

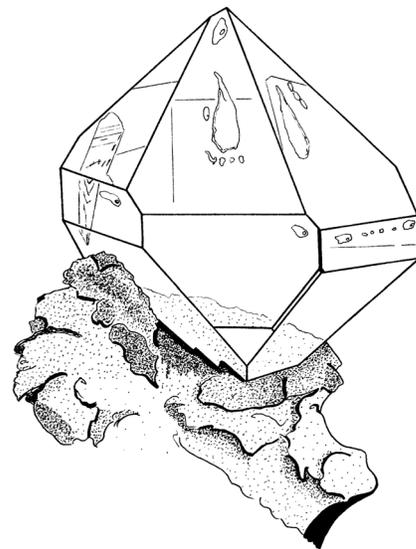
Right bottom: Dark red cuprite on malachite from Zaire.



Crystal (Quartz)

And he showed me a pure river of water of life, clear as **CRYSTAL**, proceeding out of the throne of God and of the Lamb. (Revelation 22:1)

And before the throne [there was] a sea of glass like unto **CRYSTAL**: and in the midst of the throne, and round about the throne, [were] four beasts full of eyes before and behind. (Revelation 4:6)



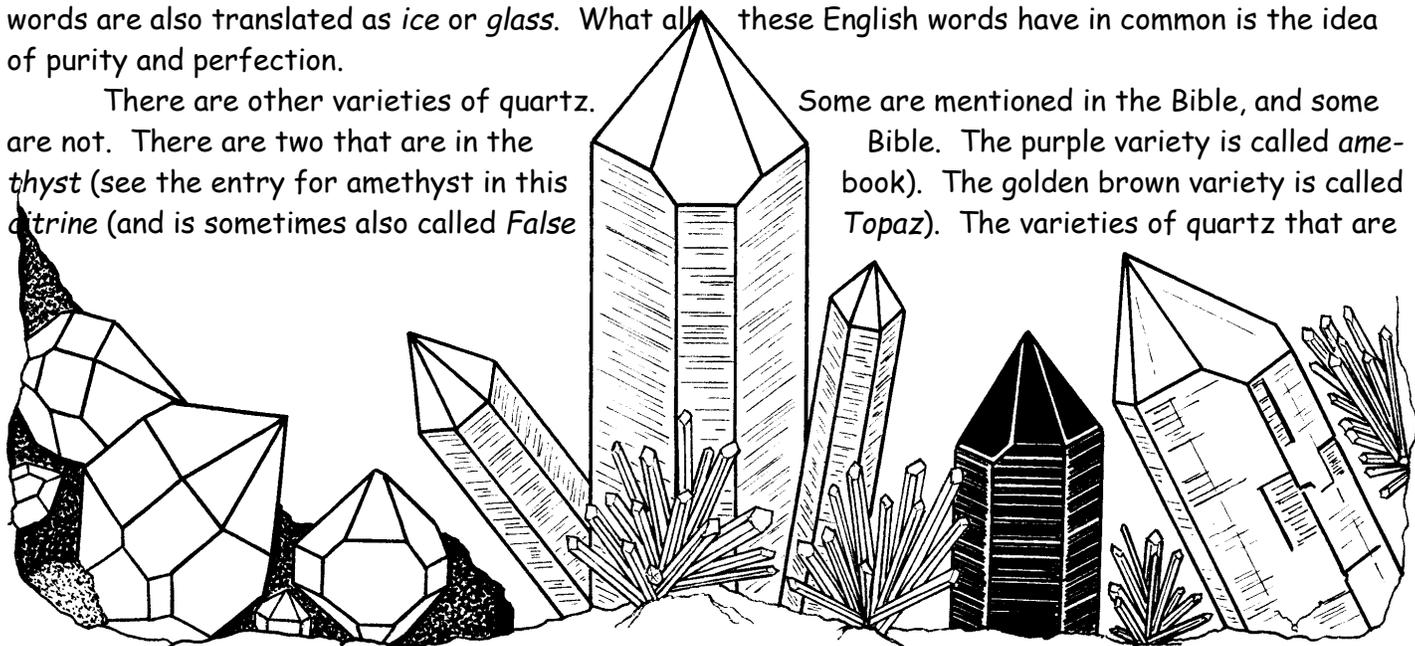
The mineral that we know as **quartz** is not called quartz in the Bible. The word we find in the Bible is **crystal**. As it is used in God's word, "crystal" refers to any hard material that is perfectly clear and colorless. This description is perfect for colorless, clear quartz, which through the centuries has also been called **Rock Crystal**.

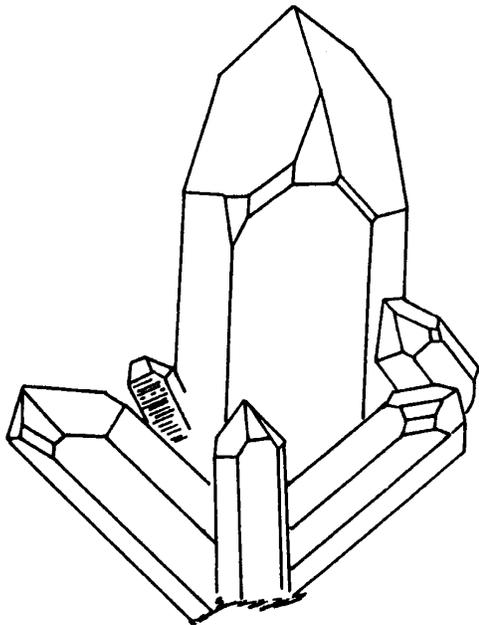
Quartz crystals of this type were known to be found high in the mountains. They also feel cold to the touch because quartz moves heat away from the finger very quickly. It is also clear, like pure ice. When all of these facts are put together, they led people in ancient times to conclude that quartz crystal had to be water that froze so hard that it would never melt. In other words, it was thought to be **petrified water**! Today we know that quartz is the combination of two elements, silicon and oxygen. Specifically, it is silicon dioxide, SiO_2 .

In the book of Revelation, the Greek word that is translated as **crystal** is **krustallos**. The descriptions are to give the image that the river of water of life and the sea before the throne are pure and absolutely clean and clear. They are, therefore, perfect. In the Old Testament, two different Hebrew words are translated as **crystal**. The words are **zekuwkiyth** and **gabiysh**. These words are also translated as **ice** or **glass**. What all these English words have in common is the idea of purity and perfection.

There are other varieties of quartz. Some are mentioned in the Bible, and some are not. There are two that are in the Bible. The purple variety is called **amethyst** (see the entry for amethyst in this book). The golden brown variety is called **Topaz**. The varieties of quartz that are

Some are mentioned in the Bible, and some are not. There are two that are in the Bible. The purple variety is called **amethyst** (see the entry for amethyst in this book). The golden brown variety is called **Topaz**. The varieties of quartz that are





not mentioned in the Bible are the following: black quartz is called *smoky quartz* or *cairngorm*. White quartz is called *milky quartz*. Pink quartz is *rose quartz*.

The most common mineral in the Earth's continental crust is feldspar. The second most common mineral in the Earth's continental crust is quartz. Massive quartz and fine quartz crystals are literally found all over the Earth. It is fair to conclude that many people in Bible times would have seen quartz crystal at some time in their lives and therefore knew what the Biblical writers meant when they wrote of *crystal*.

Previous Page, Top: A perfectly clear quartz crystal from Herkimer County, New York. These water-clear quartz crystals are commonly called

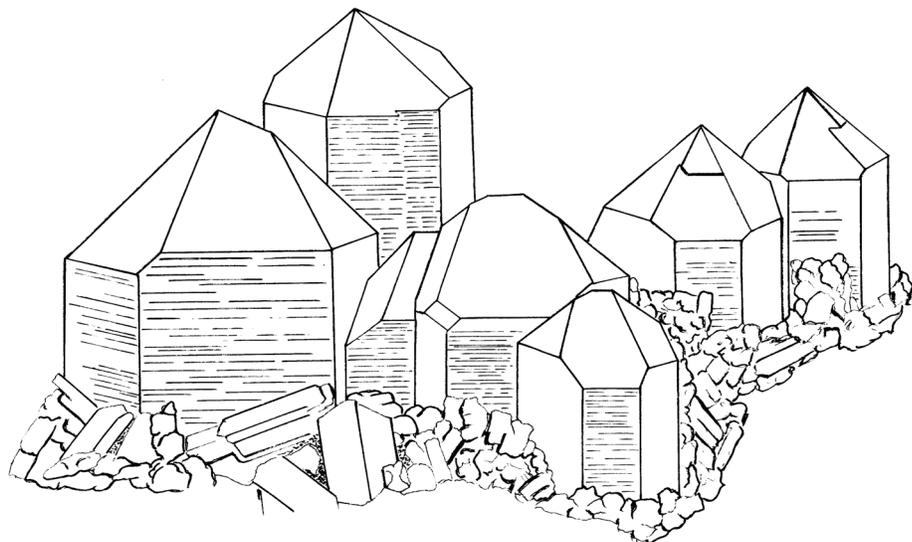
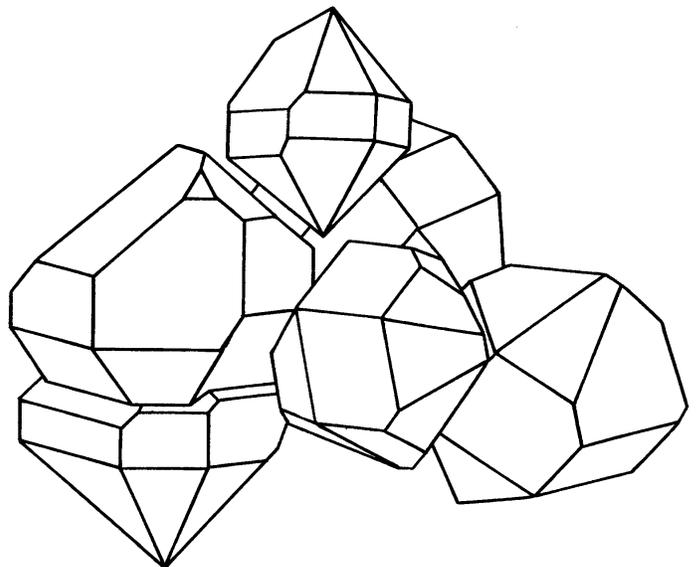
"Herkimer Diamonds." You can see some air bubbles trapped inside this crystal.

Previous Page, Bottom: A collection of quartz crystals of various shapes and sizes. You can color them purple (amethyst), brown (citrine), white (milky), green (aventurine), black (smoky quartz), or pink (rose quartz).

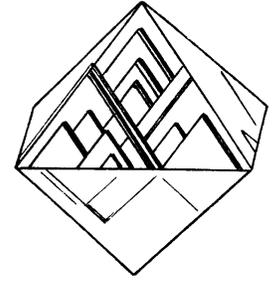
Above Left: Rock crystal (quartz) from Mt. Ida, Arkansas.

Right: A cluster of quartz crystals from Herkimer, New York.

Below: Parallel smoky quartz crystals from New Hampshire.

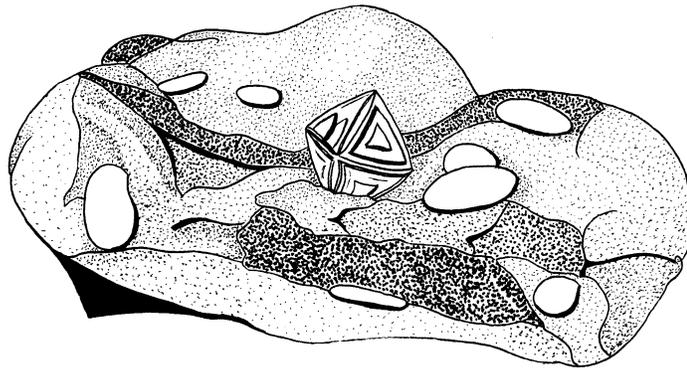


Diamond



And the second row [shall be] an emerald, a sapphire, and a **DIAMOND**.
(Exodus 28:18)

The sin of Judah [is] written with a pen of iron, [and] with the point of a **DIAMOND**: [it is] graven upon the table of their heart, and upon the horns of your altars; (Jeremiah 17:1)



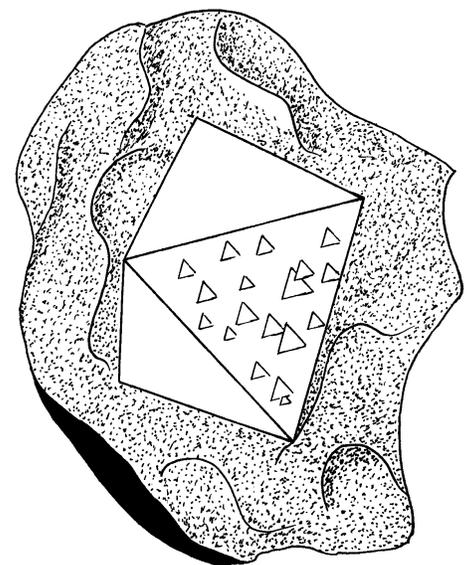
The Earth is formed of three distinct sections of rock material. The core, the mantle in the middle and the crust on top. Diamonds form deep in the Earth's mantle under conditions of extreme heat and pressure. These conditions force the carbon atoms to connect to each other in an interlocking form which creates diamond crystals. The result is the hardest substance in God's creation. Because of its hardness diamond is used to cut and engrave even the hardest rock material. Diamond is so hard that it

is 140 times harder than the next hardest mineral, corundum.

The Biblical passages that mention the mineral *diamond* are all found in the Old Testament. In Exodus 28, "diamond" is in the second row of Aaron's breastplate. The Hebrew word that is translated here as diamond is *yahalom*. This word means to **strike** which is a reference to the hardness of diamond. Many Biblical scholars agree that the mineral that we know as diamond was probably not known by Moses. It is more likely that the actual mineral mentioned as "diamond" in Aaron's breastplate was a white sapphire. Diamonds as we know them were first brought to the Western world by Marco Polo in 77 A.D. He acquired them in India.

In Jeremiah, Ezekiel and Zechariah, the Hebrew word *shamir* is translated as *diamond*. In these passages the reference to diamond is not literal but symbolic: it is meant to describe the hardness of the hearts of God's people.

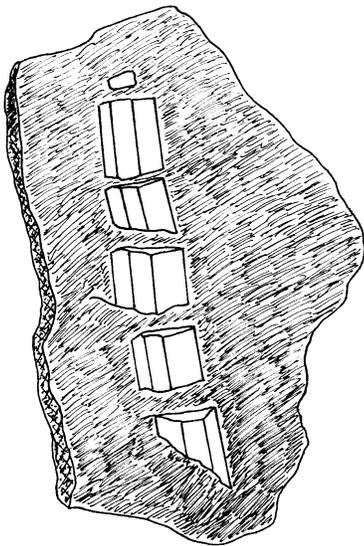
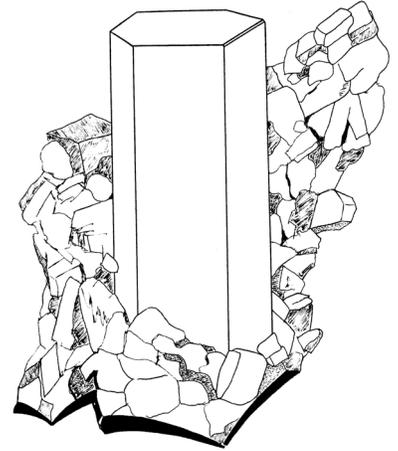
In the King James Version, the word *adamant* is sometimes used instead of *diamond*. You can find it in Zechariah 7:12, for example. "Adamant" comes from the Greek word *adamas* which means *invincible*, a reference to the hardness of diamond.



Emerald

And the second row [shall be] an **EMERALD**, a sapphire, and a diamond.
(Exodus 28:18)

And the foundations of the wall of the city [were] garnished with all manner of precious stones. The first foundation [was] jasper; the second, sapphire; the third, a chalcedony; the fourth, an **EMERALD**; (Revelation 21:19)



Emerald is the green variety of the mineral *beryl*. In the Old Testament, emerald is one of the gemstones in Aaron's Breastplate (in the second row along with sapphire and diamond). We discover here the problems and challenges of translating ancient words into modern words. In Exodus 28:17, the third stone in the Breastplate is *baregeth* which is called *carbuncle* in the King James Version. (Carbuncle is another word for *garnet*.) Hebrew scholars believe this word more likely was the word for the gem mineral now known as the emerald. The fourth stone, called *nophek* in Hebrew, may refer to turquoise or it may also refer to emerald. The New American Standard translators translate this word as emerald once and as turquoise three times.

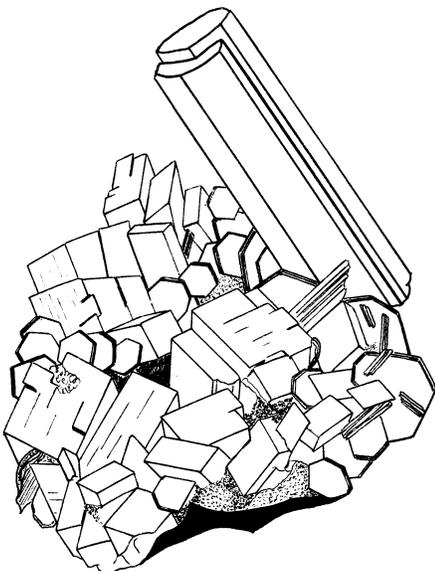
Even in ancient Biblical days emerald was considered a very valuable gem mineral. It was rare, a beautiful deep green, and could be fashioned into beautiful pieces of jewelry. Emerald mines in Upper Egypt were worked as long ago as 1650 B.C. Emerald jewelry has been discovered in Egyptian tombs. With this information in mind, it is fair to conclude that emeralds were carried with the Hebrews in their escape from Egypt.

In the New Testament, the Greek word that is translated as emerald is *smaragdus*. It is mentioned twice in the New Testament, in Revelation 4:3 and 21:19. It is the fourth foundation stone of the Holy City sent by God from heaven. Imagine an entire foundation cut from one giant emerald crystal!

Above Right: A simple, deep green emerald from Colombia.

Above Center: A single emerald crystal from Russia. Notice that after it formed, it was broken into many pieces and then preserved in the surrounding rock.

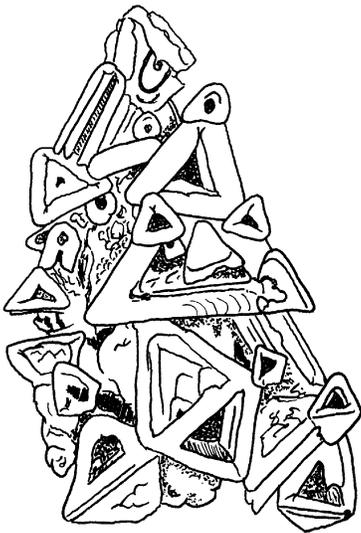
Left: One of the best emerald specimens ever discovered in the United States. It is from North Carolina. It is also the largest emerald found in North America.



Gold

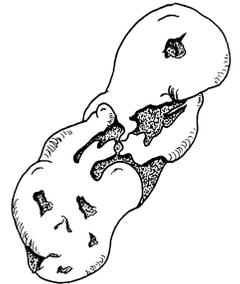
So Solomon overlaid the house within with pure **GOLD**: and he made a partition by the chains of **GOLD** before the oracle; and he overlaid it with **GOLD**. (1 Kings 6:21)

Forasmuch as ye know that ye were not redeemed with corruptible things, as silver and **GOLD**, from your vain conversation received by tradition from your fathers; But with the precious blood of Christ, as of a lamb without blemish and without spot: (1 Peter 1:18, 19)



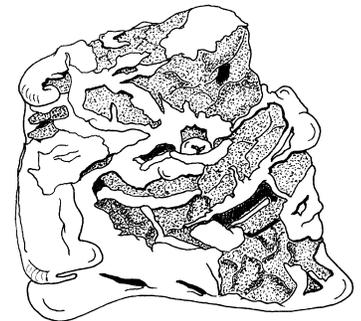
Gold is mentioned over 450 times in God's word. Gold, silver, iron, and copper were important metals in Biblical times. But the most precious metal was gold. It was found in many places. In the Old Testament we discover that gold was found in Ophir (probably somewhere in India), Sheba (the southern and western portion of the Arabian Peninsula) and Havilah (near the Pishon branch of the River of the Garden of Eden).

Gold was so important, that there were actually **SIX** different Hebrew words that are translated as *gold* in the King James Version. The most basic, simple name for gold is *harus* which simply means *gold*. *Zahab* means *yellow* or *golden* and is used to describe gold's appearance. *Beser* means *dug out* and probably is used to describe gold as it is found in the ground. The phrase "fine gold" in Psalm 19:10 and Proverbs 8:19 is



from the Hebrew *paz* which means *to purify*. In Job 28:15 and 1 Kings 6:20, 21 we find the word *segor* which means *shut up*, in other words, a treasure kept shut up in a safe place. *Kethem* means *hoard* or *golden store* meaning a treasure of gold that is safely stored away.

Scholars believe that the gold used in ancient days was discovered as gold dust and nuggets. Possibly some gold trapped in milky quartz was also recovered by hammering the quartz into very small pieces (almost like dust) which was then washed to remove as much gold as possible.



Without a doubt the Hebrews learned to mine and work gold from their Egyptian captors. Historians believe that the Phoenicians introduced gold working even earlier than this.

In the days of King Solomon, almost unbelievable quantities of gold were gathered and used by the King. In I Kings 10:14-22 we read, "Now the weight of gold that came to Solomon in one year was six hundred threescore and six talents of gold, Beside that he had of the merchantmen, and of the traffic of the spice merchants, and of all the kings of Arabia, and of the governors of the country. And king Solomon made two hundred targets of beaten gold: six hundred shekels of gold went to one target. And he made three hundred shields of beaten gold; three pound of gold went to one shield: and the king put them in the house of the forest of Lebanon. Moreover the king made a great throne of ivory, and overlaid it with the best gold. The throne had six steps, and the top of the throne was round behind: and there were stays on either side on the place of the seat, and two lions stood beside the stays. And twelve lions stood there on the one side and on the other upon the six steps: there was not the like made in any kingdom. And all king Solomon's drinking vessels were of gold, and all the vessels of the house of the forest of Lebanon were of pure gold; none were of silver: it was nothing accounted of in the days of Solomon. For the king had at sea a navy of Tharshish with the navy of Hiram: once in three years came the navy of Tharshish, bringing gold, and silver,

ivory, and apes, and peacocks." The days of King Solomon were, without a doubt, the most prosperous days of the people of ancient Israel.

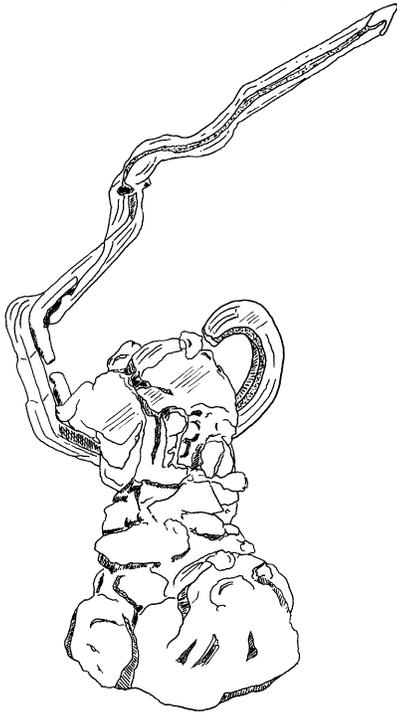
Gold was used by King Solomon to cover items because it is **malleable**. "Malleable" means that a metal can be hammered into very, very thin sheets without breaking. Gold, silver and copper, to name a few, are all malleable metals. One ounce of gold can be hammered into a sheet that is 10 feet long by 10 feet wide (that is 100 square feet of gold!). As a result, small amounts of gold could literally go a long way.

In the New Testament the Greek word for gold is **chrysolos** which means **gold** or **any thing made from gold**. Very often it is used to compare something of spiritual worth to gold, with the message that the spiritual - that is, that which is of God - is always far more valuable than even the most precious metal on Earth.

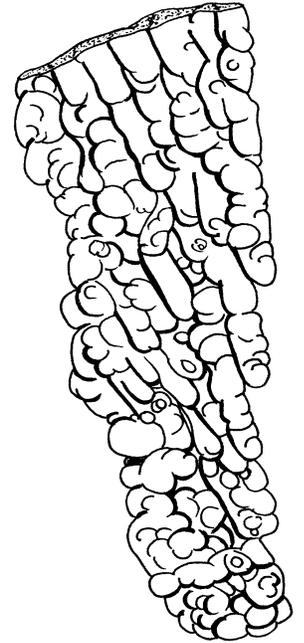
Previous Page: Gold crystals and nuggets from California.

Above: Wire gold on massive gold from the Philippines.

Right: "The Golden Bear" gold nugget from California.



Iron (Hematite & Magnetite)

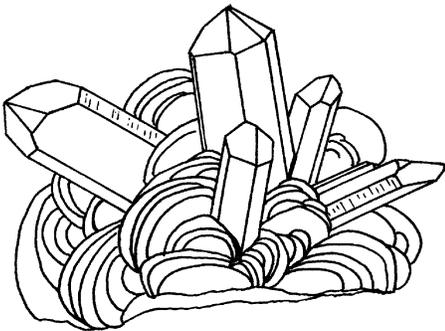


And the fourth kingdom shall be strong as **IRON**: forasmuch as **IRON** breaketh in pieces and subdueth all [things]: and as **IRON** that breaketh all these, shall it break in pieces and bruise. (Daniel 2:40)

And they had breastplates, as it were breastplates of **IRON**; and the sound of their wings [was] as the sound of chariots of many horses running to battle. (Revelation 9:9)

The first mention of iron is in Genesis 4:22 where Tubal-cain is introduced as one who made items out of brass (most likely, copper) and iron. Archaeologists have discovered that this early in human history, people had not yet learned to remove iron from iron ore. Therefore, the iron that the most ancient people used had to be iron from **nickel-iron meteorites** that they collected, melted and forged into new objects.

The Hebrew word for *iron* is *barzel*. Some translators translate this word into a specific object made of iron, depending on the context of the sentence or story. So, it is also translated as *axe*, *axe head*, and *chains*.



I Samuel 13:19-22 tells the story of how the Philistines kept iron smelting and working a secret from the Israelites "lest the Hebrews make for themselves swords and spears." This would assure that the Philistines would have an advantage over the Israelites in war. (Remember that despite this advantage, young David was still able to defeat the Philistine giant, Goliath!) Around 1000 B.C. King Saul and David brought iron making to the people of Israel.

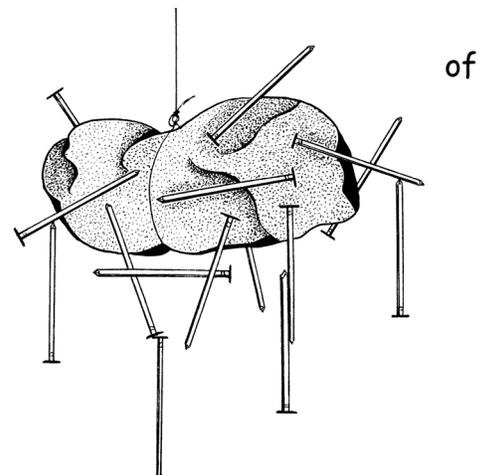
In the Bible, "iron" is used to refer to objects made out of iron. It is also used to describe strong qualities in God's people, both good and bad qualities.

In Revelation 2:27, God promises that the church at Thyatira that those who hold fast until Christ comes will rule "with a rod of iron." Again, this iron is used a symbol of God-given strength.

Above: A common iron ore called hematite.

Left: Hematite with quartz crystals from China.

Right: Massive iron ore called magnetite. Magnetite is naturally magnetic. Iron objects, like these nails, stick to magnetite.

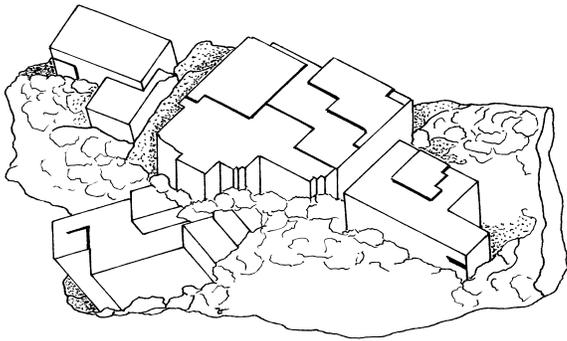
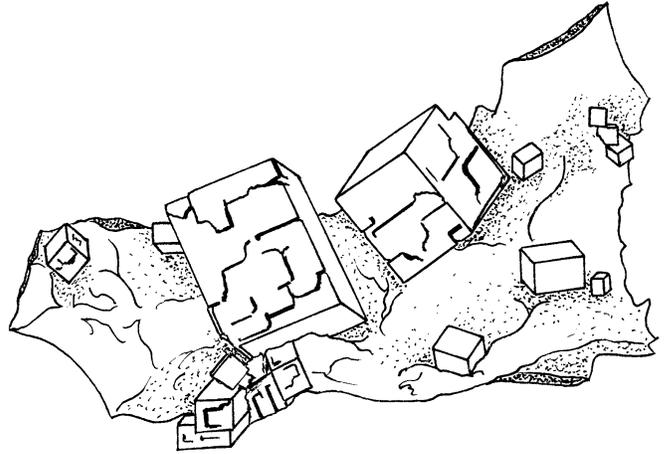


Lead (Galena & Cerussite)

That they were graven with an iron pen and **LEAD** in the rock for ever! (Job 19:24)

The bellows are burned, the **LEAD** is consumed of the fire; the founder melteth in vain: for the wicked are not plucked away. (Jeremiah 6:29)

Native lead is very rare in nature. Nearly all lead is recovered from minerals, the most common of which is *galena*. Galena is very heavy and is often very shiny, with a bright metallic luster. Another lead ore is the mineral *cerussite*. Historians and archaeologists have concluded that lead is probably the first metal smelted from its ores and used by humankind. This is because it is easy to remove from its ores due to its very low melting temperature.



The Hebrew word for lead is *ophereth*. This literally means *dusty color*, a reference to the dusty, dull gray color of pure lead.

The Romans used lead to make water pipes. The Babylonians used lead to make vases. By the time the Hebrews fled Egypt, they would have been knowledgeable of the use of pieces of lead as weights by fishermen to pull their nets down in the water. In Zechariah 5:7-8 we see that lead was used for weights. In the Prophet Amos 7:7 we find the famous description of a **plumb line** used as

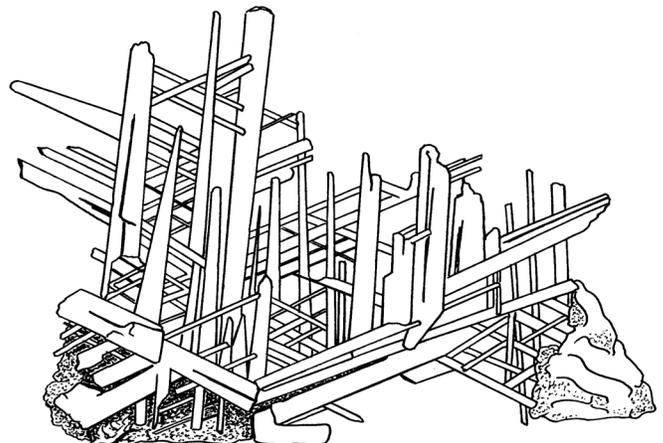
an instrument of judgment against God's people. A *plumb line* is a string with a lead weight hanging at the bottom of it.

Today we know that lead is very poisonous. The lead pipes used by the Romans caused lead poisoning - and therefore death - for many Romans. It is toxic to the heart, kidneys, bones, intestines, and nervous system. It can cause memory loss, kidney failure, severe pain and even death.

Above top: Galena cubes on dolomite rock.

Above: Galena cubes from Australia.

Right: A specimen of cerussite from Africa.



Ruby & Sapphire

And the second row [shall be] an emerald, a **SAPPHIRE**, and a diamond. (Exodus 28:18)

It cannot be valued with the gold of Ophir, with the precious onyx, or the **SAPPHIRE**. (Job 28:16)

And the foundations of the wall of the city [were] garnished with all manner of precious stones. The first foundation [was] jasper; the second, **SAPPHIRE**; the third, a chalcedony; the fourth, an emerald; (Revelation 21:19)

Ruby and sapphire are two colorful varieties of the mineral **corundum**. Red corundum is called **ruby**. Other colorful, gem varieties of corundum - colorless, yellow, pink, blue - are called **sapphire**.

In Lamentations 4:7 we read, "Her Nazarites were purer than snow, they were whiter than milk, they were more ruddy in body than rubies, their polishing was of sapphire." The Hebrew word translated as rubies here is **panin** which more often is translated as **pearl** or **red coral**. This shows how translating from one language to another can be difficult at times.

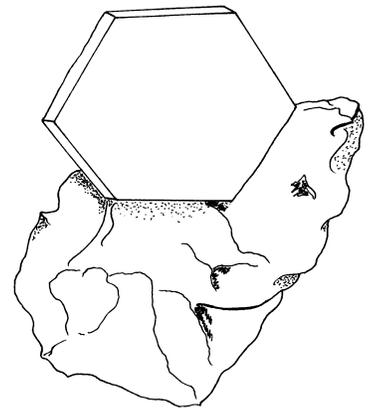
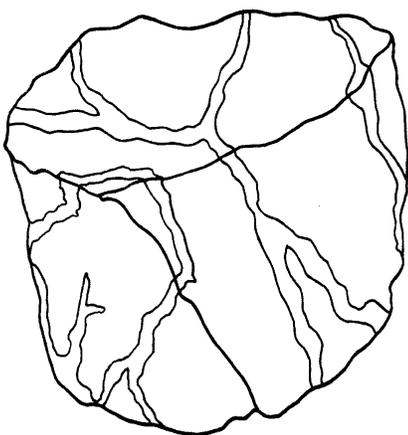
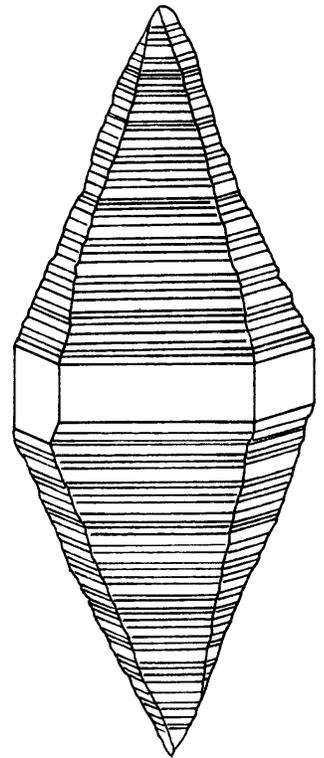
In Biblical times, minerals were identified mostly by their color. As a result, different minerals with the same color would be called the same thing. The most common color for sapphire is blue. Consequently, a number of different blue minerals were called "sapphire." The Hebrew word that is translated as sapphire is **sappir**. The Greek word from the New Testament is **sappheiros**. You can see by looking at both of these words that **sapphire** is the usual translation for this mineral. However, Biblical scholars are in agreement that these two words

probably were used to refer a massive, dark blue material known as **Lapis Lazuli**. Also called "Lapis," this material is a mixture of blue lazurite, a little white calcite and sprinkles of shiny, metallic pyrite.

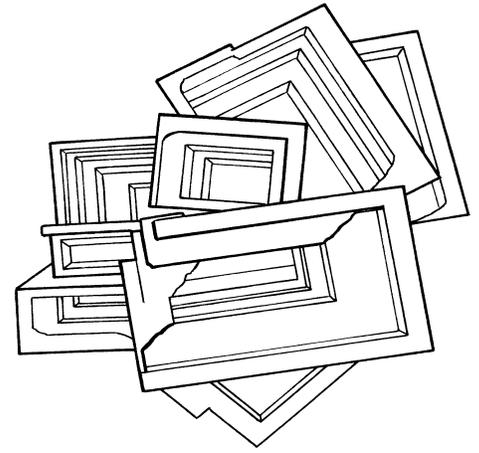
Top: A large, barrel-shaped sapphire crystal.

Above Right: Deep red ruby on matrix from Australia.

Below Left: Deep blue lapis lazuli with white calcite veins.



Salt (Halite)



Ye are the **SALT** of the earth: but if the **SALT** have lost his savour, wherewith shall it be **SALTed**? it is thenceforth good for nothing, but to be cast out, and to be trodden under foot of men. (Matthew 5:13)

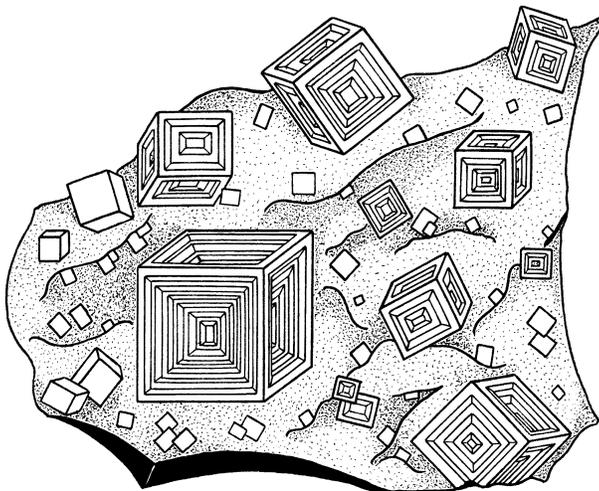
But his wife looked back from behind him, and she became a pillar of **SALT**. (Genesis 19:26)

Without salt, life would end. Some salt is needed to sustain life. On the other hand, too much salt can kill a living being. Salt has been known and used and valued by nearly all societies in the history of humankind. Archaeological discoveries have revealed that salt was mined as early as the 15th century B.C.

The mineral name for salt is *halite*. In the Old Testament, the Hebrew word for salt is *melach* which literally means *to powder*. This must be a reference to salt being crushed and used for seasoning and to preserve meat, for example. In the New Testament, the Greek word for salt is *hals* from which we get our mineral name *halite*.

The Dead Sea is called in Hebrew *Yam Ha-Melach*, which means *Sea of Salt* (see Genesis 14:3). The Dead Sea is located in southern Israel at the southern most end of the Jordan River. The Jordan River is the only important source of water for the Dead Sea. There are no outlet streams for the Dead Sea. It loses water only through evaporation. At 1,388 feet below sea level, it is the lowest dry land feature on the surface of the Earth. The lake itself is 1,237 feet deep and is one of the saltiest bodies of water on Earth.

There are layers of salt around the Dead Sea. For example, you will find a hill called Mount Sodom on the southwest side of the Dead Sea that is a formation of halite. This single salt formation is an amazing 700 feet tall!



The salt deposits around the Dead Sea are not pure halite. The halite (also called *rock salt*) is mixed with other minerals like clay and silt. In Matthew we read the curious statement from Jesus "when salt loses its flavor..." How can salt lose its flavor? When it is mixed with other minerals like clay and silt! When the salt itself is removed, both by scraping it away and by dissolving it in water, the silt and clay is left behind. This is the part that a family would normally throw out after the salt was used up.

Pictured here are two specimens of halite crystals from California. They are called "hopper crystals." Hopper crystals form when the edges of the crystals grow faster than the faces.

Silver

Then there passed by Midianites merchantmen; and they drew and lifted up Joseph out of the pit, and sold Joseph to the Ishmaelites for twenty pieces of SILVER: and they brought Joseph into Egypt. (Genesis 37:28)

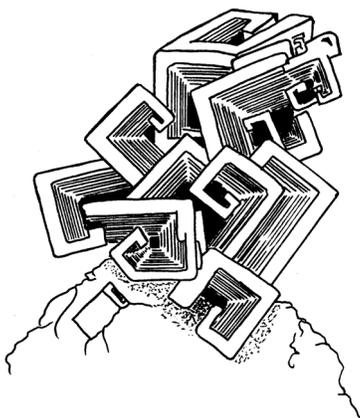
Then one of the Twelve—the one called Judas Iscariot—went to the chief priests and asked, "What are you willing to give me if I hand him over to you?" So they counted out for him thirty SILVER coins. From then on Judas watched for an opportunity to hand him over. (Matthew 26:14-16)

There are 376 references to silver in the King James Version of the Bible! Throughout the scriptures, silver is used as a form of exchange and money.

Jeremiah the prophet tells us that at least one important source of silver was Tarshish (Jeremiah 10:9) which may have been Tartessus, a town near the southwest coast of Spain. Interestingly, the name *Tarshish* means to melt or to be melted so Jeremiah might actually be referring either to a specific place where silver was melted or perhaps more generally to any place where silver was mined and smelted out of its ore minerals. For example, the lead ores of Greece contained important amounts of silver, too. When the lead ore (galena) was smelted, silver could be separated from the lead.

The Hebrew word for silver is *keceph*. In Job (28:15) we see that in the days before *keceph* - silver - was made into coins, it was weighed out in chunks or pieces. Archaeology shows that coins were not created until the 6th century B.C. by the Persian empire. In the Joseph story in Genesis (chapters 42-45), Joseph is sold for "20 shekels of silver." A *shekel* was a measure of weight. 1 shekel is about 2/5 of an ounce. 20 shekels of silver was the price of a mature slave. So, a slave was worth 8 ounces, or 1/2-pound, of silver.

One of the most famous Bible passages that mentions silver is in the Gospel of Matthew when Judas agrees to betray Jesus for 30 pieces of silver. The



Greek word is *argurion* which means *silver coins*. The Bible is not clear as to which specific coins were paid to Judas.

Above: Silver wires on calcite from the famous silver deposits of Kongsberg, Norway.

Bottom Left: Silver crystals from Michigan's Upper Peninsula.

Bottom Right: Silver wires from Colorado.

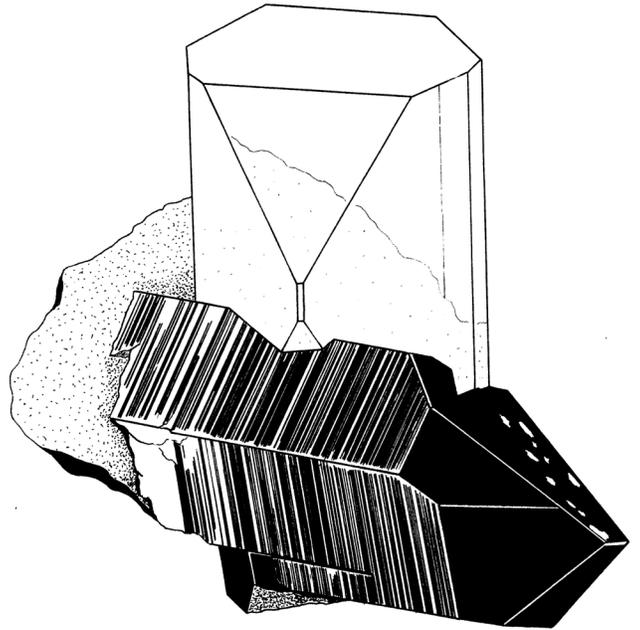


Topaz

And they set in it four rows of stones: [the first] row [was] a sardius, a **TOPAZ**, and a carbuncle: this [was] the first row. (Exodus 39:10)

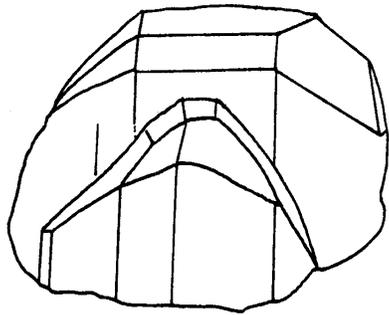
But where can wisdom be found? . . . The **TOPAZ** of Ethiopia shall not equal it, neither shall it be valued with pure gold. (Job 28:12 & 19)

The fifth, sardonyx; the sixth, sardius; the seventh, chrysolite; the eighth, beryl; the ninth, a **TOPAZ**; the tenth, a chrysoprasus; the eleventh, a jacinth; the twelfth, an amethyst. (Revelation 21:20)



As we have seen before in this book, the ancient Hebrew and Greek words that are translated as *topaz* most likely don't refer to the mineral we know today as "topaz" but to a different mineral altogether. The Hebrew word translated as *topaz* in the Old Testament is *pitdah* which comes from a root word which means *green*. Similarly, the Greek word used in the New Testament is

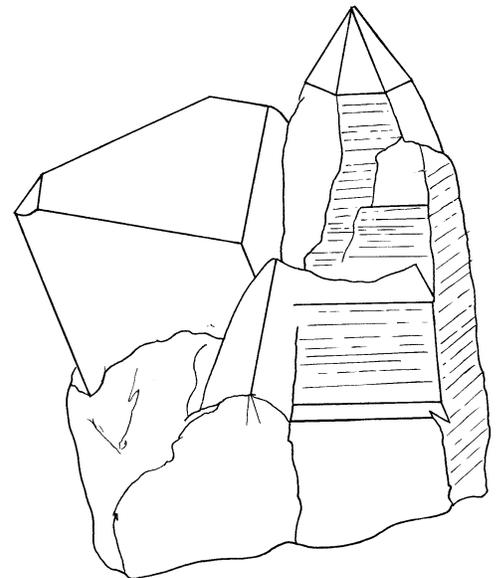
topazion which language experts say was used to refer to a green stone of some kind. It could be that the "green stone" referred to in the Old and New Testaments was the emerald. However, it is also possible that the green stone was a gem variety of the mineral olivine which is called *peridot*.



There is a small island in the Red Sea that is known today as St. John. In ancient days it was called **Topazein**. Historians believe this island was the source of the green gem that in ancient days was called "topaz." The only

green mineral found on St. John is peridot and the peridot found there is among the highest quality in the entire world. In the book of Job, there is a reference to "the topaz of Ethiopia..." (Job 28:19). This could have been a reference to St. John island which is between Israel and Ethiopia.

Today we know that the mineral that is called *topaz* is very different from peridot. Topaz is number 8 on the mineral hardness scale. It can be colorless, blue, sherry-brown, yellow, or red. It cleaves or breaks in one direction. Both topaz and peridot can be cut and polished to make very fine gemstones.



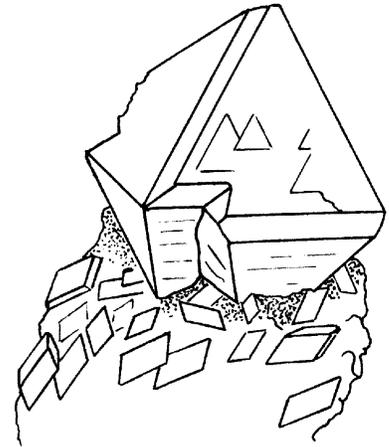
Above: Orange topaz from Pakistan.

Left: Grass-green peridot.

Right: Blue topaz (left) with smoky quartz (right).

Vermilion (Cinnabar)

Woe to him who builds his house by unrighteousness . . . Who says, "I will build myself a great house with spacious upper rooms," and cuts out windows for it, paneling it with cedar, and painting it with VERMILION."
(Jeremiah 22:13-14)

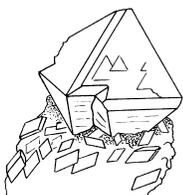


Today the word "vermilion" refers to the color that can be best described as bright orange-red. In the past, the name "vermilion" was used for the mineral that mineralogists now call *cinnabar*. Cinnabar is most often massive and powdery (though rare, deep red cinnabar crystals have been found in China). It is also red. Because of its color, and the fact that it can be easily crushed into a powder, it has been used as a pigment for paint. In ancient times most cinnabar (that is, vermilion) came from Spain. Today significant deposits of cinnabar are known in California and Russia.

The Hebrew word that is translated *vermilion* is *shashar*. In every case, this word is used to describe the bright red color of vermilion, not the mineral called cinnabar. However, crushed cinnabar was used as a pigment to create this color for painting walls and objects in Biblical days.

Today, cinnabar is the ore mineral for the element *mercury*. Mercury is the only metallic element that is liquid at room temperatures. Mercury is very important in modern technology. For example, without mercury, compact fluorescent lights will not function. The problem with using mercury, however, is that it is very, very poisonous.

Above: A rare, deep red cinnabar crystal from China.

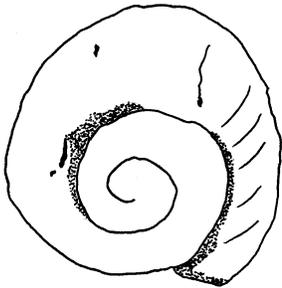
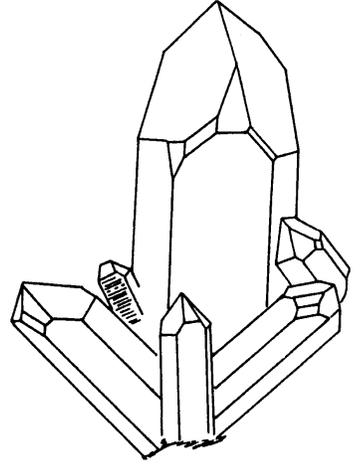


Actual cinnabar crystals are usually the size of the picture to the left -- or smaller! Draw your own cinnabar crystals here.

What Do You Know?

Let's see what you learned about the minerals of the Bible. First try to answer as many as you can without looking back in the book. Then, if you have to, go back and find the answers.

1. In the Bible, the mineral "quartz" is called _____.
2. _____ is not a mineral. It is fossilized tree resin and sometimes has insects trapped inside of it.
3. The purple variety of quartz is called _____. Its name means "not drunken."



4. Iron comes from two iron ores, _____ and _____.
5. _____ is the precious metal that was cut into chunks and bars in order to purchase things. The Persians made this metal into coins.

6. _____ is a gem mineral that came from the island called Topazein in the Red Sea.

7. The hardest mineral on Earth is called _____. In the Bible, it is mentioned to refer to the hardness of people's hearts toward God.

8. Brass is an alloy made from _____ and zinc.

9. Jasper, agate, flint, chrysoprase and onyx are varieties of the mineral _____.

10. Name the "mystery" mineral mentioned in the Bible that might have been what we know as opal.



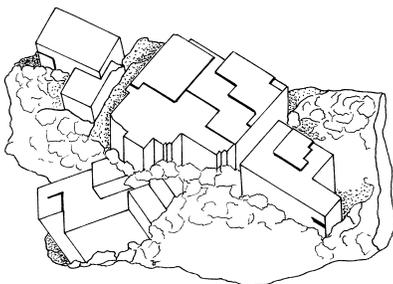
The mystery mineral is _____.

11. The green variety of beryl is called _____.
12. The blue variety of beryl is called _____.
13. Sulfur is a soft, bright yellow mineral. It can catch fire in a match flame and when it

burns, it smells like rotten eggs. In the Bible, sulfur is called _____.

14. The Israelites probably learned to work this precious metal during their time in captivity in Egypt. This precious metal is _____.

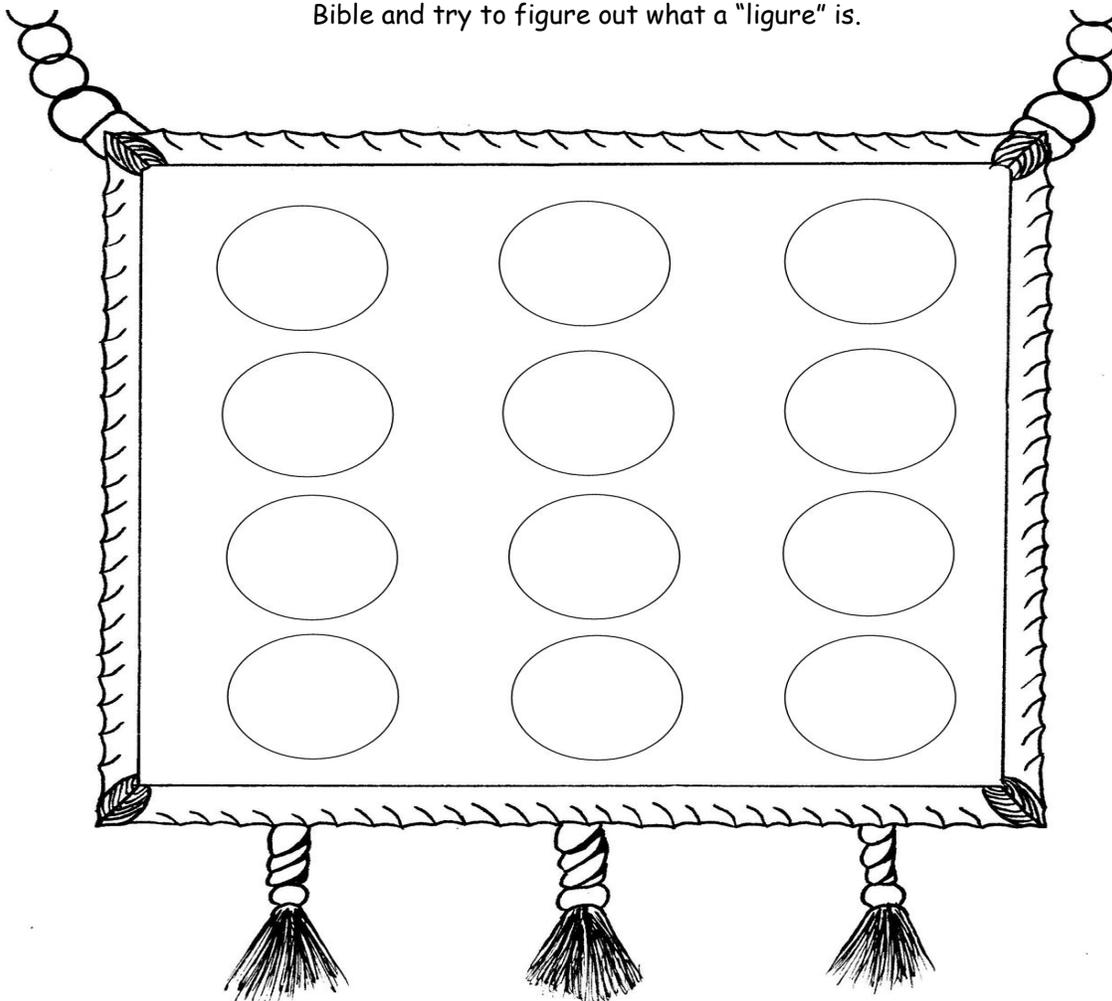
15. Galena and cerussite are ore minerals of the metal _____.



Aaron's Breastplate

In Exodus 28 Aaron is given directions on the gemstones in the High Priest's breastplate and where they are placed on the breastplate. Pictured below is a drawing of Aaron's Breastplate. Either from memory or by going back to the scripture, make a list of the names of the minerals in the breastplate. Color each gem according to its proper color.

In the King James translation of the Bible, the third row of Aaron's Breastplate contains "a ligure, an agate, and an amethyst." It is your challenge to get two or three or more translations of the Bible and try to figure out what a "ligure" is.

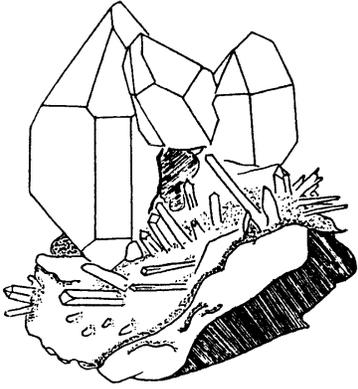


In each oval above, write the name of the mineral that corresponds to that oval. You can refer to the entries in this book, or go to Exodus 28:15 and forward. Start with a King James Version of the Bible. Then, do the same using other translations of the Bible. (You will discover how the language experts struggle to find the precise translation for every mineral listed here.) Next, color each mineral its proper color. According to the scriptures, the names of the 12 Tribes were carved onto the gems, one name for each gem. Do some research and write the names of the 12 Tribes on the gems.

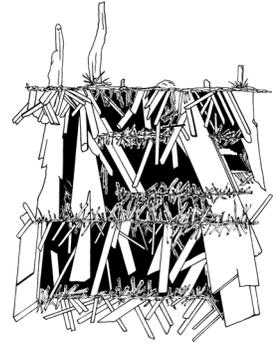
Once this is all done, you can begin a more challenging project. Using the details from Exodus 28, recreate Aaron's Breastplate. If you would like to learn how to polish semi-precious minerals, you can contact a local mineral club for guidance. A list of all of the mineral clubs and societies across the country can be found at the **American Federation of Mineralogical and Lapidary Societies'** website: **www.amfed.org**.

Bible Mineral Match

The colors and shapes of minerals help mineral scientists identify different mineral species. You have read a lot of information about the minerals found in the Bible, but did you really study what these minerals look like? Let's put your observations to the test. Draw a line from the mineral name in the center to the matching mineral drawing on the right or left.



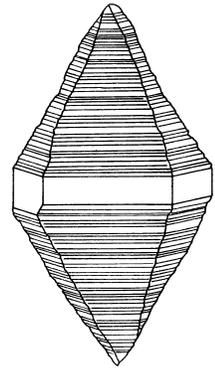
Emerald



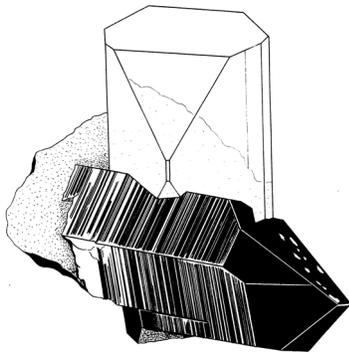
Silver



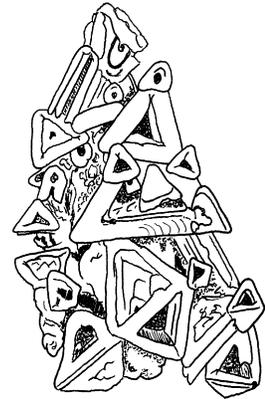
Copper



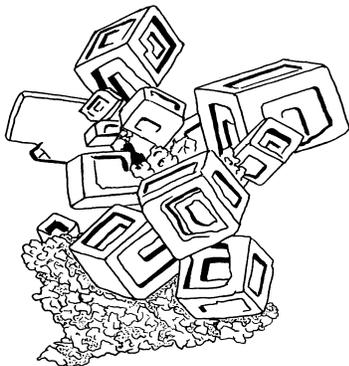
Gypsum



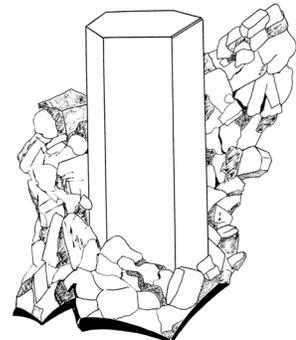
Amethyst



Sapphire

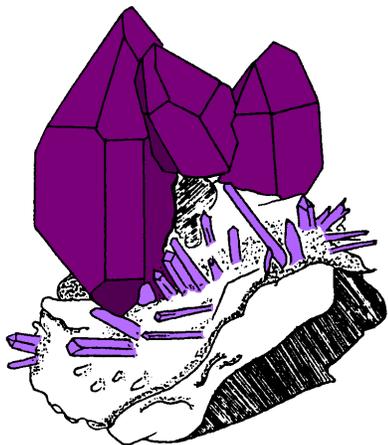


Topaz



Gold

Minerals of the Bible

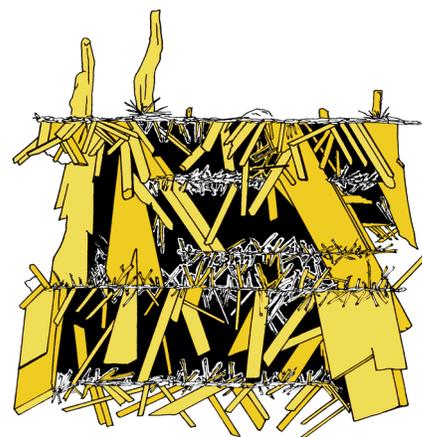


In this book, you will be introduced to over 30 different minerals that are found in the Bible.

You will learn a little bit about the Hebrew and Greek languages; the Hebrew scriptures (which Christians call the "Old Testament") were written in Hebrew and the Christian scriptures (which Christians call the "New Testament") in an ancient form of Greek. Words from different languages, especially ancient languages, can be hard to translate today. In

fact, Bible scholars and scientists are not certain how to translate a number of the ancient mineral names found in the Bible. But they make some very smart guesses!

You will also learn some history. Rocks and minerals are very important to cultures throughout history. Here you will discover how some minerals were used for useful items. Others were polished and used for jewelry and decorations.



You will also discover interesting facts about these minerals and their uses in Biblical times. From preserving food to making swords to decorating the High Priest's Breastplate, minerals, crystals and gems have been a necessary part of life in Biblical times.

About the Author and Artist: Reverend Darryl Powell is an ordained Baptist minister. Before becoming a minister he studied geology and mineralogy at the University of Rochester in Rochester, New York. Rev. Powell and his wife, Holly live in Rochester, New York.



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