MINI MINERS MONTHLY

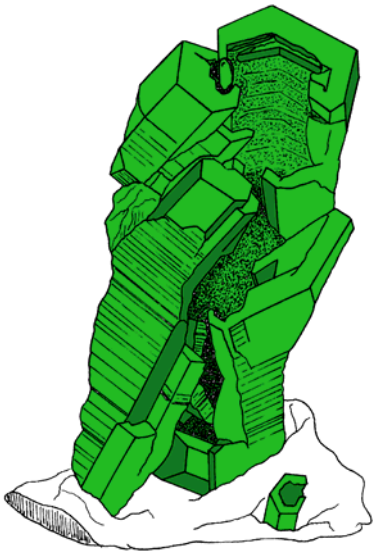
A MONTHLY PUBLICATION FOR YOUNG MINERAL COLLECTORS

VOL. 12 NO. 6 JUNE 2020

Still A Lot of Time At Home!

Things are starting to change but many of us are still spending a lot of time at home! So Diamond Dan would like to give you one more month of a larger than usual issue of "Mini Miners Monthly." This issue here is extra-long, a total of 33 pages. Most of it is a coloring and learning book called "Mineral Oddities." It's about many of the fun and interesting shapes that are found in the mineral world. It will also teach you some fancy words that mineral collectors use to describe these treasures.

We give you special permission to share this issue with all your family and friends. Email it to anyone who might enjoy it. Let others enjoy minerals like you do.



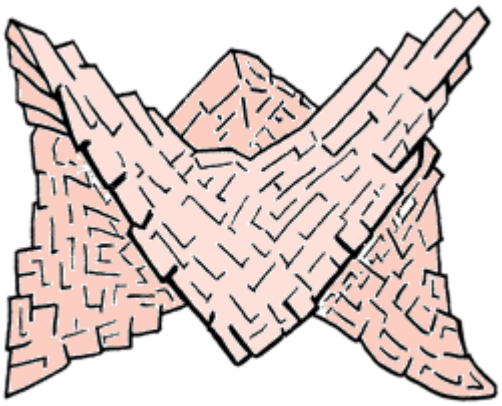
And just in case we all get some freedom to travel and enjoy a vacation this summer, this issue will tell you about the only place in the United States you can dig for diamonds! Maybe you'll get the chance to travel to Arkansas and just maybe, you'll go home with a real diamond crystal.

And please join a mineral club or society near you. It's the best way to learn and grow in knowledge. You'll make great friends. And you'll learn to build an excellent mineral collection, one that will grow in beauty and value through the years.

As always, many blessings to you! Diamond Dan is pleased you continue to be part of our Mini Miners Monthly family.

What Mineral Am I?

I am a carbonate mineral. This means that I have a molecule made of carbon (C) and oxygen (O). The molecule is CO_3. The other elements in my chemical formula are calcium (Ca) and magnesium (Mg). I am harder than calcite, but my crystals can be the same, most often as a rhomb. I crystallize in the Trigonal Crystal System. Sometimes my rhombs grow together and form what mineralogists describe as "saddle-shaped" crystal groups, like the one pictured to the right.



My mineral name is

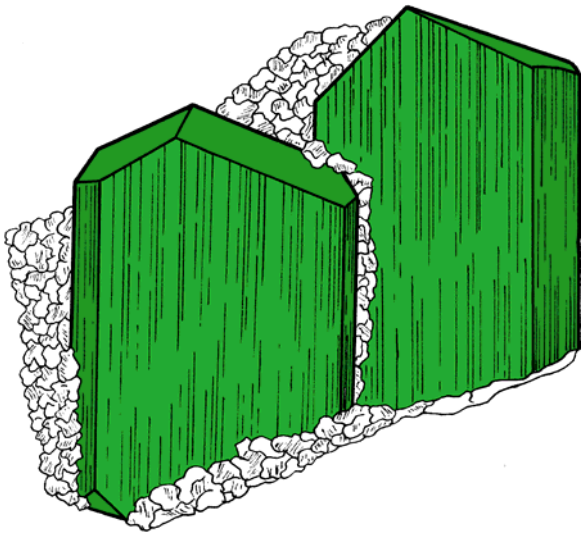
_____.

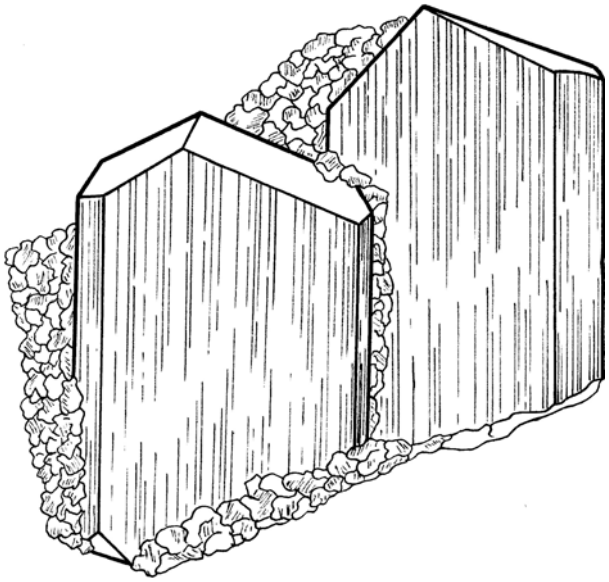
Check your answer on the next page.

MINI MINERS MONTHLY

Mineral of the Month

Spodumene





Chemical Formula: $LiAlSi_2O_6$; **Crystal System:** Monoclinic;
Color: Gray, White, Light Purple, Grass Green;
Hardness: 6.5 to 7; **Luster:** Vitreous; **Streak:** White;
Specific Gravity: 3 - 3.3; **Fracture:** Uneven

Spodumene is a silicate mineral that contains the important element, Lithium (Li). It's chemical formula is $LiAlSi_2O_6$ (lithium aluminum silicate). It often forms large, well-formed, grayish-white crystals that are mined as a source of lithium.

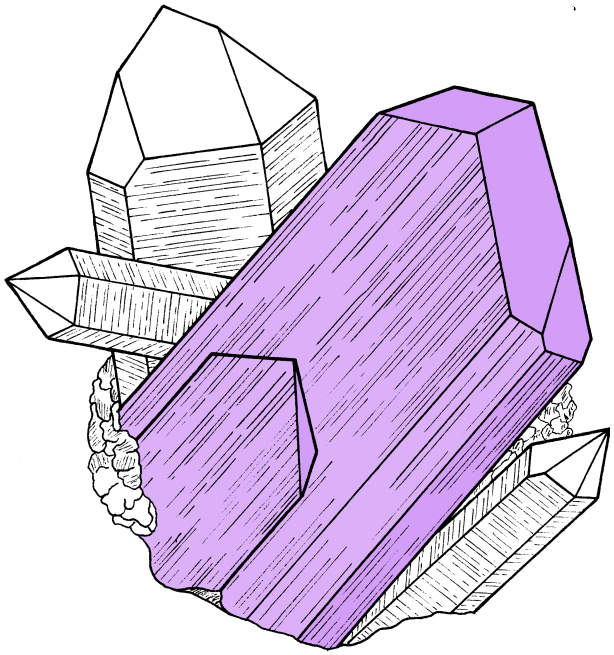
Some of the largest crystals ever found in the world were Spodumene crystals. In the Etta Pegmatite Mine in the Black Hills of South Dakota, Spodumene crystals weighing many tons each were mined in the early part of the 1900s. The picture on the next page shows how thick and long these crystals were (picture from the USGS).

Spodumene also occurs as glass-clear, colorful crystals that are often cut as gemstones. Each color variety has its own special name. Light purple, lilac Spodumene crystals are known as Kunzite. This variety was named after the famous gemologist, George F. Kunz. He studied the first light purple Spodumene crystals from California when gemologists were trying to identify what this beautiful mineral was. Grass green Spodumene is known as Hiddenite.

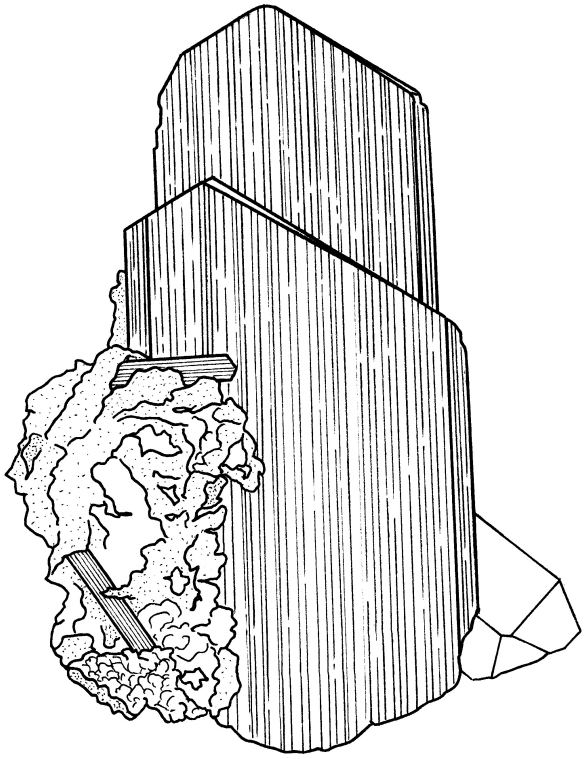
Cut Kunzite and Hiddenite gemstones are not often worn in jewelry because Spodumene has very strong cleavage and if these gemstones were hit against a hard surface, they could easily cleave into to or more pieces.

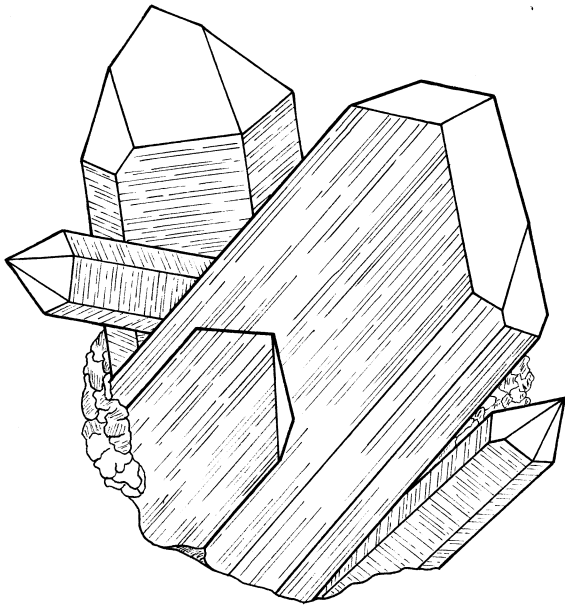
What mineral am I? Answer: Dolomite

Spodumene



Above Left: USGS Photograph of a miner standing next to two Spodumene crystals in the Etta Mine, Black Hills, South Dakota. One of these huge crystals weighed over 90 tons!
Above Right: A Kunzite Crystal with Quartz from Pakistan.
Below Right: Same crystal for you to color.
Below Left: Another Kunzite crystal to color.





An Important Woman In Mineralogy

In the 1800's, when mineralogy was becoming a science of its own, there were a lot of men studying minerals and writing books about them. People like James Dwight Dana, James Sowerby, William Babington, Archibald Bruce, and Parker Cleaveland, to name only a few, were making discoveries and writing papers and books about minerals, their properties, their forms, their chemical formulas, their uses and more. Though they are not always recognized for their contributions, there were women who also wrote about minerals and mineralogy. One of these women was Jane Kilby Welsh. She wrote a set of two books that are called "Familiar Lessons in Mineralogy and Geology." They were published in 1833.

Jane Kilby Welsh was born in Boston, Massachusetts on January 25, 1783. She was an only child. Her family called her "Jenny." Her mother died when she was very young and her father died when she was six years old. She was raised by her mother's mother, who also had the name Jane (young Jane was named after this grandmother.) Her family moved to Northampton, Massachusetts in the Berkshire Mountains where she would live the rest of her life.

Here she attended public lectures on nature and science and became very interested in science. One of the important teachers was Amos Eaton, who was a lawyer and an important scientist of his day (he was an expert in plants and geology.) He is remembered for the fact that he educated young women in the sciences, some of which went on to teach in important colleges.

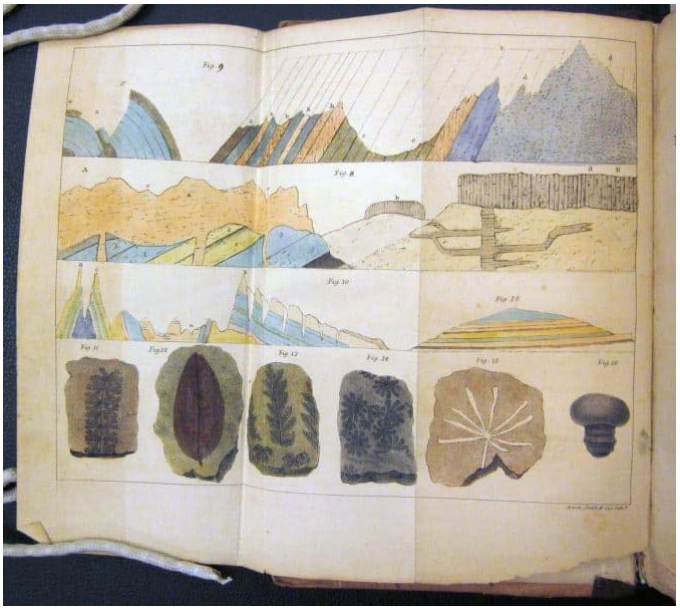
The first book that Jane Welsh wrote and published was a book about botany (plants). The title page of the book did not have her actual name. Instead she published it with the words, "By a Lady."

Jane Welsh first had an idea for writing a book on Mineralogy and Geology in 1819. But it wouldn't be until 1832 that the book would actually be published. And this time, when it was published, her own name was on the title page. In her lifetime, she wrote a number of books, mostly on science topics.

Books like "Familiar Lessons" were written in a style that was supposed to be entertaining, fun and educational for young readers. The story has brothers and sisters, and sometimes their friends, who are taught by an older relative or friend who is an expert. They have conversations and ask questions and in the process learn about minerals, their forms, their properties, how and where to find them, what their uses are, and more.

Jane Welsh's book on Mineralogy and Geology taught about minerals and geology, this is not a surprise. It also taught about the Bible, God and Christian faith. The practice of writing about scientific themes and connecting them to Christian faith was not unusual in the early 1800's.

Jane Kilby Welsh died on September 12, 1853. The newspaper reported she died "of a fit." No one really knows what that means. Unfortunately, we do not have a picture of Jane Welsh.



Pictured Right: Volume 2 of "Lessons in Mineralogy and Geology" included a hand-colored foldout page illustrating some of the lessons in the book.

Mineral Museums

There are a lot of small and large mineral museums throughout the United States. Sometimes they are mineral museums. Some of them are Natural History Museums that include really good mineral displays. Now that we are able to travel more, maybe you and your family would be able to travel to a mineral museum and see some of the best mineral specimens ever recovered.

Where can you find a good mineral museum near you? Check out this website for a complete list of museums in the United States. Wikipedia has a nice listing under the title "Geology Museums in the United States."

You can also find a really nice state-by-state listing of mineral, fossil, and geology museums at

http://the-vug.com/educate-and-inform/museums/.

Each museum that is listed also includes a brief description of the museum and what you can expect to find there.

BIG HINT: Before you plan to visit any of these museums, be sure you check out their website and, perhaps, even give them a phone call ahead of your visit. With the Coronavirus and all the rules about social distancing, you will want to be sure the museum of your choice is open for visits. It would be a shame if you drove all morning only to find the museum is closed or you need a special ticket with a specific time and date.

Go Someplace Fun!

Crater of Diamonds State Park, Murfreesboro, Arkansas

We have had a lot of time in our houses, staying away from others so as not to be infected with the Coronavirus. Maybe you and your family will have the time and enough money to go on a mineral trip, a DIAMOND DIGGING trip, to the only place in the United States where it is possible to find real diamonds: Crater of Diamonds State Park in Arkansas.

We just checked their website and it says at the top of the home page, "The Diamond Search Field is now open." However, there are rules in place to keep you safe from catching the Coronavirus. So please visit their website for full instructions on how to prepare for a fun visit. Their website is

https://www.arkansasstateparks.com/parks/crater-diamonds-state-park

For a reasonable fee, you can enter the park and dig in search of real diamonds. It is not a guarantee that you will go home with a diamond. But every year there are reports of at least one large, gem-quality diamond being discovered. These diamonds are not found somewhere else and scattered around the park. These diamonds are truly deposited here in Murfreesboro.

The diamonds found here can be different colors. Some are colorless. Others are brown. Others are shades of yellow. The website shares this fun information: *"More than 33,100 diamonds have been found by park visitors since the Crater of Diamonds became an Arkansas state park in 1972. Notable diamonds found at the Crater include the 40.23-carat Uncle Sam, the largest diamond ever unearthed in the U.S.; the 16.37-carat Amarillo Starlight; the 15.33-carat Star of Arkansas; and the 8.52-carat Esperanza."*

This is a GREAT vacation for families. Young and old can all enjoy digging in the dirt together, sifting through the soil for valuable treasure.

Diamond image above courtesy of Arkansas State Parks, Crater of Diamonds State Park.

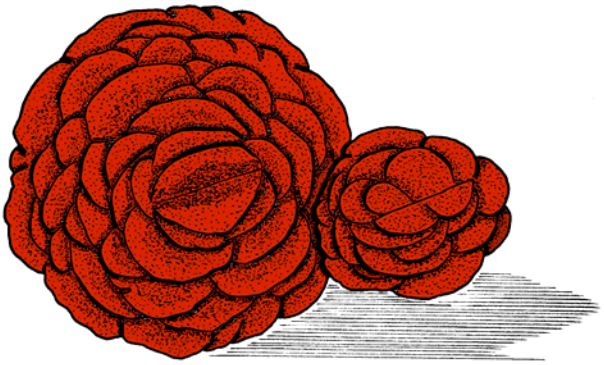
Join a Mineral Club

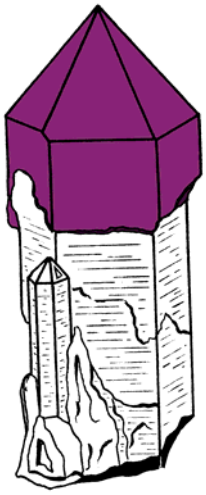
One of the best ways to learn about minerals is to join a local mineral club or society that has monthly meetings. When you join a club, you will meet people of all backgrounds and levels of expertise. You will learn, be able to trade specimens, buy specimens, share books and other resources, and much more. One of the best ways to become an expert collector is to join a club (or more!), make friends and learn. Eventually you will teach others as well.

So, how do you find an active mineral club or society near you? There's a list! Visit the **American Federation of Mineralogical Societies'** web-site and follow the link to the **Regional Federations**. Each Federation has a link to the States in that Federation and the clubs within each State.

REMEMBER: Due to the Covid-19 situation, many Mineral Clubs and Societies have chosen to cancel or postpone their meetings and activities in the near future. Search out their websites and make phone calls if you need to so you can be sure the Club you are interested in is actually meeting.

www.amfed.org



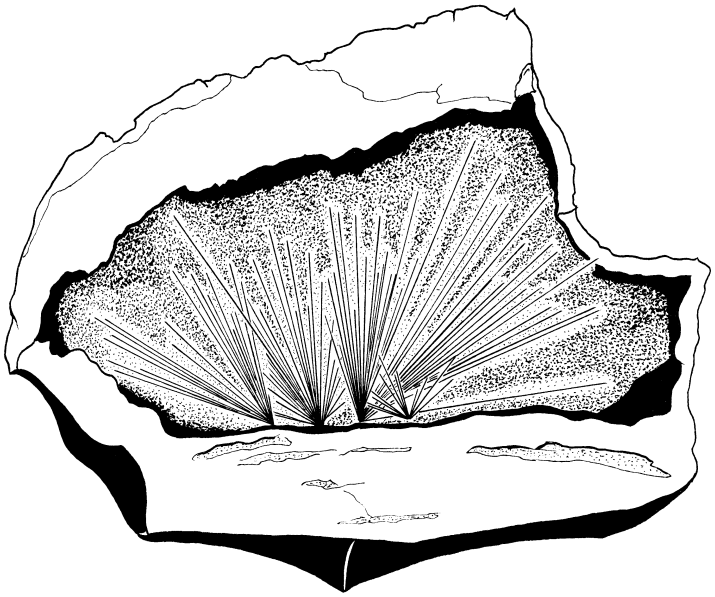


Mineral Oddities

A Dictionary of Mineral Pranks

Their Strange & Wonderful Forms

Acicular

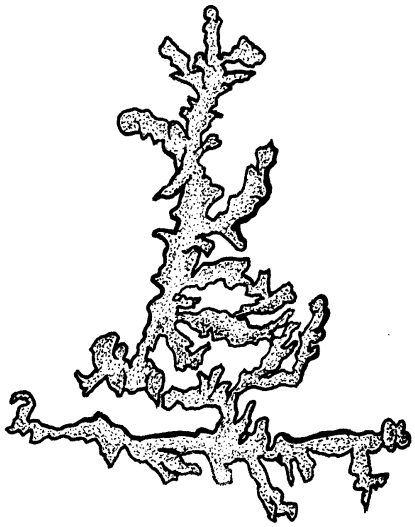


"Needle-Like"

The word *acicular* is from a Latin word *acicula* that literally means *a little needle.*

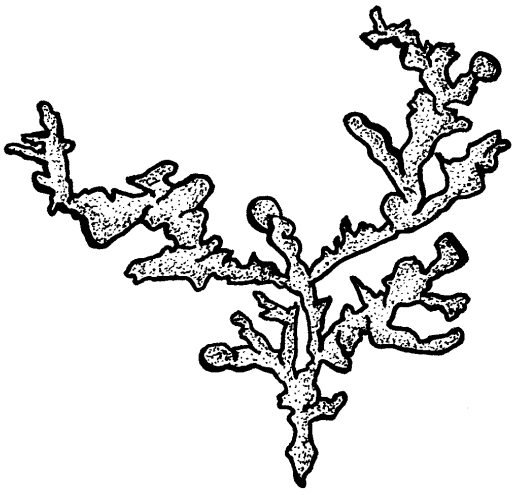
Acicular crystals are minerals that crystallize as long, thin, hair-like needles. The list of minerals that form acicular crystals include aurichalcite, artinite and millerite. You can see the acicular crystals in this specimen of millerite from the Sterling Mine, Antwerp, New York. The needles are brass-yellow and are extremely fragile. Even a light touch can break them off. In this specimen from a very famous mineral locality, the millerite crystal sprays grow in holes (mineralogists call these holes *vugs*) in massive hematite (iron ore).

Arborescent

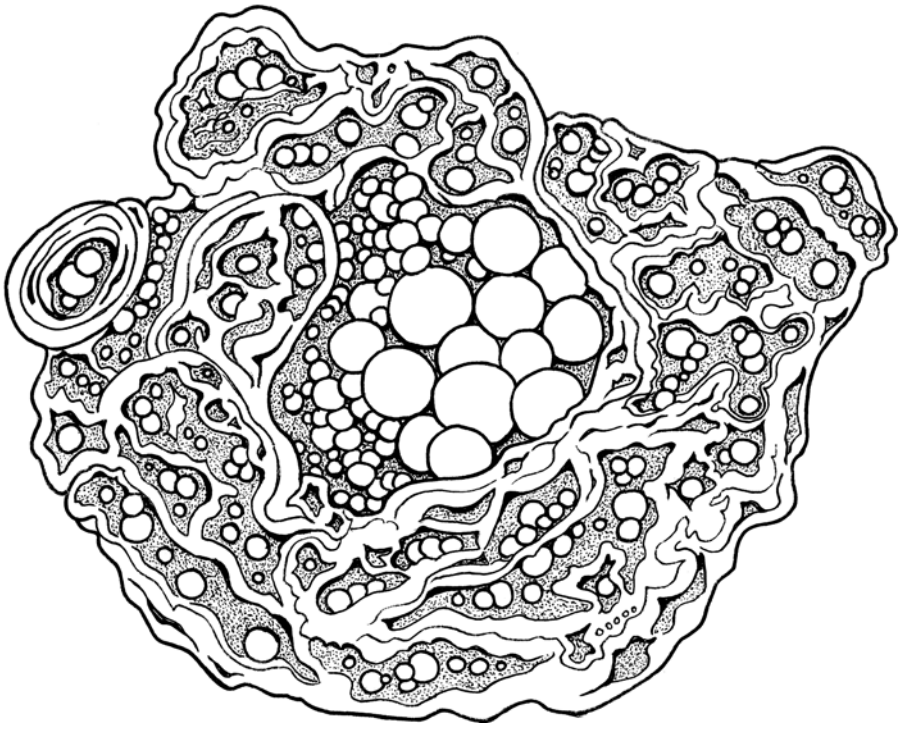


"Like a Tree"

The Latin word for *tree* is *arbore*. Some minerals, like these copper specimens from Itauz, Djezkazgan, Central Kazakhstan, grow in forms that resemble tree branches and so are described as *arborescent.*



Bird's Nest



Mineralogists often use fancy words that come from languages like Latin or Greek to describe the shape of a mineral. Words like *acicular* and *reniform* and *botryoidal* describe special mineral shapes.

Sometimes mineralogists describe a mineral form simply based on what it looks like. Here are some balls of calcite that formed and hardened in a depression in limestone. Limestone and calcite are made of the same material - they are both calcium carbonate ($CaCO_3$).

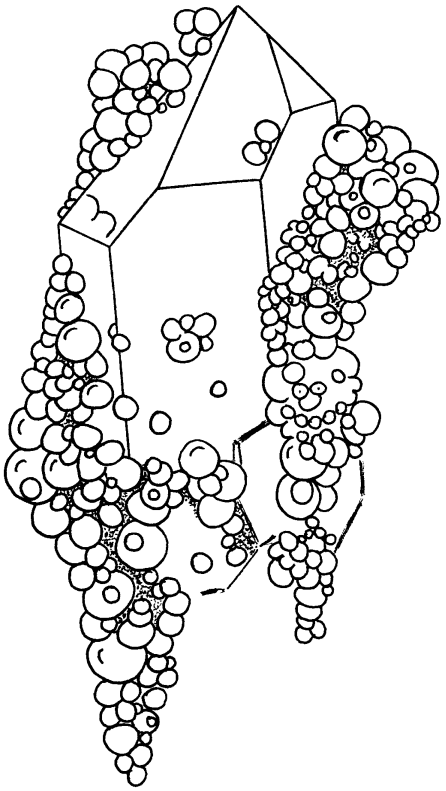
The very serious mineralogists call this formation *pisolitic*. The word *pisolitic* comes from the Latin word *pisos* which means *pea* because the specimen looks like a bowl of peas.

Other mineralogists looked at this specimen and said, "Hey, that looks like a bird's nest filled with eggs." So, specimens like this one are commonly called

"Bird's Nest Calcite."

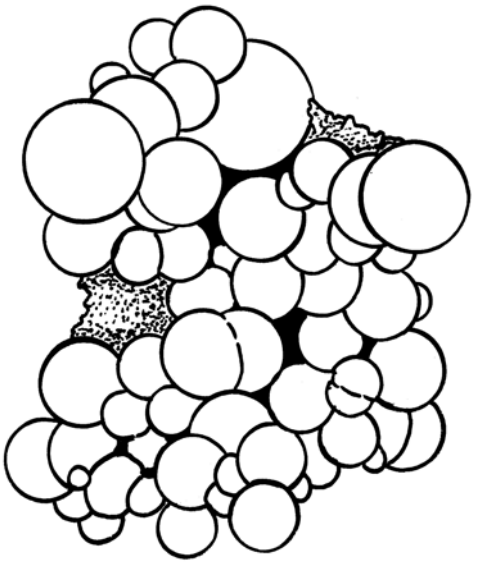
This specimen was found in Bisbee, Arizona. Germany was well known for these specimens, too.

Botryoidal



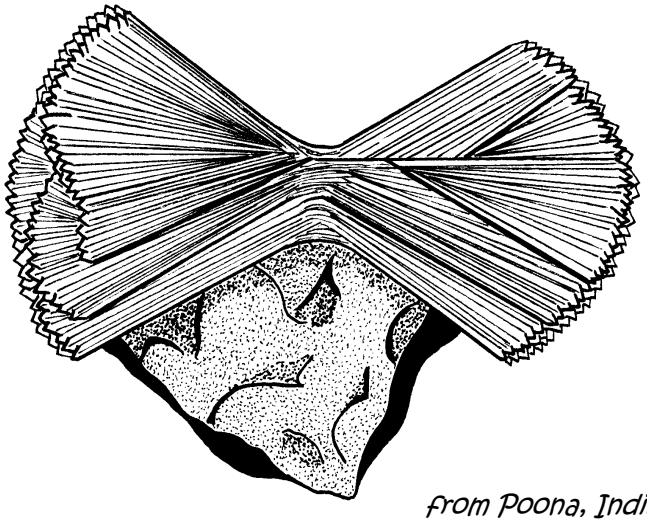
"Grape-Like"

Under the right conditions, some minerals form clusters of round balls that look like bunches of grapes. Mineralogists call this form *botryoidal*. *Botryoidal* comes from the Greek word *botrys* which means *bunch of grapes*.



Left: Hematite on quartz from Graves Mountain, Georgia.
Right: Malachite from Morenci, Arizona.

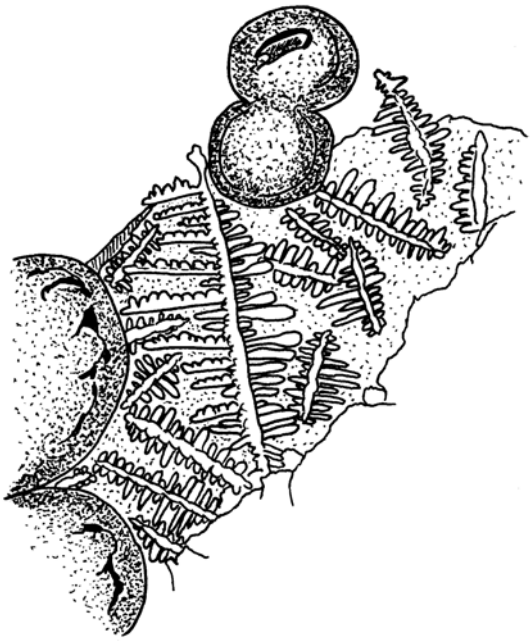
Bow-Tie Crystals



A single stilbite crystal looks like a thin blade. But when thousands of stilbite crystals grow together, they can form groupings of crystals, like this specimen from India, that look like an old-fashioned bow tie. If you look carefully you can see how a number of crystal groups have grown over each other to create the bow-tie shape.

from Poona, India.

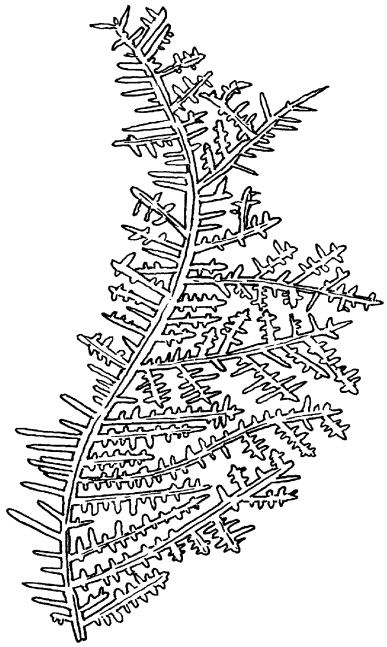
Dendritic



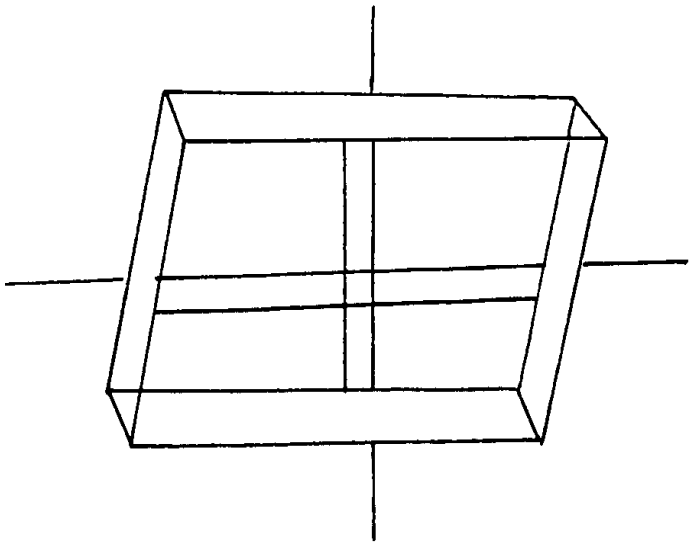
"Branching"

Some minerals form growths that look like branches on a bush or small tree. They are described as looking like plants. *Dendritic* is from the Greek word *dendron* which means *tree*. (Notice that this is similar to *arborescent*.)

Examples of dendritic growth are silver from Batopilas, Chihuahua, Mexico, copper from Keweenaw County, Michigan and Bisbee, Cochise County, Arizona.



Double Refraction

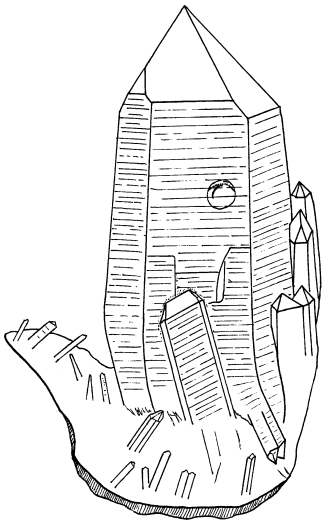


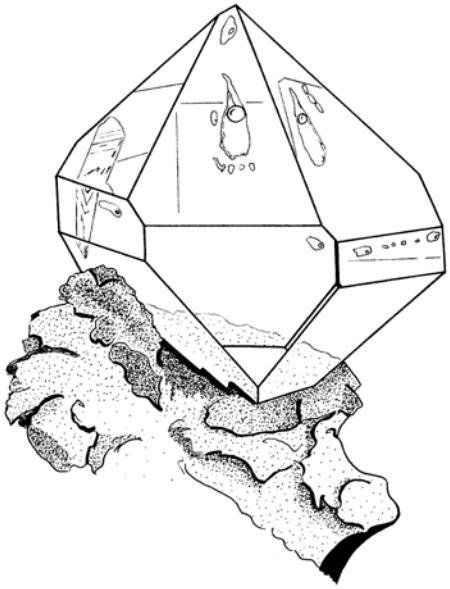
Double Refraction is an optical property that is very strong in colorless rhombs of calcite. Colorless calcite is called *Iceland Spar*. When a ray of light passes through the crystal, the light is split into two separate rays. You can see this effect when a piece of Iceland Spar is placed on a single line, like the piece in this picture. Notice that the single line is seen as a <u>double</u> line when viewed through the crystal.

This specimen is from Durango, Mexico. A famous deposit of Iceland Spar was first discovered in . . . Iceland!

Enhydro

"Containing Water"

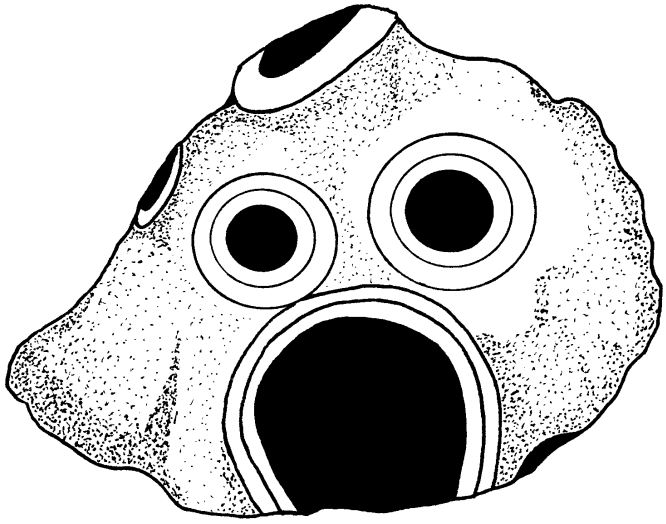




There are a number of minerals in which water plays a part in their formation and sometimes a little water gets trapped inside a crystal as it grows. In igneous rocks the water is super hot. In sedimentary rocks the water is cooler. In these two pictures you can see the quartz crystals contain water-filled pockets, and in these pockets are small bubbles of gas. As the crystals are tilted and moved, the bubbles move back and forth, like a bubble in a carpenter's level. The bubble is *included* inside the crystal. When anything is inside a crystal, it is called *an inclusion*.

The crystal on the left is a dark purple amethyst from Las Vigas, Vera Cruz, Mexico. The crystal to the right is a doubly terminated colorless quartz specimen popularly known as a *Herkimer Diamond* from Herkimer County, New York. Both have water bubbles trapped inside. (Note: "Herkimer Diamonds" are not diamonds. Diamonds are crystallized carbon and a Herkimer Diamond is crystallized quartz.)

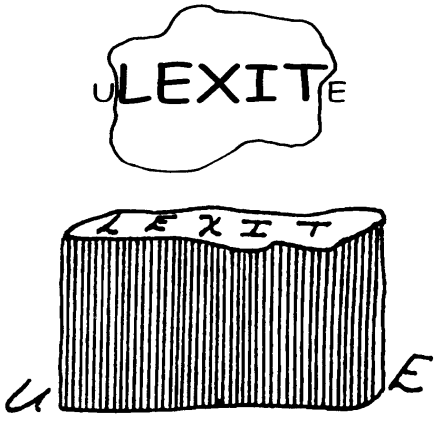
Eye Agate



"Here's Looking at You"

Agate is a form of quartz that has bands of different colors. Some agate specimens, when cut and polished properly, reveal circular bands that look like eyes. Here is an outstanding example from Brazil. The outer ring of the eye (and the "mouth," too) is light brown. The next band is white. Eye agates are rare. Some experts believe that about 5 out of every 100 agates has an eye formation. Eye agates are also from Idar-Oberstein, Germany.

Fiber Optics

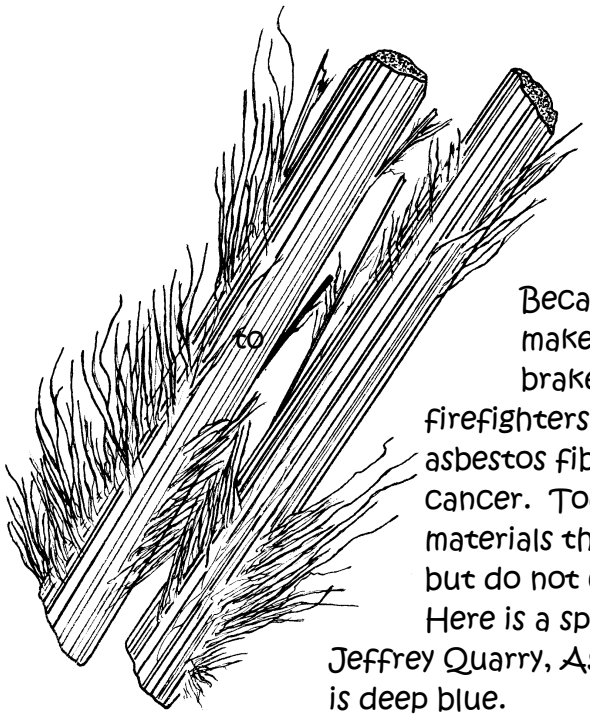


Large veins of the mineral *ulexite* are found in Boron, California. These veins are composed of millions of fibers that are all lined up, parallel to one another. When these specimens are cut and polished across the fibers and the specimen is placed on a picture, the image appears to be on the top of the ulexite specimen! The image is actually transmitted (that is, moved) from the bottom of the fibers to the top. Collectors call this type of ulexite "Television Stone." Television Stone is found only in Boron, California.

Scientists use long, thin plastic fibers to transmit or move information from one place to another. This technology is called "Fiber Optics."

Fibrous

"Like a Fiber"

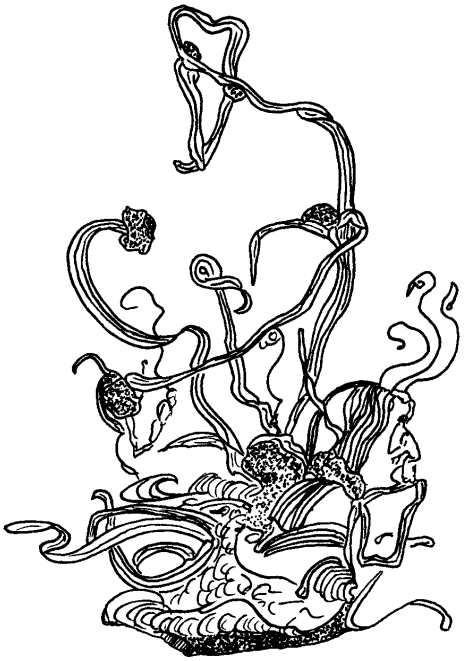


Some minerals can break into very thin, flexible fibers. These fibers can be short or very long. Mineralogists describe these minerals as *fibrous*. Chrysotile is a mineral that has this fibrous, asbestos-like texture. Asbestos minerals can withstand extremely high temperatures without melting. Because of this property, asbestos fibers were used make everything from insulation for hot pipes, to brakes on cars and trucks, to fireproof clothing for firefighters. It was discovered, however, that very tiny asbestos fibers can get into a person's lungs and can cause cancer. Today scientists are trying to find or invent materials that are as resistant to heat and flame as asbestos but do not cause health problems.

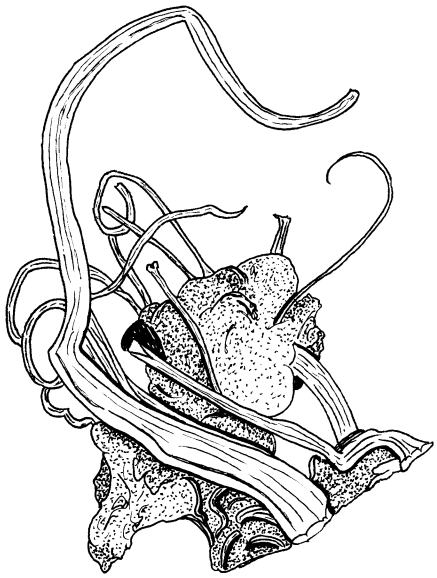
Here is a specimen of green chrysotile asbestos from the Jeffrey Quarry, Asbestos, Quebec, Canada. Crocidolite asbestos is deep blue.

Filiform

"Like a Thread"

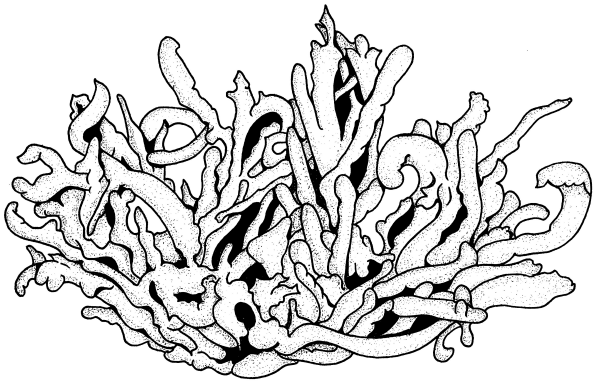


The word *filiform* comes from the Latin word *filum* which means *a thread*. When a mineral is described as *filiform* it looks like fibers or filaments. Here are two silver specimens that grew in the shape of fibers. The specimen to the left is from Batopilas, Chihuahua, Mexico. The specimen to the right is from the Elura mine, New South Wales, Australia.



Flos Ferri

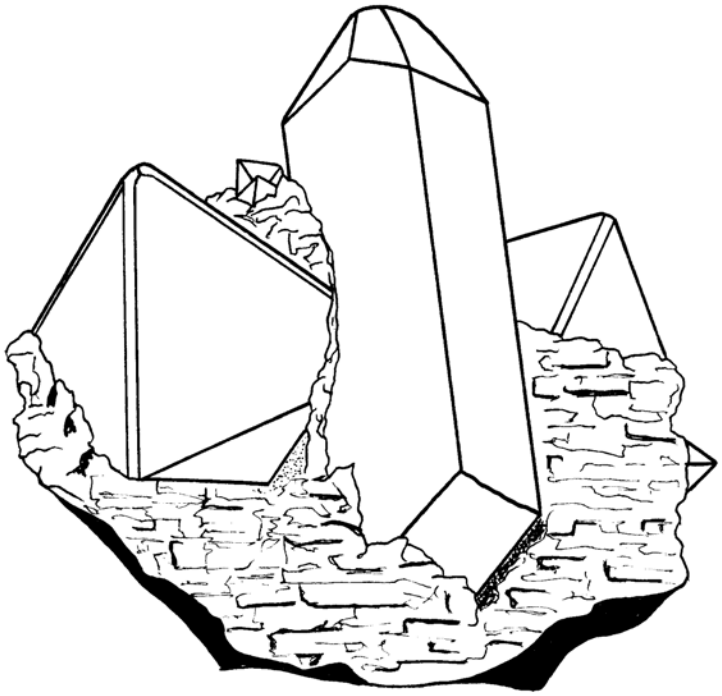
"Flowers of Iron"

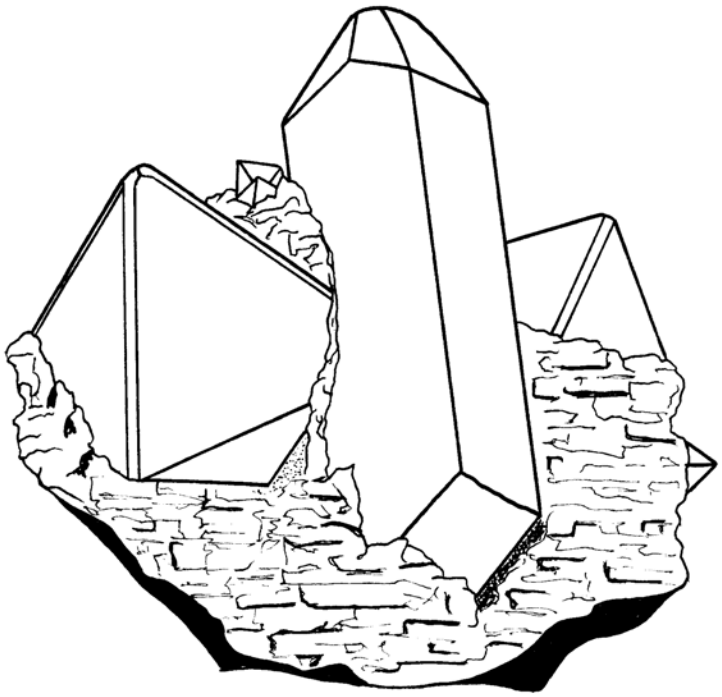


This mineral is *aragonite*. The form you see here was first discovered with iron ore minerals in Austria. The miners thought the specimens look a lot like branches or flowers so they named them "Flowers of Iron." *Flos Ferri* is a Latin phrase that means, literally, *Flowers of Iron*. Specimens like the one pictured here are from mines near Salzburg, Austria and Schwaz in Tyrol, Austria.

Mineralogists use the scientific word *coralloidal* to describe this mineral shape. This means that the aragonite looks like the branches of white coral that are found in warm oceans.

Fluorescence



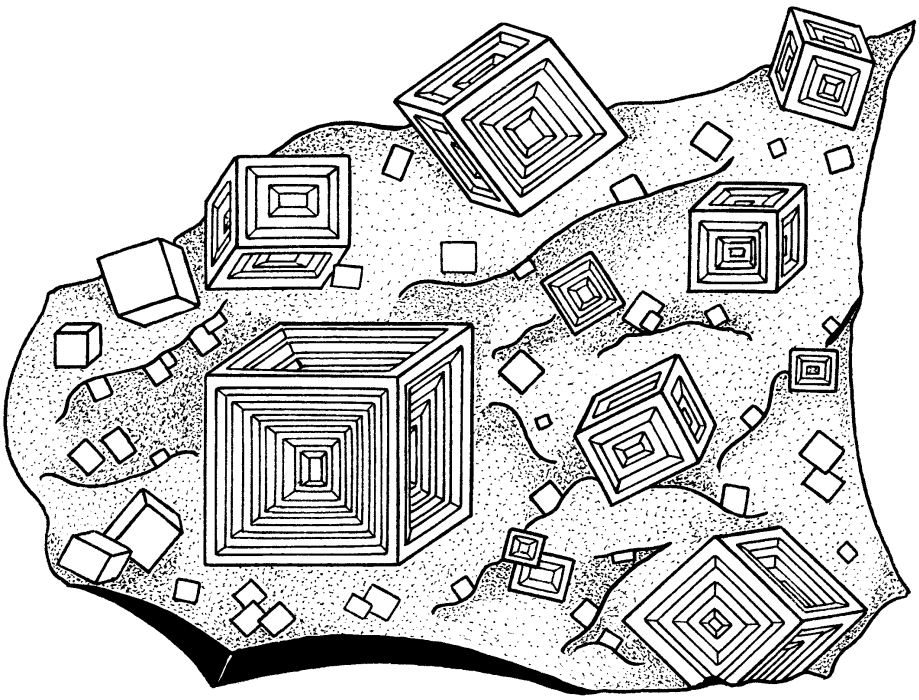


Fluorescence is a special color property of some minerals. In order to see fluorescence, a special light is used that creates *ultraviolet light* (also called UV light). UV light cannot be seen by the human eye. (Warning: never look directly into an ultraviolet lamp or you will damage your eyes.)

The process that causes fluorescence in minerals is pretty complicated to describe because it involves light energy, electrons, and more. So here is a very simplified explanation. When UV light shines on some minerals, it causes electrons in the minerals to jump around. This "jumping around" creates light that you see as fluorescent colors on the minerals. Fluorescence is a special color property of some, but not all, minerals.

Here are two copies of the same mineral specimen from the Sterling Hill mine, Ogdensburg, Sussex County, New Jersey to color. The specimen is of a long, light tan willemite crystal with two black franklinite crystals all of which are sitting on white to gray calcite. When the UV light shines on them, the willemite shines bright green and the calcite shines bright orange-red. The black franklinite crystals remain black.

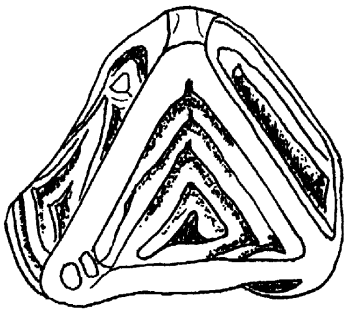
Hopper Crystals

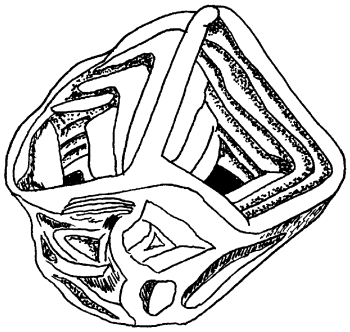


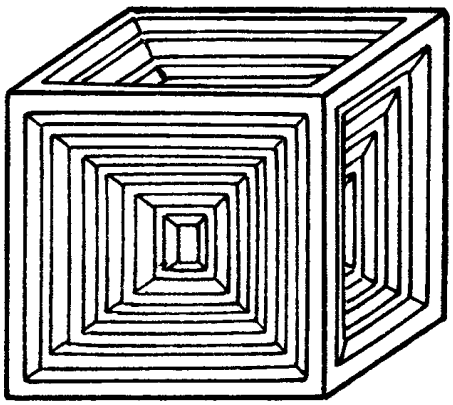
A "hopper" is a funnel-shaped box that is used to store and pour out things like coal and grain. A hopper crystal is a crystal where the edges of the crystal have grown faster than the faces. This creates a hollow space that makes the crystal look like a funnel-shaped box.

Above are pink halite crystals from Searles Lake, California that grew together on a matrix of halite (salt).

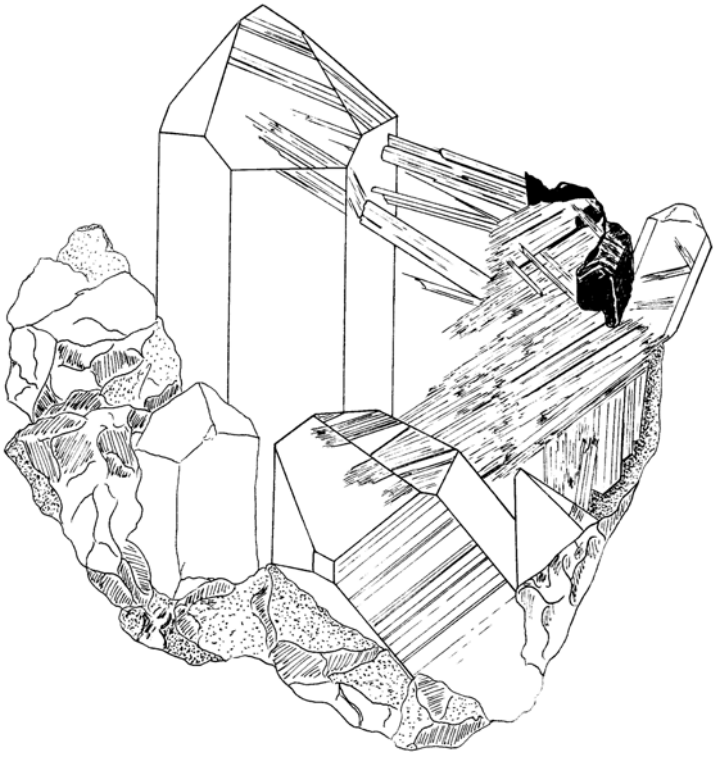
Below left are two gold crystals from Peru.







Inclusions

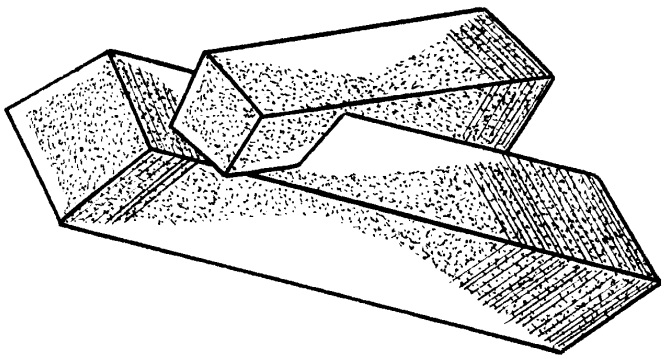


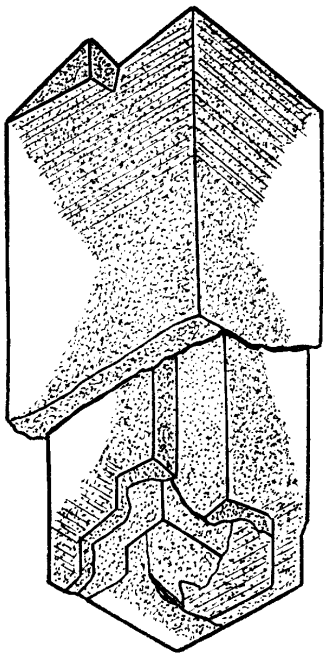
"Something Trapped Inside"

When crystals form, they can trap other minerals or objects inside. When something is trapped inside a crystal, it is said to be "included" in that crystal. Mineralogists call this an *inclusion*.

To the left is a fine specimen of clear quartz crystals that have needles of rutile included in them. In this specimen, the rutile formed first and then quartz formed later. It looks like the rutile has been pushed into the quartz like needles pushed into Jello.

Other objects can be included in crystals. On page 6 are specimens of quartz with bubbles of water included in the crystals. At the bottom of this page are two specimens of gypsum crystals. They grew in beds of sand in Norman, Oklahoma. As the crystals grew, grains of red sand were trapped or included inside the crystals. What is interesting is that the crystal form of the gypsum allowed the sand to be included in some areas but not in others. The result are crystals that look like an hourglass. They are called "Hourglass Selenite" crystals by mineral collectors.



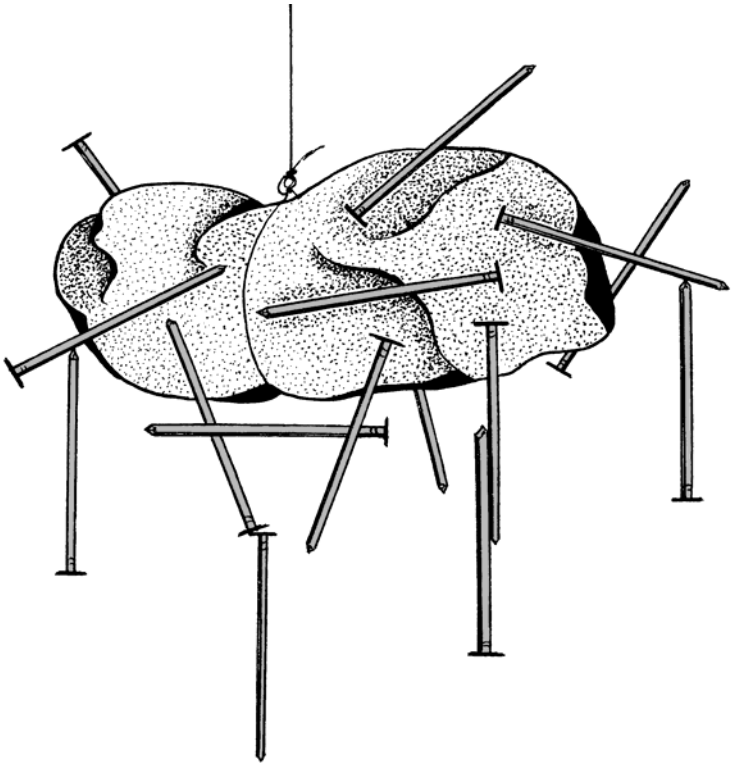


Incredible Crystals

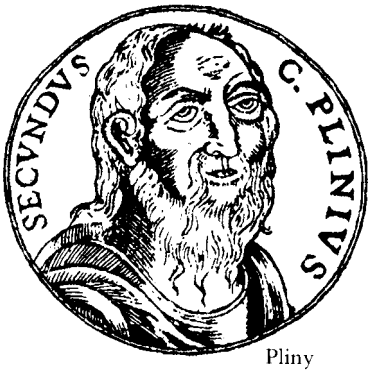
You are probably used to seeing crystals that are about as tiny as a fingernail up to specimens that are about as big as your head. However, some minerals, when allowed to grow in very special conditions, can be bigger than a car!

Above are gypsum crystals that were discovered in 2000, deep underground at Naica, Chihuahua, Mexico. Some of the crystals are up to 40 feet long and are estimated to weigh up to 55 tons . . . each! These crystals are easily the largest gypsum crystals found anywhere in the world. They may very well be the largest crystals of any mineral ever found!

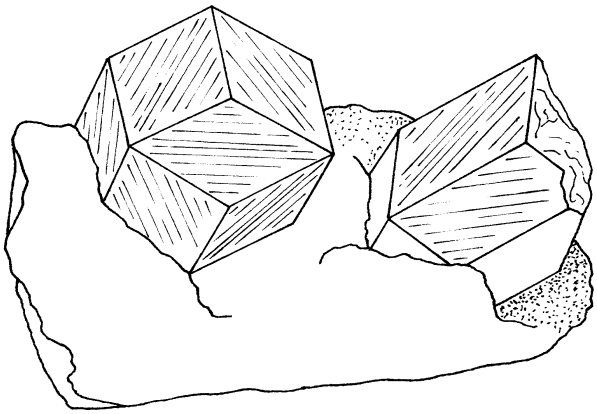
Magnetism

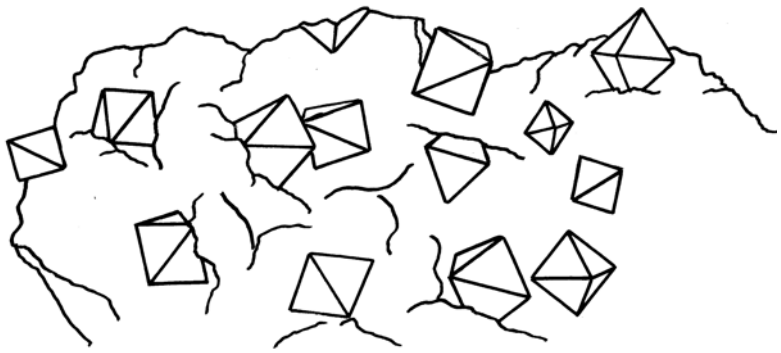


The ancient Roman author and naturalist, Pliny the Elder (pictured here), recorded a story about a shepherd named Magnes. One day Magnes was out keeping watch over his flock of sheep when the nails in his shoes and the iron tip of his shepherd's staff stuck to the rocks in the ground. Whether this story is a true account or not we can never know. What we do know is that items made out of iron, like nails, are attracted to and stick to some iron minerals. This is called *magnetism* and materials that attract iron objects are called *magnets*. Magnetite forms crystals, like the ones pictured here. Massive magnetite is called *lodestone*. Above is a chunk of lodestone with a bunch of nails held in place by the mineral's magnetism!



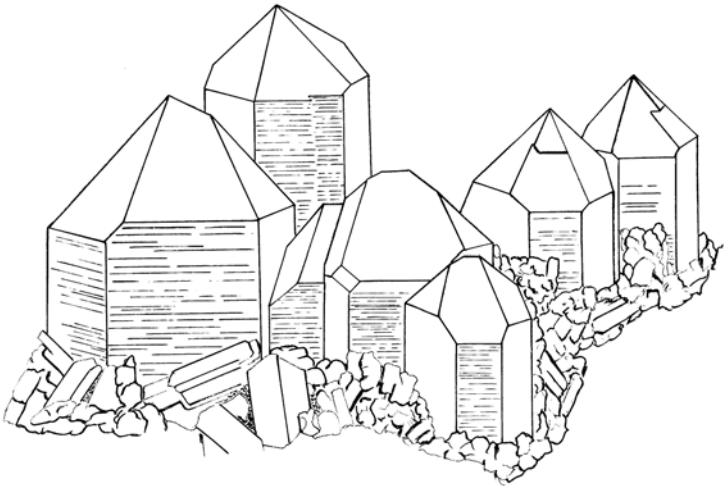
Pliny





Left: Dodecahedral magnetite crystals from Australia.
Right: Octahedral magnetite crystals from Vermont, USA.

Parallel Growth

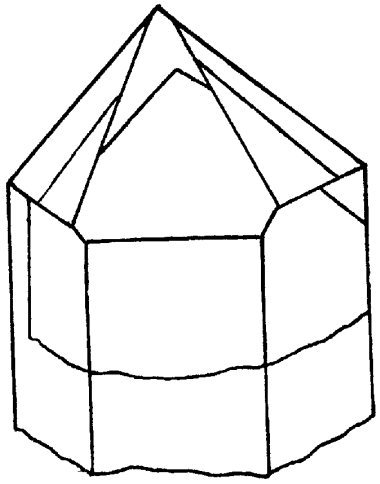


"All Lined Up"

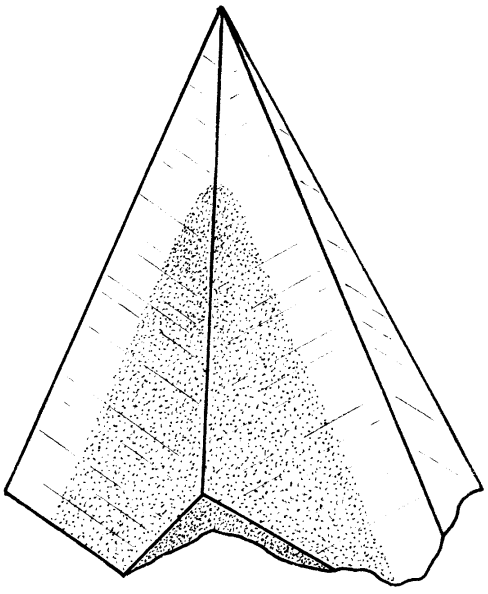
In most situations, crystals grow in random directions. However, when the conditions are just right, crystals can grow parallel to one another. They look like marchers in a parade, all lined up next to each other. Mineralogists simply call this *parallel growth*.

Here are some glassy, black smoky quartz crystals from the White Mountains of New Hampshire, USA. They are "standing" on a bed of small feldspar crystals.

Phantom (ooh! Scary!)

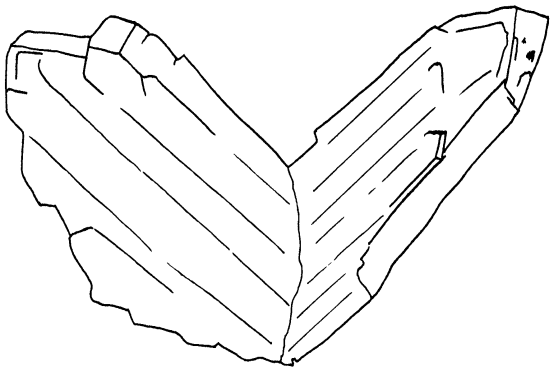


Sometimes a crystal will grow to a certain size and then stop growing. At a later time, the crystal growth can start again, but the new material can be a different color, or the first crystal may have some other material attached to it. When the growth is all complete, the larger crystal will look like it has a smaller crystal trapped inside. As you can see in these two pictures, the original, smaller crystal is the same shape as the larger, later crystal. Mineralogists call this situation a *phantom crystal*. The quartz crystal to the left is from China. It is a clear quartz with a smaller orange quartz crystal inside. To the right is a calcite crystal with a phantom from near Joplin, Missouri.



Pseudomorph

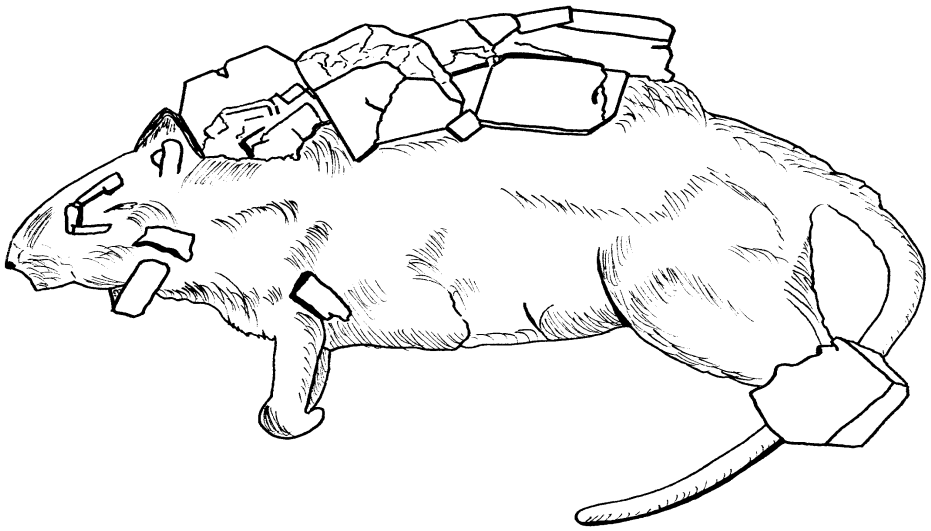
"False Form"



The word *pseudomorph* is made up of two Greek words: *pseudo* means *false* and *morphe* means *form*. A pseudomorph starts off as a particular mineral. But when the chemical environment changes, the chemistry of the mineral changes. The original mineral becomes a new mineral with a different chemical formula. However, the specimen keeps the shape or crystal form of the original mineral.

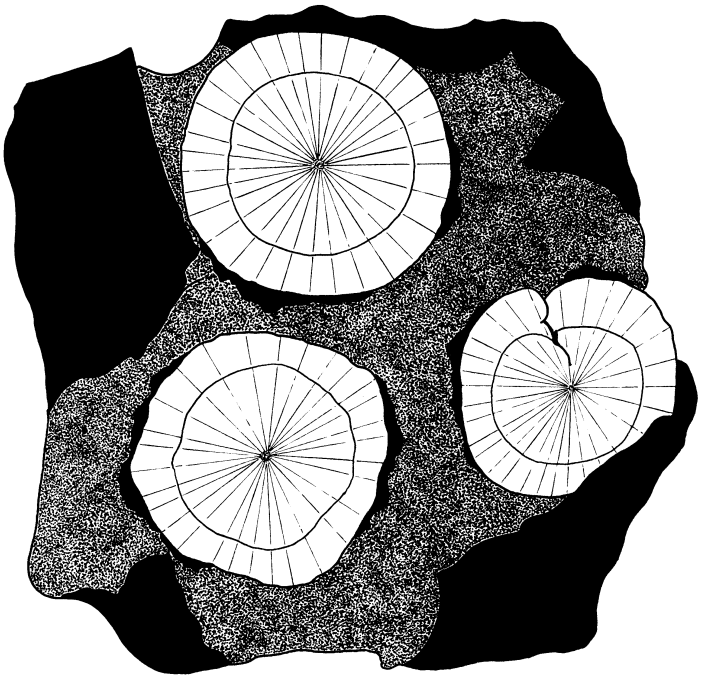
For example, the crystals pictured here were originally dark blue azurite crystals. But due to chemical changes, the azurite turned into malachite and the specimen is now dark green. Mineralogists would describe this specimen as "Malachite after Azurite." Wonderful specimens of malachite after azurite were found at the Copper Queen mine, Bisbee, Cochise County, Arizona.

"The Atacamouse"



This is the weirdest pseudomorph you will ever see! Yes, it is a mouse. It died in a copper mine in Russia. After the poor little mouse died, it didn't decay. It was replaced with the copper mineral, atacamite. Atacamite crystals also grew on its back and tail.

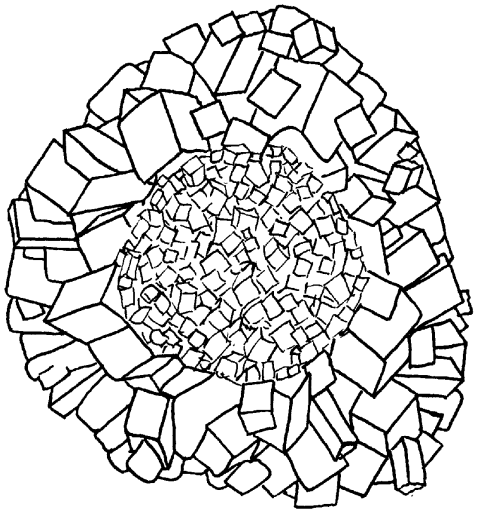
Pyrite Dollars



Among the most unusual and popular mineral specimens are the "Pyrite Dollars" from Sparta, Illinois. In Sparta the pyrite crystals are found in coal deposits, forming between layers of black shale. There is no room for the crystals to grow as they normally would into cubes and octahedra. So, the pyrite grows out from a center point like rays of light moving out from the sun. The pyrite forms into thin, flat discs that are called "Dollars." They really do look like big coins!

Pyrite Suns

Some beautiful groups of pyrite cubes were discovered in China in recent years. They are made of hundreds of pyrite cubes that formed a ring around hundreds of smaller cubes in the center of the specimen. Dealers and collectors have called these specimens "Pyrite Suns" because of their round, disc-like shape and bright, metallic yellow color.

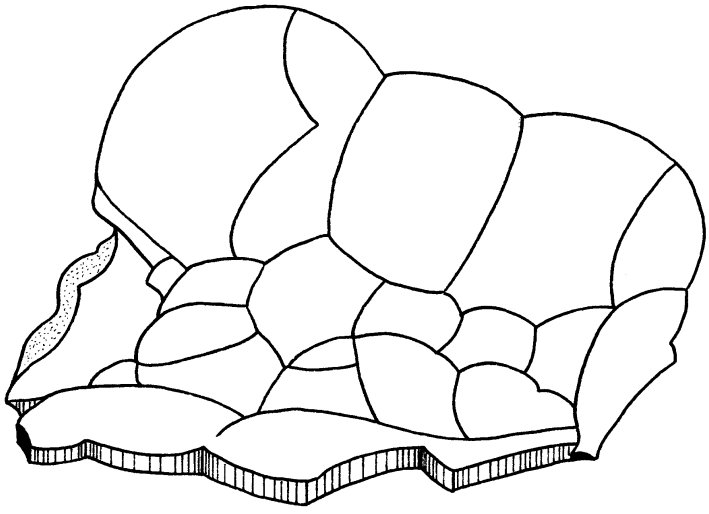


Ram's Horn Selenite

Ram's Horn Selenite is a popular name given to gypsum specimens that form in curved growths that look like rams' horns. These beautiful and delicate specimens grow in caves where the air is very dry and where they will not be disturbed or damaged. Water that is carrying dissolved gypsum seeps out of the cave walls. When the water hits the dry cave air, the water evaporates and gypsum solidifies on the cave wall. As more water seeps out and evaporates, more gypsum is deposited on the cave wall. This new gypsum pushes the older gypsum away from the cave wall. This process continues, making the gypsum deposit longer and longer and longer. The gypsum curves because more gypsum is deposited on one side than the other, causing one side to grow faster than the other.

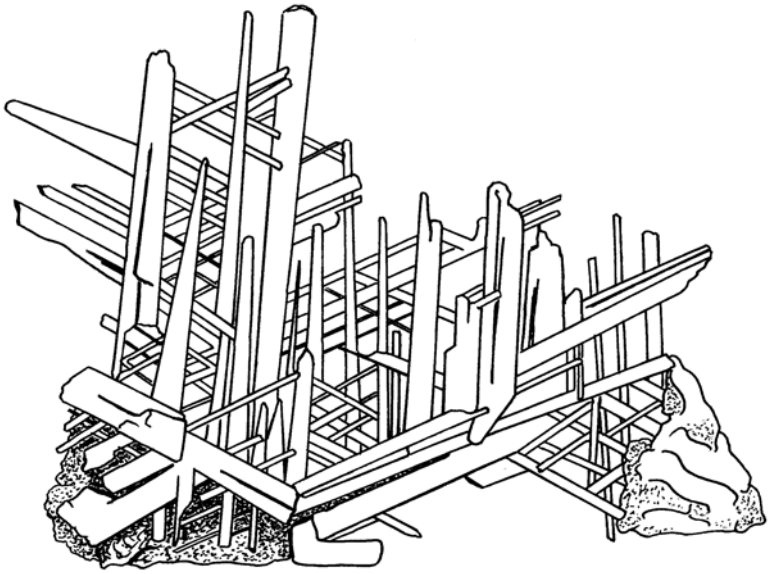
This is a Ram's Horn Selenite specimen from the mines in the Santa Eulalia District, Chihuahua, Mexico. Specimens like this one have also been found in Kentucky and Texas in the United States, and also in Morocco.

Reniform



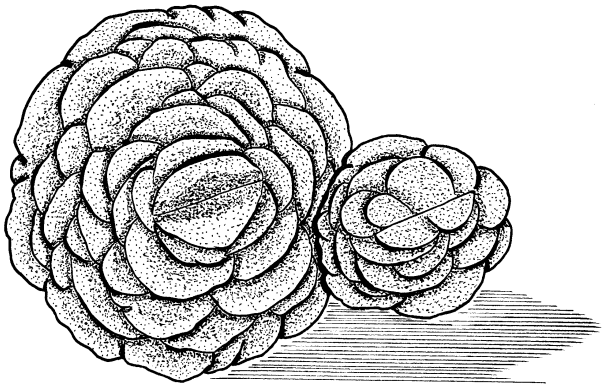
The word *reniform* is from the Latin words *renes* which means *kidney* and *formis* which means *form*. In other words, it describes a mineral that looks like a kidney. Here is a specimen of hematite from Cumberland, England. The miners called this shape *kidney ore* because the dark, blood red, rounded masses of hematite look like kidneys. Notice that the hematite is rounded, but not in individual balls that look like grapes. Do you remember what mineralogists call specimens that look like bunches of grapes?

Reticulated



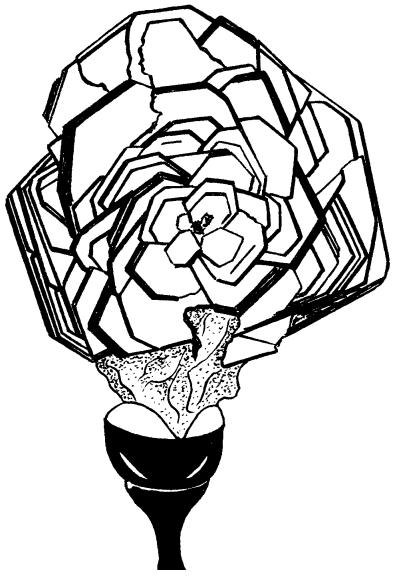
Anything that is described as "reticulated" is built in a way that forms a pattern or network. Some minerals, like rutile and cerussite, can crystallize and form long, thin crystals that grow in criss-cross patterns. Here is a fine sample of a reticulated cerussite specimen from Tsumeb, Namibia (Africa).

Rosettes



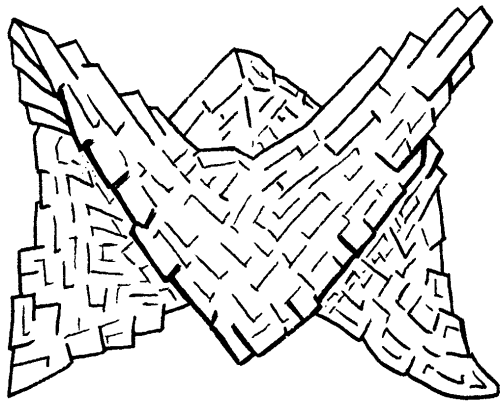
There are some minerals in which many individual crystals grow together in such a way that they resemble a flower. Any rose-like crystal groups are called *rosettes.* The minerals that typically form rosettes are gypsum, barite and hematite.

To the left is a "rose" made of inter-grown barite crystals. The barite grew in red sandstone and in the process, grains of red sand were trapped in the crystals.



Another well-known and very interesting mineral "rose" is made of hematite crystals. To the right is a hematite rose from St. Gotthard, Switzerland. Collectors call this specimen an *Eisenrose* which literally means *Iron Rose,* because hematite is an iron ore.

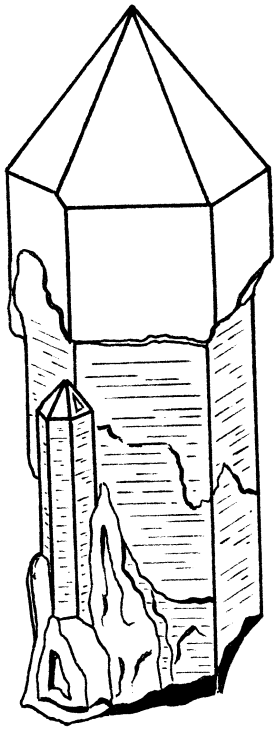
Saddle-Shaped Crystals



Under the right conditions, groups of dolomite crystals grow together and form a curving shape that looks like a horse's saddle. Other minerals that can form saddle-shaped crystals are calcite, ankerite, siderite and rhodochrosite. All of these minerals have similar chemical compositions and crystallize in the same crystal system.

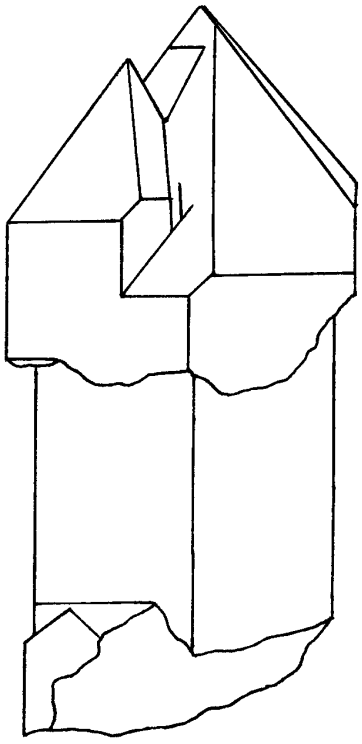
Excellent saddle-shaped specimens have recently been discovered in Shangbao, Leiyang, Hunan Province, China.

Scepter Crystals



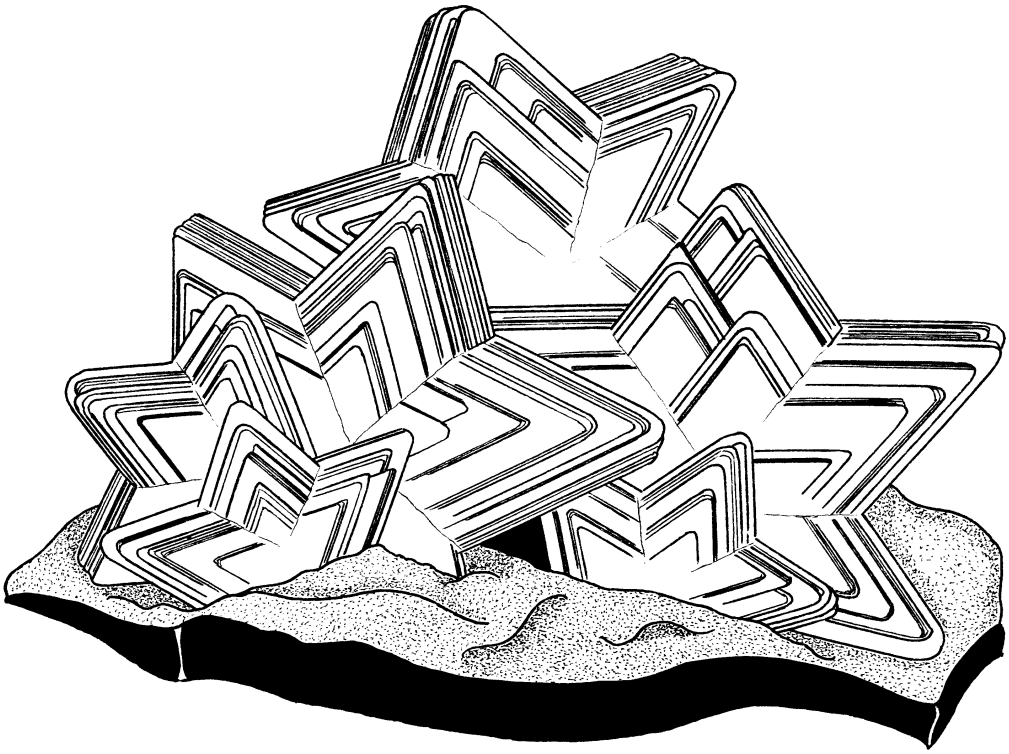
A *scepter* is a long stick that is held by a King as a sign of the King's power and authority. The end of the King's scepter is topped with a large ornament that is covered with beautiful jewels.

A *scepter* crystal is one in which there is a long, lower portion that is topped with a larger, wider crystal termination. Mineralogists call the lower portion of the scepter crystal the *prism* of the crystal.



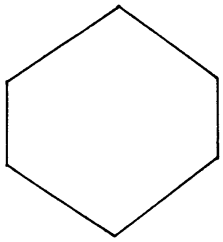
To the left is a scepter crystal from Namibia (Africa) with a white, milky quartz prism and a purple, amethyst termination. To the right is a white scepter quartz crystal from Brazil.

Star Mica



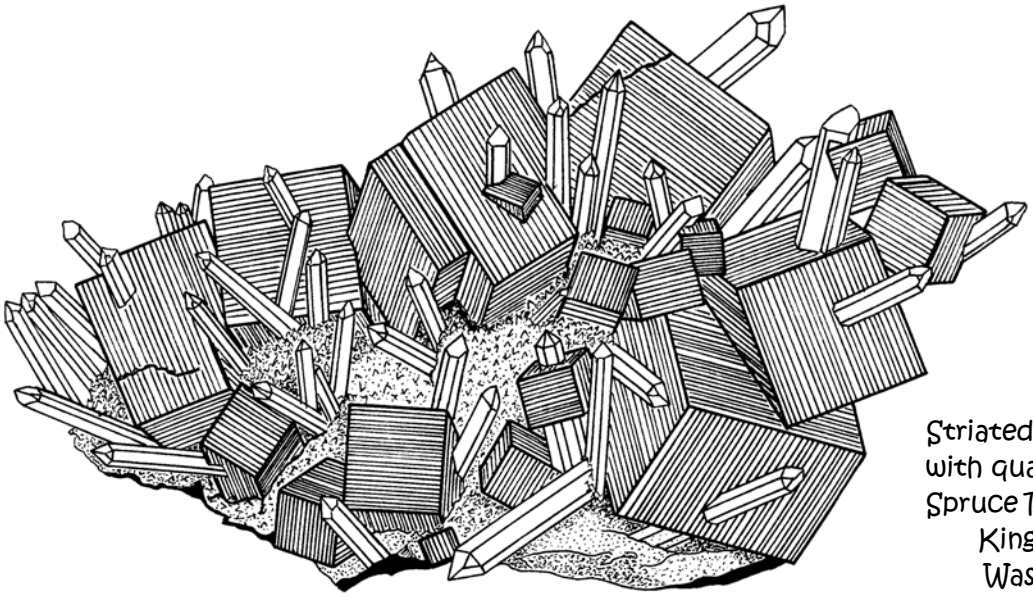
Muscovite crystallizes in the monoclinic crystal system. However, it typically forms six-sided crystals. When you look at them, you would think that they actually belong to the hexagonal crystal system (but they don't!) When mica crystals grow together, they can form crystal groups that look like stars. You would not be surprised to learn that collectors call these specimens "Star Mica." The specimen above is similar to the star mica found in the State of Minas Gerais, Brazil. In this specimen you can see not only the star shape, but also the many layers of mica that formed one upon another. Remember that mica splits into very thin sheets, a type of cleavage that mineralogists call *micaceous cleavage*.

Do you know the special name for two crystals that grow together? Star mica is a twinned crystal (oops, we gave away the answer!) It is actually *five* crystals arranged on a circle, a combination that results in a star. (Now turn the page and read about *twinned crystals*.)



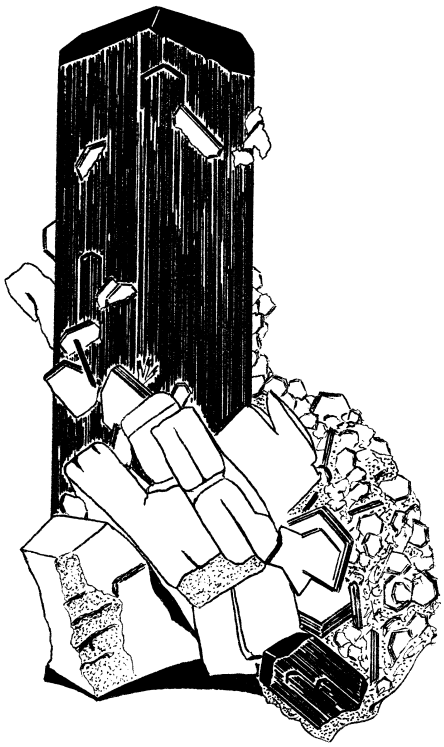
Here is a perfect, six-sided mica crystal. Because it is not in the hexagonal crystal system, it is referred to as *pseudohexagonal* which means *false-hexagonal*.

Striated Crystals

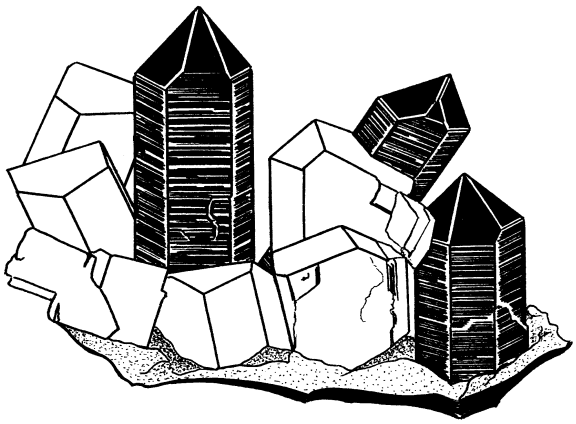


Striated pyrite cubes with quartz from the Spruce Ridge Claims, King County, Washington.

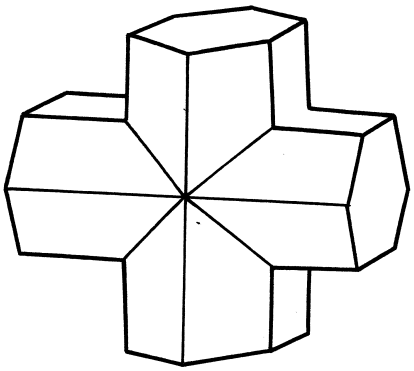
Lines that form on crystal faces that are parallel to each other are not scratches. They are called *striations*. A "striation" is a line that runs across the face of a crystal. Striations are created by small changes that occur over and over again as the crystal grows. They are often formed when one crystal face grows faster than another, but then slows down and the other face grows faster.



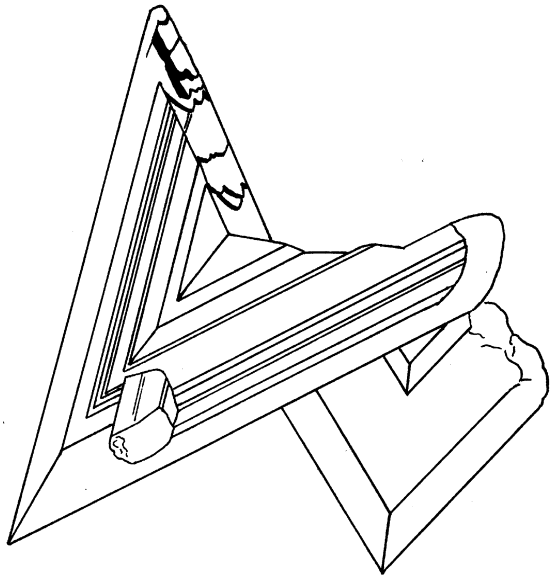
Many different minerals can be found with striations. Above are striated pyrite crystals that are formed when the dodecahedral crystal shape alternates with the cubic crystal shape. To the left is a striated tourmaline crystal from Pakistan. Below are striated smoky quartz crystals from New Hampshire, USA. Other minerals that form striations are feldspars, apophyllite and sphalerite.



Twinned Crystals

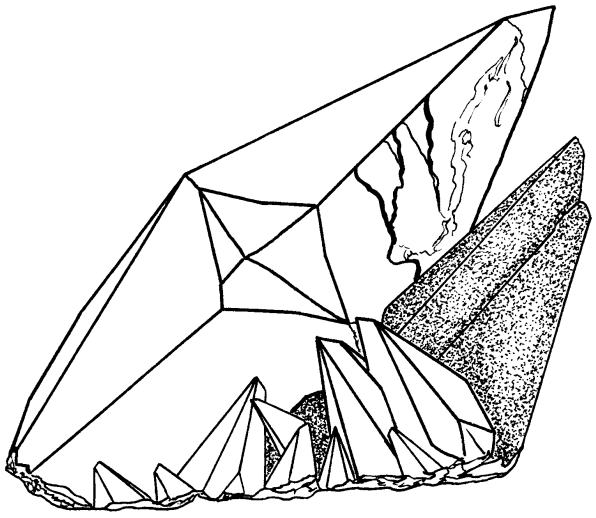


Most often, minerals form single crystals or groups of single crystals. There are times, though, when two or more crystals grow together. When two crystals grow together, at a specific angle, a *twinned crystal* is formed.

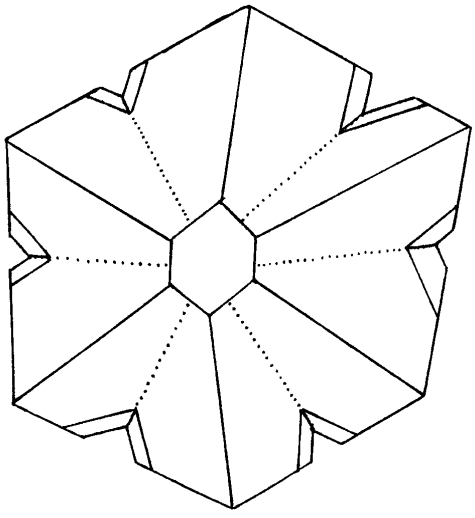


To the left (above) is a staurolite twin. In this specimen two individual crystals have grown together in a cross formation.

The crystal below (left) is a large twin crystal of calcite surrounded by a number of smaller individual calcite crystals. The diamond-shaped portion in the center indicates where the two individual crystals connect to each other.

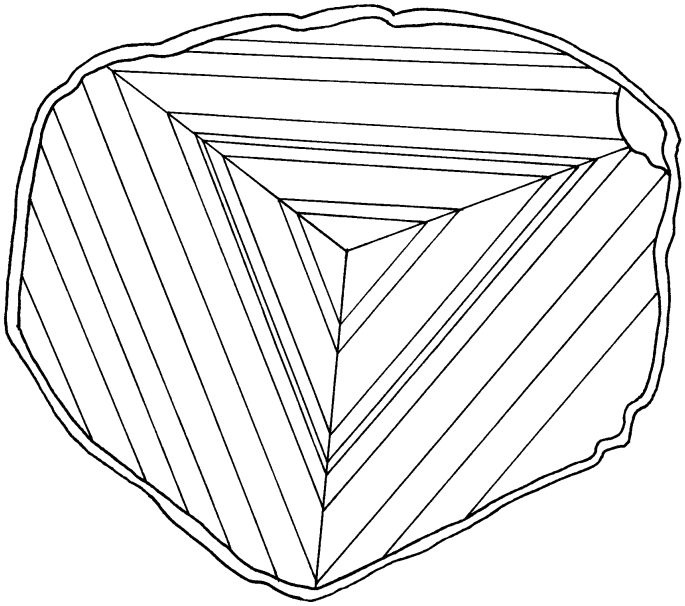


The crystal to the right (above) is a twin crystal of the lead mineral called cerussite. The individual crystals attach to one another creating a V-shape.

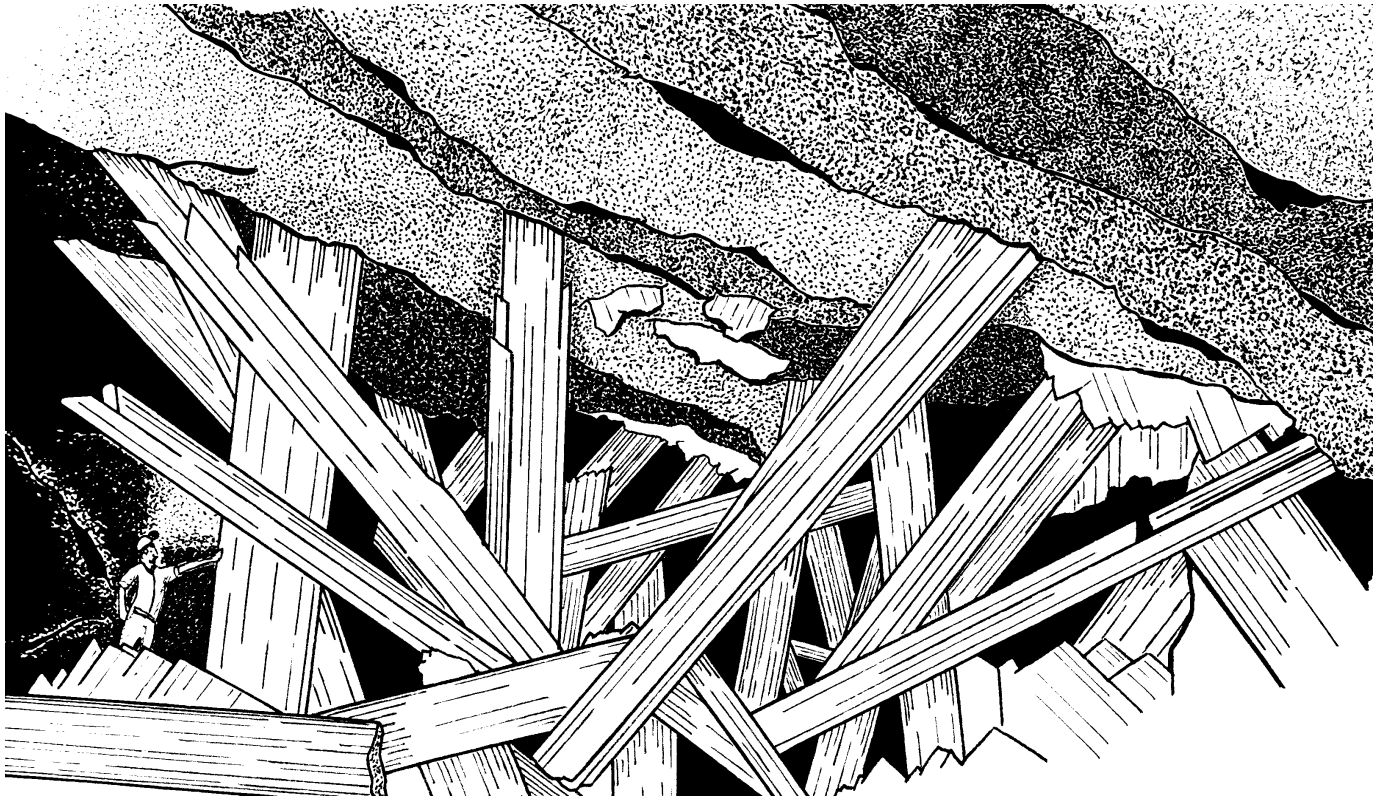


The crystal to the right is an interesting "twin" of the mineral chrysoberyl. It is actually much more than a "twin." Mineralogists call it a *sixling* because six individual crystals have grown together to form a single, wheel-shaped crystal.

Zoned Crystals



It is possible that there can be changes in chemistry as a crystal grows. These changes can create different color zones in the crystal. These zones are best seen when the mineral is cut across the crystal (called a *cross section*). This zoning occurs often in amethyst crystals. It also occurs in tourmaline crystals. The state of Maine has produced zoned tourmalines that are green on the outside and red on the inside. These specimens have been called "Watermelon Tourmalines" because they resemble ripe watermelon with a green rind. To the left is a zoned mineral species in the tourmaline group known as Liddicoatite.



Gypsum crystals in the Gibralter mine, Naica, Chihuahua, Mexico.

What Do You Know?

Let's See What You Learned About Mineral Pranks.

1. A mineral that has many parallel lines running across its crystal faces is called _____.
2. A lumpy mineral that looks like a kidney is called _____.
3. A lumpy mineral that looks like a bunch of grapes is called _____.
4. When a mineral grows in crystals that look like long, pointed needles, it is described as _____.
5. When two crystals of the same mineral grow together at a certain angle, a _____ crystal is formed.
6. A crystal that has a long, thin prism that is topped off with a larger, wider termination is called a _____ crystal.
7. Crystals can have other minerals or materials trapped in them. When water is trapped inside, it is described as _____.
8. A crystal that is trapped inside another crystal is called a _____.
9. Minerals like barite and hematite can grow in flower-shaped clusters. Mineralogists call these specimens a _____.
10. If a pyrite crystal chemically changes into limonite, but keeps the shape of the pyrite, it is called a _____.
11. When the edges of a halite crystal grow faster than its faces, a _____ crystal is formed.
12. _____ _____ means "Flowers of Iron."
13. A clear piece of calcite can break a single ray of light into two rays. This special optical property is called _____.
14. When gold or silver forms long, thin wires, it is described as _____.
15. The mineral chrysotile is described as _____ because it breaks into long, thin fibers that are like sewing thread.
16. Copper can form specimens that look like tree branches. Mineralogists describe this formation as _____.
17. Which mineral forms saddle-shaped crystal groups? _____

A Word Search for Mineral Pranks

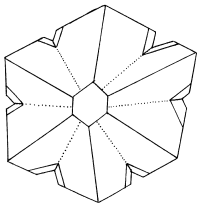
The names of mineral pranks described in this book can be found in the word search puzzle below. The words can be left to right, right to left, top to bottom, bottom to top and diagonally.

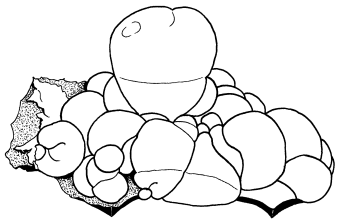
Good Luck!

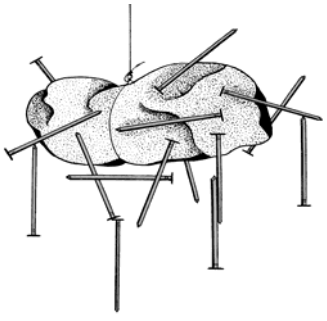
A	R	S	C	I	T	P	O	R	E	B	I	F	O	F
C	R	X	P	S	E	U	D	O	M	O	R	P	H	L
I	O	B	I	R	D	S	N	E	S	T	V	U	L	O
C	S	B	O	W	T	I	E	P	O	R	C	I	A	S
U	E	D	R	R	L	A	O	R	D	Y	H	N	E	F
L	T	F	J	D	E	N	O	Z	U	O	O	C	Y	E
A	T	I	I	N	B	S	W	E	S	I	P	L	E	R
R	E	L	C	B	D	O	C	T	I	D	P	U	A	R
S	C	I	T	I	R	D	N	E	D	A	E	S	G	I
D	S	F	M	O	M	O	R	Y	N	L	R	I	A	A
O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

Search for the following words:

Acicular, Arborescent, Birds Nest, Botryoidal, Bow Tie, Dendritic, Double Refraction, Enhydro, Eye Agate, Fiber Optics, Fibrous, Filiform, Flos Ferri, Hopper, Magnetism, Phantom, Pseudomorph, Dollar, Sun, Rams Horn, Rosette, Scepter, Star, Twinned, Zoned.



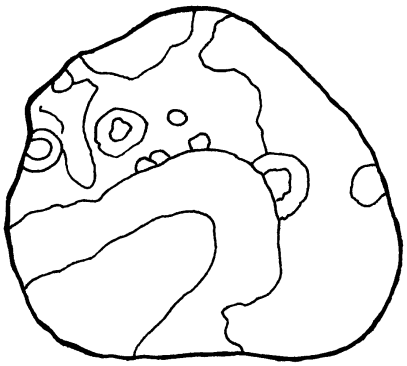




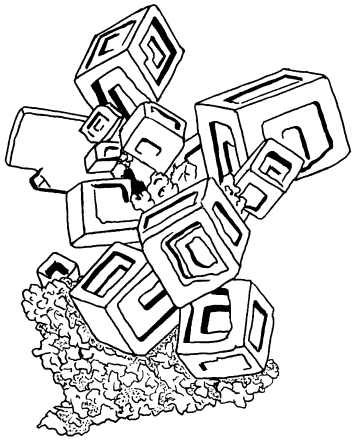
What's That Strange Mineral?

On this page are drawings of mineral oddities. They are different from the other drawings in this book. However, if you have read the book carefully, you will be able to match the specimens with the correct word used to describe that mineral.

Good Luck!

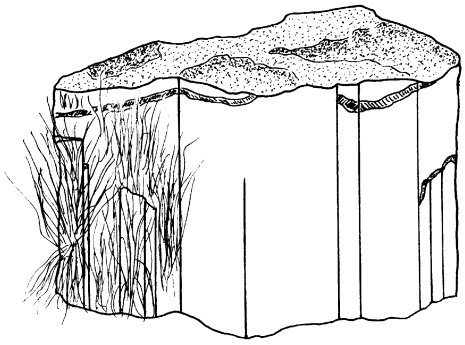


Filament

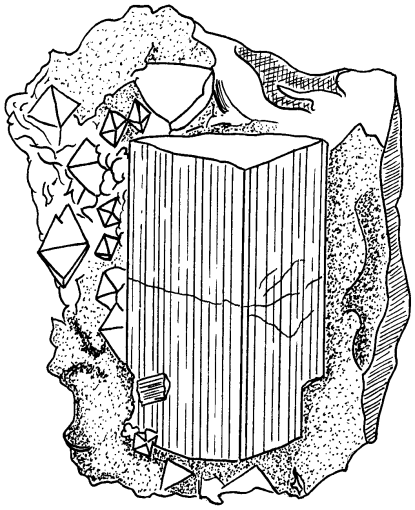


Botryoidal

Inclusion

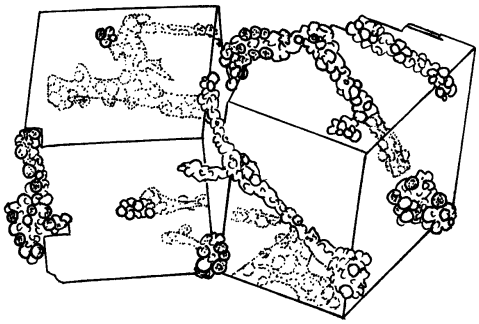


Striations



Parallel Growth

Hopper Crystals



Eye Agate

Fibrous