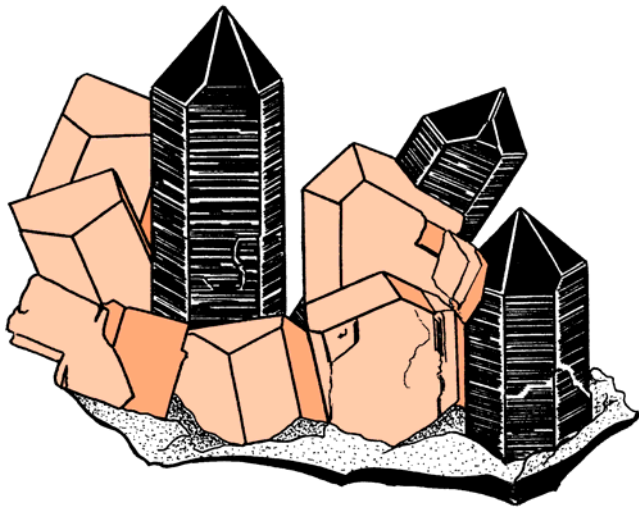




Vol. 5 No. 10
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Kids Love Rocks is written to give you fun, colorful information about minerals and mineral collecting. At the same time, it is a publication that wants to include your articles about minerals, as well as mineral art and other mineral collecting projects. Did you go digging for crystals and minerals last summer? Send us your pictures and stories. Have you created a special box, chest or shelf to store your mineral collection? Take pictures and tell us about your project. Do you have a favorite mineral species? Write an article about it. When

you are ready, you can contact us at diamonddan@rochester.rr.com. We would LOVE to publish your work!

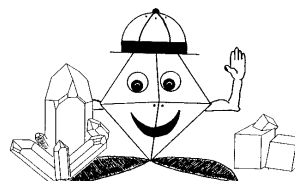
What is the most common mineral in the Earth's continental crust? Most people would say **quartz**. This is a great answer, but quartz is the *second* most common mineral in the continental crust. The #1 most common rock-forming mineral is **feldspar**! This issue is packed with interesting and unusual information about feldspar.

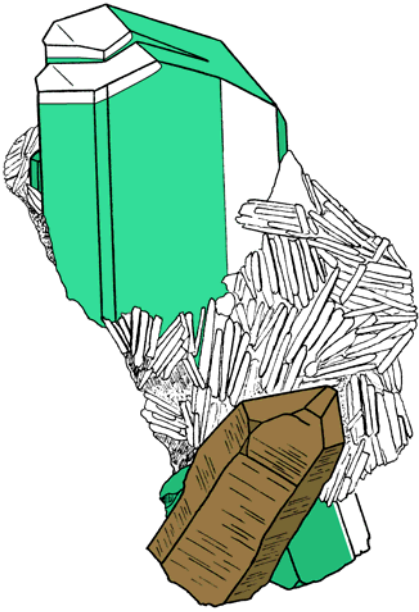
The mineral collector's cards were a HUGE hit last month. They were so popular we did two things: first, we have printed two more sets in this issue; second, we have put them on our website. You can find ALL of the mineral trading cards by going to www.diamonddanpublications.net. About 1/2 way down the home page you will see a link to the trading cards on the right hand side of the page. It is our plan to create a new set of cards every month for the next few months. Make enough copies for all of your friends in science class. They are a great way to learn about minerals and mineralogy. By the way, we do articles and pictures about fossils, too. So the trading cards will be different in November. Next month: Fossil trading cards.

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Mineral of the Month

Feldspars

"Feldspars" is a group of similar minerals that have small, but important, differences in their chemical compositions. They are thought of as a single mineral species. Here are the different varieties of feldspar minerals:

1. Orthoclase Feldspar

Chemical Formula: KAlSi_3O_8 **Crystal System:** Monoclinic

Color: White, brown, flesh-pink, yellow, colorless. **Luster:** Vitreous (Glassy) **Hardness:** 6
Specific Gravity: 2.6 **Streak:** White **Cleavage:** 2 cleavage planes that intersect with each other at 90 degrees.

2. Microcline Feldspar

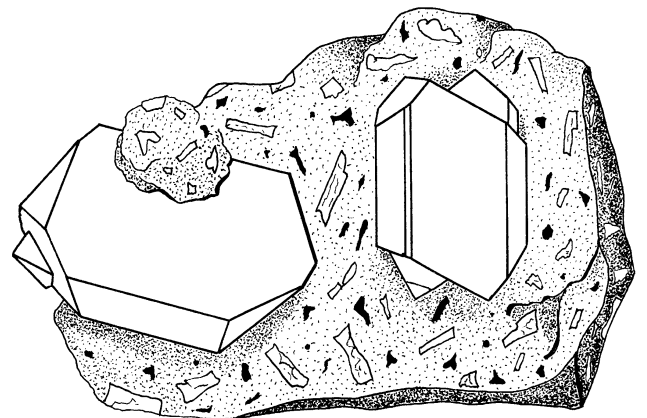
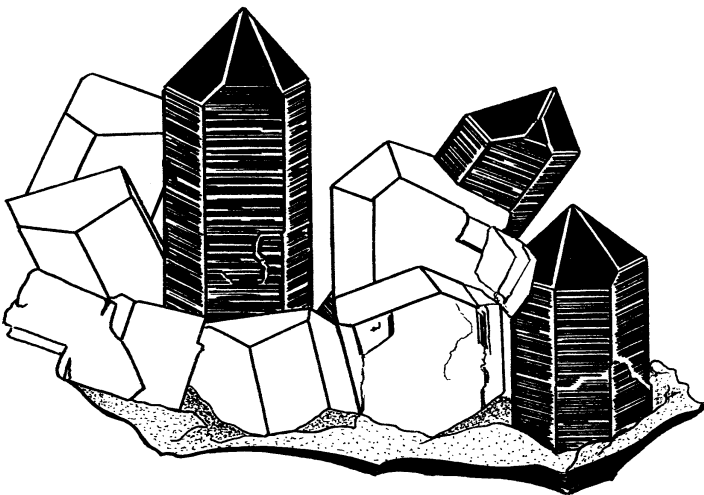
Chemical Formula: KAlSi_3O_8 **Crystal System:** Triclinic

Color: White, flesh-pink, green, red-brown. **Luster:** Vitreous (Glassy) **Hardness:** 6
Specific Gravity: 2.6 **Streak:** White **Cleavage:** 2 cleavage planes that intersect with each other at 90 degrees.

Pictured above: Microcline feldspar var. Amazonite (also called Amazonstone) from Colorado.

Left: Pink orthoclase feldspar with smoky quartz from New Hampshire.

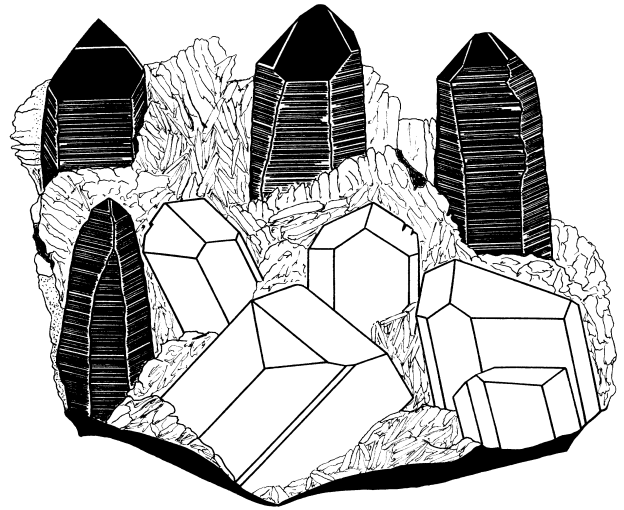
Right: Tan orthoclase crystals in matrix from Colorado. Each crystal in this specimen is actually two crystals that have grown together. They are therefore called "twinned crystals."



More Feldspar

3. **Plagioclase Feldspars** (which includes Albite, Oligoclase, Andesine, Labradorite, Bytownite, Anorthite)

Chemical Formula: $\text{NaAlSi}_3\text{O}_8$ (Albite) to $\text{CaAl}_2\text{Si}_2\text{O}_8$ (Anorthite) **Crystal System:** Monoclinic **Color:** White, yellow, reddish gray to black. **Luster:** Vitreous (Glassy) **Hardness:** 6 **Specific Gravity:** 2.6 **Streak:** White **Cleavage:** 2 cleavage planes that intersect with each other at about 94 degrees to each other.



Feldspars have a number of important uses in our lives.

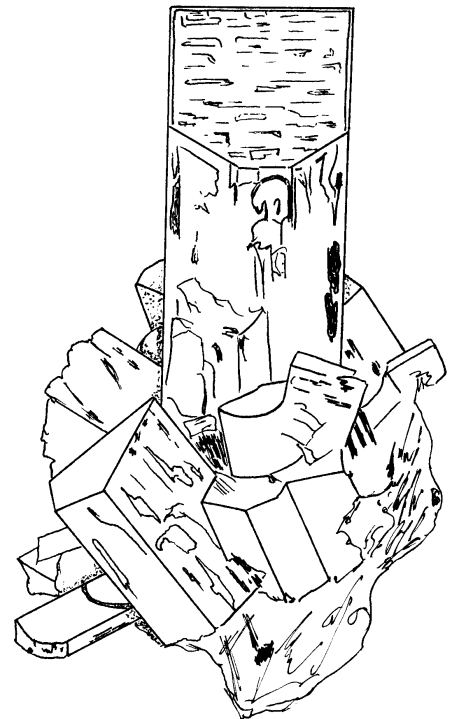
Orthoclase feldspar is mixed with quartz and another mineral called *kaolin*. This mixture is then heated to create **porcelain**. Porcelain is light and glassy and is used to make insulators (insulators don't conduct electricity. You can see insulators on telephone poles. Porcelain is also used to make fine cups and plates. Fine-colored, yellow orthoclase is sometimes polished to make semi-precious gems.

Microcline feldspar is mostly just of interest to scientists. However, deep green and blue-green amazonite crystals and masses are cut and polished semi-precious gems to make jewelry.

Plagioclase feldspars are also important for making ceramics, just like the orthoclase feldspars mentioned above. Some varieties, like labradorite, have a special property. When light bounces off of the surface of the specimen, the light is broken into its colors and it looks like there are reds, blues and greens bouncing off of the labradorite specimen. These specimens are frequently polished to make jewelry.

Above: Blue-green amazonite feldspar with smoky quartz.

Right: A group of tan feldspar crystals from Brazil.



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Golden Facts



Fill in the blanks in the paragraph below. You might need to use a good mineral hand book or the internet to discover the answers. You will see the first letters of each word, just to give you a hint. When you think you have found the correct answer, place the answer in the correct space in the crossword puzzle on the next page. The place in the puzzle is indicated in bold to the right of the blank space. Good luck!

Paul and Penny Prospector are brother and sister. Last summer they were on vacation in the hills of California and stopped to have lunch by a beautiful stream. After lunch they waded in the stream. Penny flipped over a rock and something shiny and golden caught her eye. She picked it up and screamed with delight, "I found a gold nugget!" They spent the rest of the day searching for more, but didn't have the right tools to pan for gold. So, they went home to study and prepare so that next time they could find more gold. This is what they learned.

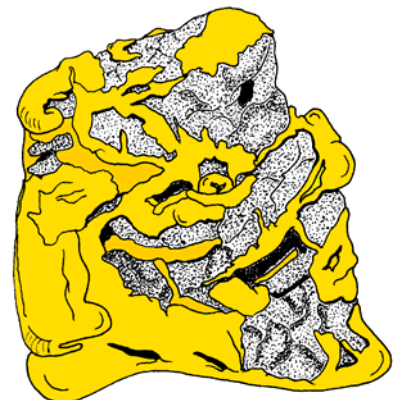
Natural gold is very soft: it has a ha_____ <13 Across> of only 2.5 to 3. Because it is so soft, harder metals are added to pure gold so it can be worn as jewelry. Pure gold is 24 ka_____. <15 Across> Most jewelry is 14 karat; it has less gold but is harder and wears well. Paul and Penny learned that the smooth gold nug_____ <5 Down> they found in the river was in what is called a pl_____ <1 Down> deposit. This is where nuggets of gold are deposited by moving water in a river. Gold can also be found trapped in solid rock. Very often gold occurs in veins of white mi_____ <16 Across> quartz. The quartz itself has no value. The gold is removed and the quartz is thrown away. Geologists call this quartz "trash" ga_____. <17 Across>

Gold has a lot of interesting physical properties. It crystallizes in the is_____ <7 Down> cry_____ <10 Down> system. This is also called the cu_____ <9 Down> system. Penny found a rounded nugget, but in the quartz seams the gold can crystallize. It forms cubes, sometimes, and 8-sided diamond-shaped crystals more often. When the gold is deposited in thin spaces between rocks, it is as thin as the tin foil Paul and Penny see in their kitchen. When it is this thin, it is called le_____ <12 Down> gold because it looks like leaves from a tree.

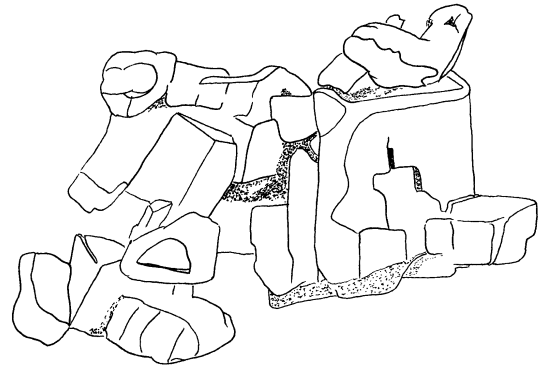
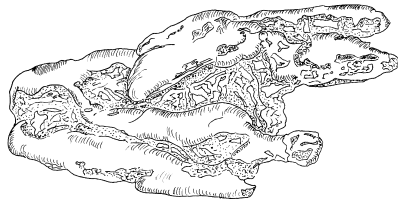
Some people think of gold as a "miracle metal." Unlike silver and copper, gold will never tar_____. <8 Down> Gold, like silver, copper and platinum, is mal_____. <3 Down> This means that it can be hammered into very, very thin sheets. Penny read in her Dad's geology book that gold is also duc_____. <4 Across> She learned that this means it can be pulled into thin wires. While Penny was in her book, Paul was on the internet. "Hey, Penny," Paul said, "elec_____ <11 Across> can go through gold!" Later on their Mom taught them that gold, like other metals, is a conductor of electricity. That is why gold is used in computer circuit boards.

Penny and Paul sat down and looked through a mineral book they borrowed from the library. In it they read that gold that is found in nature is not always pure. Sometimes it is mixed with sil_____. <14 Down> When it is, it is called "electrum." They also learned about something called "F_____ Gold." <2 Across> Penny felt her heart skip a beat: could it be that her "gold" is not gold at all, but is only worthless iron py_____? <6 Across> Their Mom took them to a gold prospector friend who lived a few miles away. He looked at Penny's specimen and told her, with a great big smile on his face, that she had found real gold - not Fool's Gold!

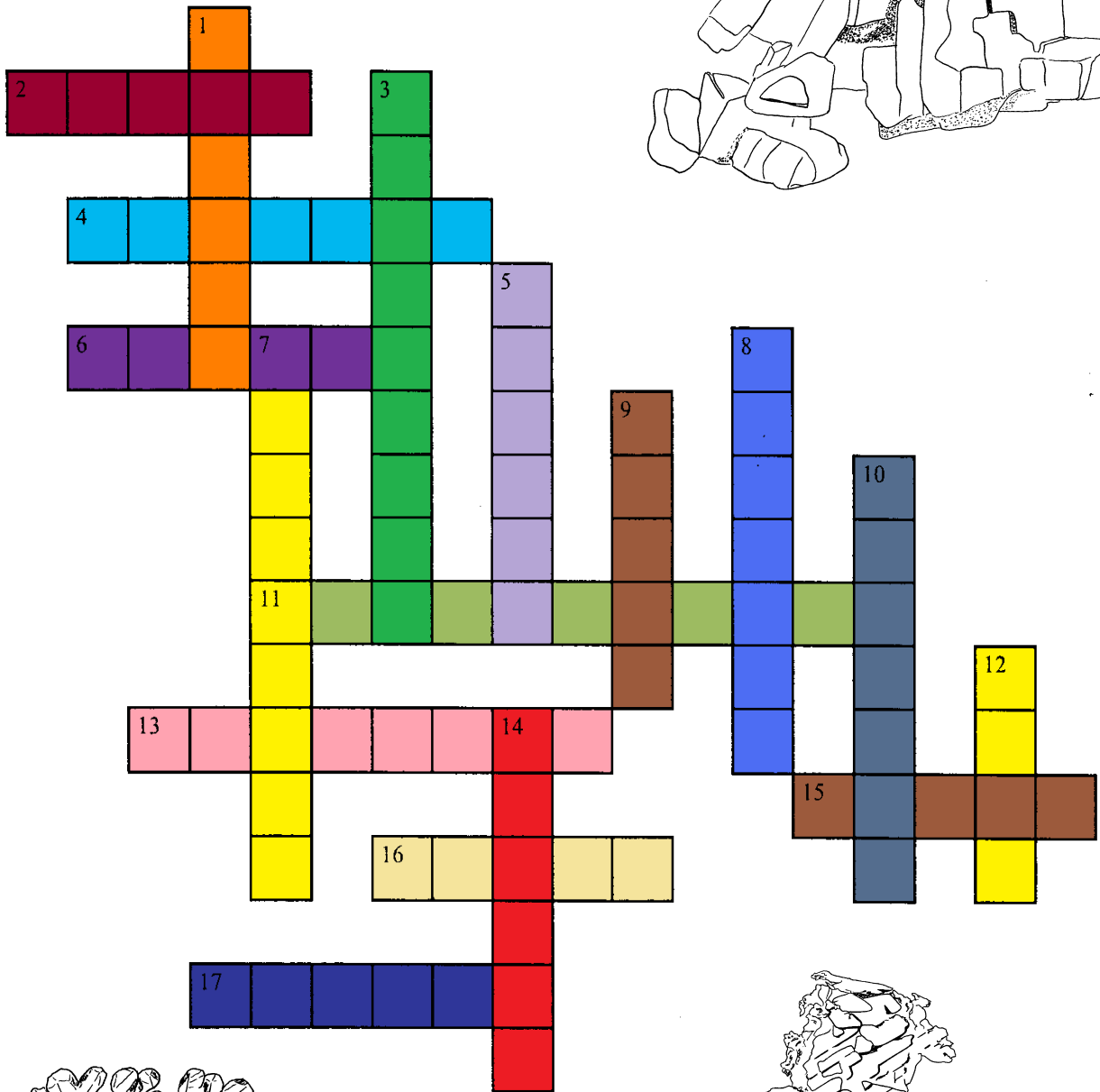
Guess where Penny and Paul spent the rest of their summer? Back at the stream, panning for gold. So far they have found 7 gold nuggets and a small glass bottle that is filled with tiny gold flakes.



PAUL AND PENNY FIND GOLD!



COLOR THE GOLD SPECIMENS!



Important Mineral Collectors

Washington Augustus Roebling



Washington Augustus Roebling was born May 5, 1837, in Saxonburg, Pennsylvania. His parents were Jane and John A. Roebling. His father made long, strong cables out of steel wires. They were known as “wire rope.” The Roebling family specialized in making bridges that were supported (that is, held up) by their steel cables. The most famous bridge that the Roeblings made is the Brooklyn Bridge in New York City.

Washington Roebling studied engineering at Rensselaer Polytechnic Institute (RPI) in Troy, New York. This was very important for his lifetime career as a bridge builder. He was a Union soldier in the Civil War from 1861 to 1865. He served with distinction and retired from the Army as a Colonel. He was even present when General Lee surrendered to the Union Army at Appomattox.

W.A. Roebling first became interested in minerals when he was in college at RPI. Very quickly, he loved collecting minerals. He made a fortune in the cable and bridge-building businesses and liked to use his wealth to buy the best mineral specimens found all over the world. His goal was to build one of the largest and finest mineral collections ever put together - and that’s exactly what he did. As a matter of fact, he has been called one of the “greatest American mineral collectors of all time.” (Mineralogical Record website).

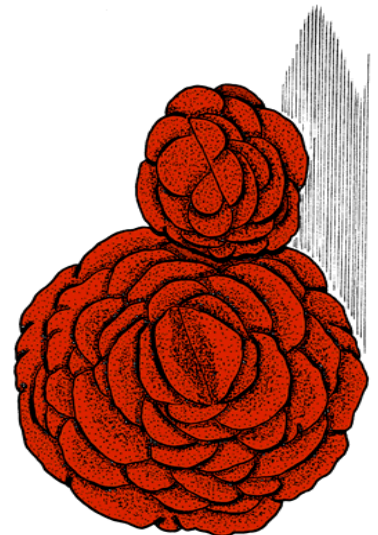
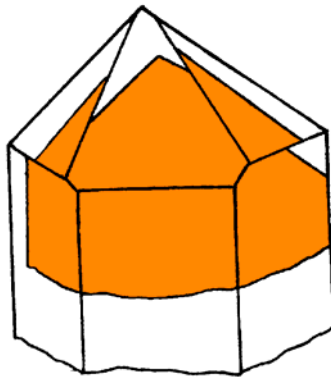
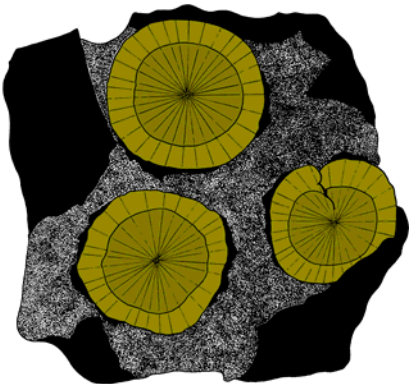
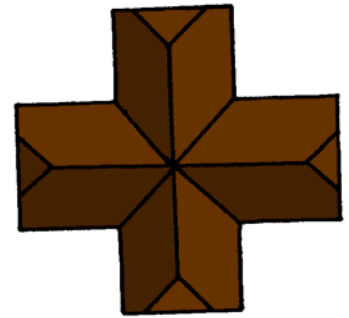
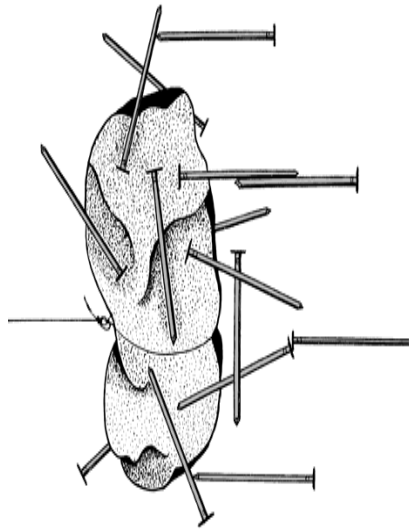
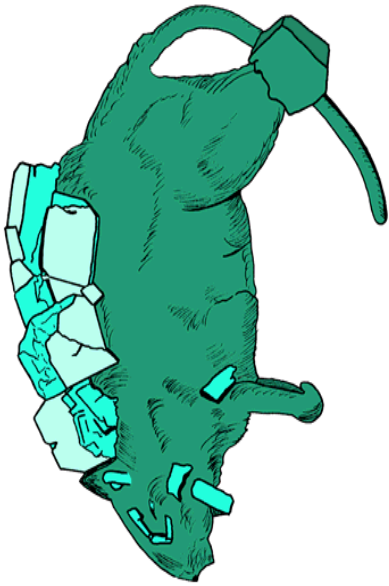
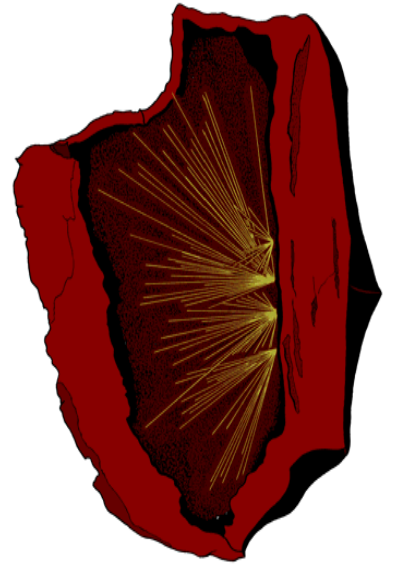
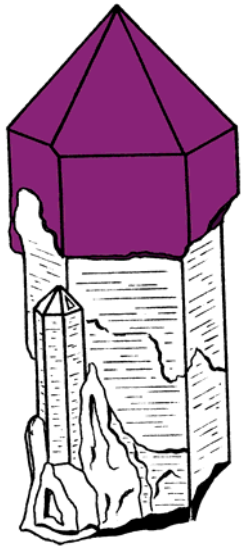
The Roebling mineral collection had approximately 16,000 specimens! In 1926, after a lifetime of hard work and collecting minerals, Washington Augustus Roebling died. A year later, his son, John, donated this great collection to the Smithsonian Institution. He also donated a large sum of money so that the museum could take proper care of the collection. This gift of Roebling’s mineral collection helped to make the mineral collection at the Smithsonian one of the best mineral collections in the entire world.

Did you know that the Smithsonian Institution is a group of museums in Washington, D.C. that contain the collections of the people of the United States? A great family vacation is a trip to Washington, D.C. where you can visit the Smithsonian Institution and see this awesome mineral collection in person. It is truly spectacular! And while you are there, visit the other Smithsonian museums, too. It is a trip you will never forget.

Picture Above: Washington A. Roebling in 1854. This picture is in the public domain.

Picture Below Right: The Brooklyn Bridge, as seen from Manhattan, New York City. Copied under the GNU Free Documentation License.





Acicular

Millerite

"Acicular" is from a Latin word "acicula" that means "a little needle." Acicular crystals are minerals that crystallize as long, thin, hair-like needles. The needles are extremely fragile. Even a light touch can break them off. The list of minerals that form acicular crystals include aurichalcite, artinite and millerite. The millerite pictured on this card is from the Sterling mine, Antwerp, New York.
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Arborescent

Copper

"Arborescent" means "like a tree". Some minerals, like this copper specimen from Itauz, Djezkazgan, Central Kazakhstan, grow in forms that resemble tree branches and so are described as arborescent.
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Scepter

Amethyst on Milky Quartz

A "scepter" is a long stick that is held by a King as a sign of the king's power. The end of the 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. This scepter is from the African nation of Namibia.
©2008 Darryl Powell

Twinned Crystals

Staurolite

There are times when two or more crystals grow together at a specific angle. When this happens, the crystal is called a "twinned crystal." Pictured here is a staurolite twin. In this specimen two individual crystals have grown together in a cross formation.
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Magnetism

Magnetite, Lodestone

The ancient Roman naturalist, Pliny the Elder, told about a shepherd named Magnes. Magnes was out watching his sheep when the nails in his shoes stuck to the rocks in the ground. Items made out of iron, like nails, are attracted to and stick to magnetite. This property is called "magnetism." Massive magnetite is called "lodestone."
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Pseudomorph

"The Atacamouse"

The word "pseudomorph" literally means "false form." A pseudomorph is a mineral that starts off as a particular mineral. But when the chemical environment changes, the chemistry of the mineral changes. The mineral has the shape of the original mineral but the chemistry of another mineral. Pictured here is a mouse that has been changed into the copper mineral atacamite.
©2011 Darryl Powell

Rosette

Barite

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. Pictured here is a "rose" made of intergrown barite crystals. The barite grew in red sandstone and the red sand was trapped in the barite.
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Phantom

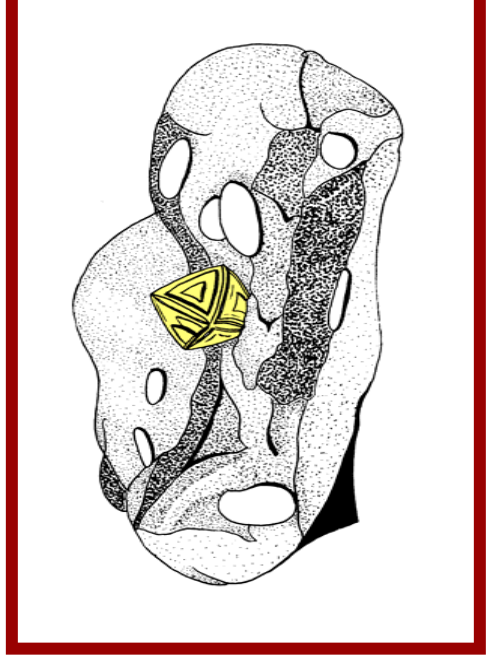
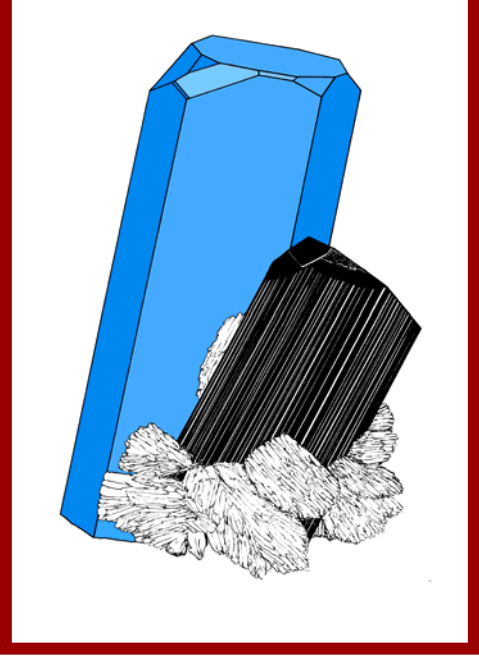
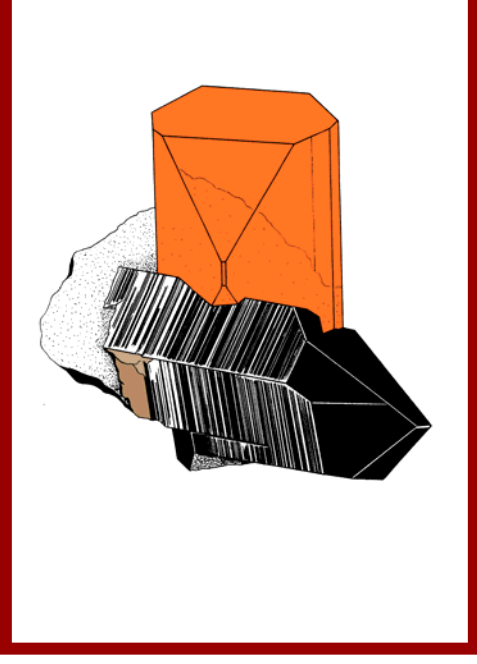
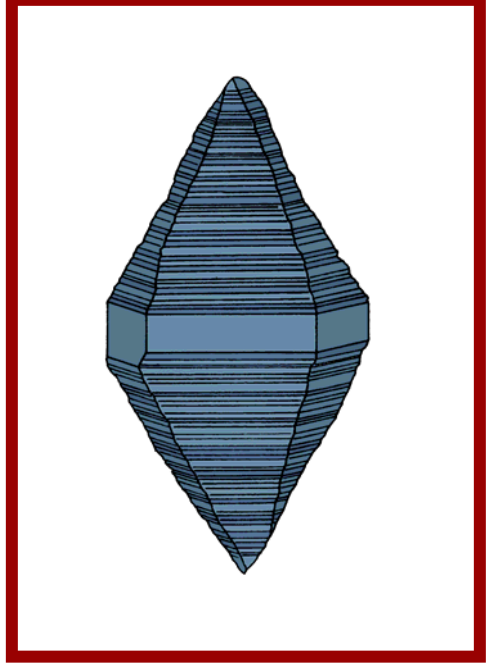
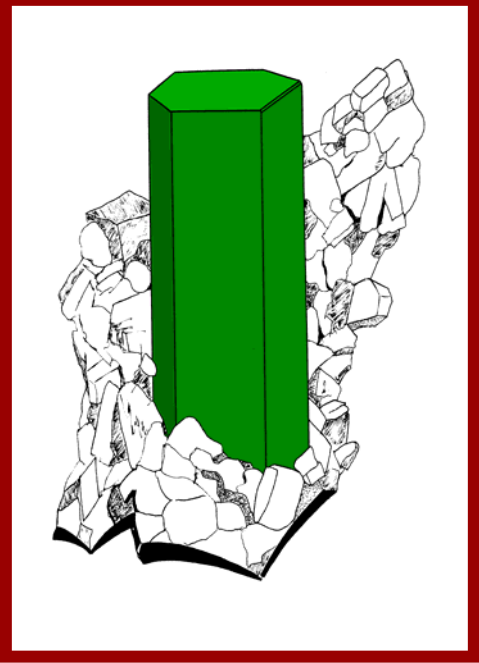
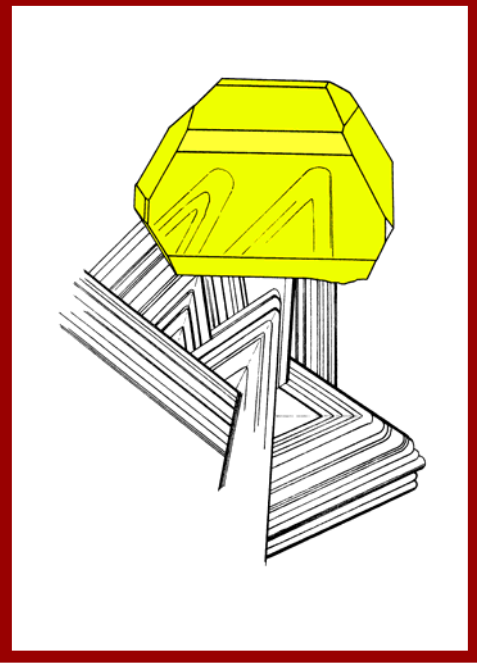
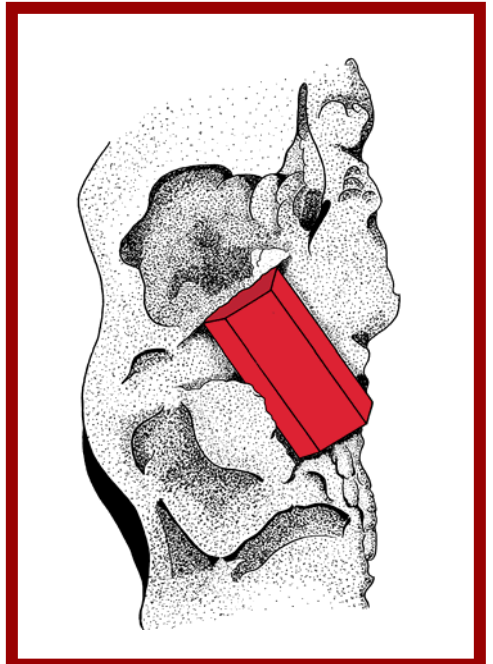
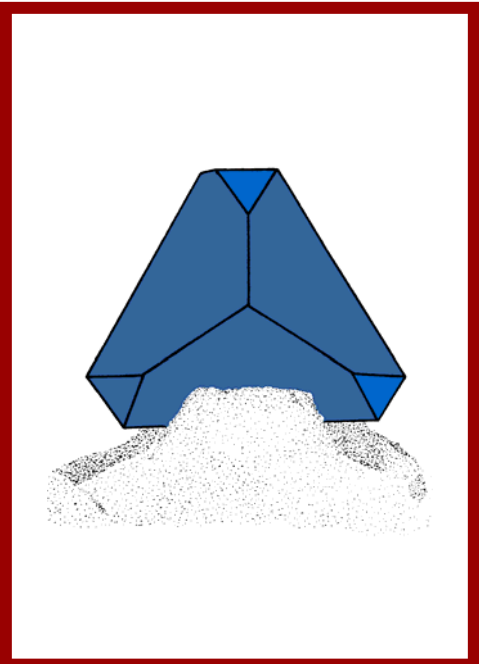
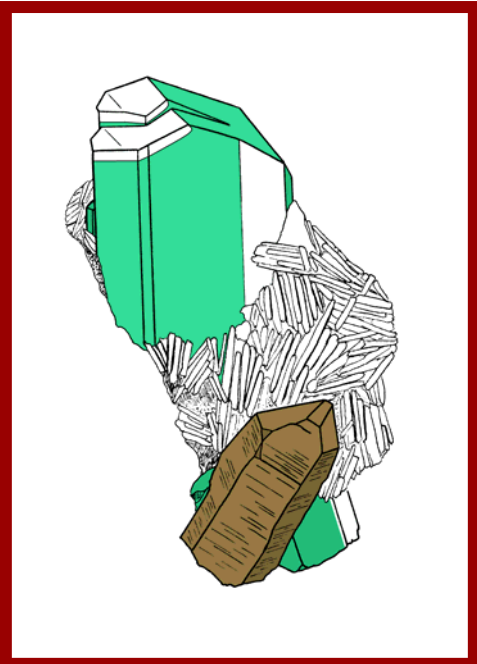
Quartz

Sometimes a crystal will grow to a certain size and then stop growing. Later on, the crystal growth started again, but the new material can be a different color. When the growth is all complete, the larger crystal looks like it has a smaller crystal trapped inside. The original, smaller crystal is the same shape as the larger, later crystal. Mineralogists call this situation a "phantom crystal."
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Dollars

Pyrite

Among the most unusual and popular mineral specimens are the "Pyrite Dollars" from Sparta, Illinois. They are found in coal deposits, forming between layers of black shale. The crystals grow from a center point like rays of light moving out from the sun. The pyrite forms into thin, flat discs that collectors call "Dollars." They really do look like big coins!
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Bixbite

Wah Wah Mountains,
Beaver Co., Utah

Bixbite is a very rare red variety of the mineral beryl. Beryl is a group of minerals that is only different in color. They all crystallize in the hexagonal system, have a chemical formula of $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$, and have a hardness of 7 1/2 to 8.

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Benitoite

San Benito County

Benitoite is a relatively new gemstone. It was first discovered in 1906 in San Benito County, California (can you see how it got its name?!) by James M. Couch who was camping in the hills. The story goes that he woke up to find the sunshine bouncing off of the faces of benitoite crystals that were on the ground around his campsite. Not only is benitoite a rare mineral but gem-quality crystals are even rarer.

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Amazonite

Pike's Peak Region, Colorado

Amazonite is also called Amazon stone. It is opaque (this means light does not pass through it) so it is not faceted like diamonds or emeralds. It is carved into small figurines and polished to make semi-precious gems for rings, necklaces and ear rings.

Amazonite is a variety of the group of minerals called feldspars. Specifically, it is the turquoise-colored variety of microcline feldspar.

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Sapphire

Sri Lanka

Sapphire is the blue, yellow and colorless variety of the mineral corundum. It is number 9 on the Mohs' Hardness Scale. Because it is so hard, corundum is used to make grinding wheels and papers for grinding and polishing softer materials like porcelain, metals and wood. Pure corundum is aluminum oxide, Al_2O_3 , and is colorless. The presence of the elements iron and titanium in corundum gives sapphire its blue color.

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Emerald

Colombia

Emerald is the green variety of beryl. People have believed emerald to have many different "powers" through the ages. The Romans thought it was a symbol of the power of nature to reproduce.

The ancient Greek scientist, Theophrastus, claimed emeralds could bring rest to the eyes and relieve eye problems. Others believed an emerald could help a person predict the future.

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Brazilianite

Minas Gerais, Brazil

Brazilianite was named after the country in which it was first discovered, Brazil. It is yellow to yellow-green, rarely occurring as dark, olive green specimens. It was discovered in 1945 making it a fairly new gemstone. Brazilianite is often found growing on and with silvery muscovite crystals. These muscovite crystals form a shape that looks like a star.

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Diamond

South Africa

One of the most famous, popular and valuable of all gems is the diamond. Diamond is number 10 on Mohs' Hardness Scale, making it the hardest substance on Earth. It is so hard that it is actually 4 times harder than corundum (number 9 on the hardness scale) and 8 times harder than topaz (number 8 on the hardness scale). In very rare situations, diamonds can have deep colors, like blue, yellow, red, orange or pink.

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Aquamarine

Pakistan

Aquamarine is the blue variety of beryl. The name aquamarine comes from two Latin words, aqua marina, which mean water of the sea or ocean. Deep blue aquamarines are popular gemstones, both as gems and as specimens. In ancient times, sailors wore aquamarine because they believed it would give them courage and protection from the dangers at sea.

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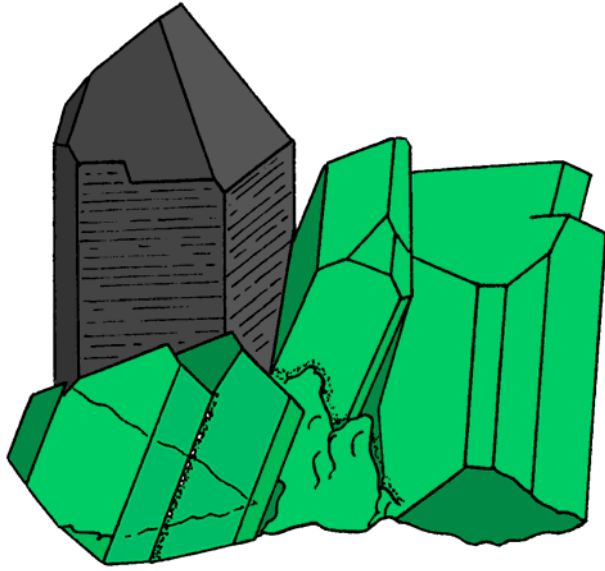
Topaz

Skardu District, Pakistan

Topaz is number 8 on the hardness scale. It can be colorless, red, blue, pink, yellow, golden brown, sherry red, and even orange. Orange topaz is also referred to as Imperial Topaz. Colored topaz gems are beautiful and very popular. Topaz crystals can be less than an inch long and can be as large as a boulder. The world's largest topaz crystal is from Minas Gerais, Brazil and weighs almost 600 pounds!

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Irradiated Quartz: Why is Smoky Quartz Black?



Feldspar minerals all contain *radioactive elements*. Radioactive elements are elements that break down and when they do, they give off *radiation*. Radiation can go through solid objects - like minerals and crystals! When radiation goes through quartz crystals, the clear, colorless quartz turns black. This is why the specimens you have seen in this issue of *Mini Miners Monthly* that have feldspar and quartz together have *smoky quartz*.

When you go to mineral shows, you will often see “Irradiated Quartz” for sale. “Irradiated Quartz” is clear, colorless quartz that has been irradiated in a laboratory. The quartz itself is natural and was mined out of the

ground (usually from Arkansas or Brazil). But the color was caused - by a human in a laboratory - and not by nature. These crystals can be very attractive, but many mineral collectors don't like to collect specimens that have been changed by humans.

Don't worry about being exposed to radiation. We know that radiation can make people sick. Don't worry, though. When irradiated quartz is taken out of the laboratory, it is *not* radioactive and it cannot hurt you.



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Hello, my name is Adam Marchacos and I am the editor and webmaster of kids love rocks. I started this site to educate young and old alike all about rocks, fossils, minerals, and everything else that relates to our earth. I've included educational information about the types of rocks, where to find rocks, as well as information on how to make new friends with others who are interested in rock and mineral collecting.

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