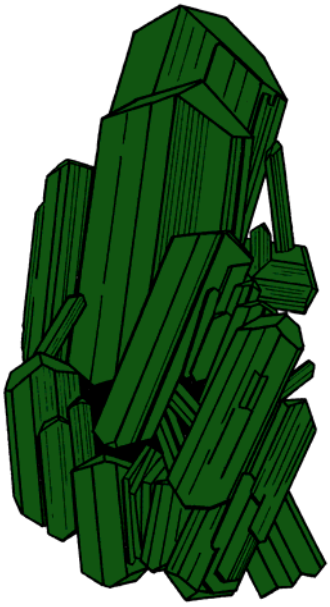
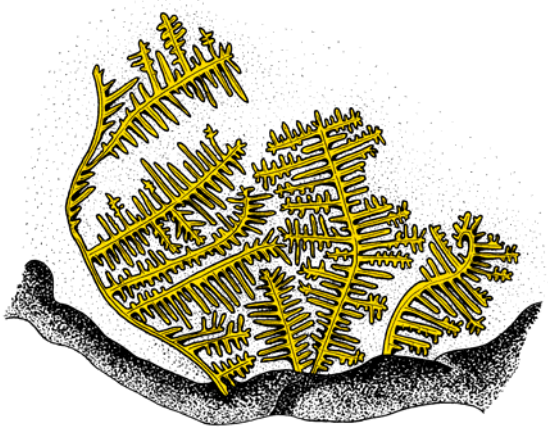
Mini Miners Monthly

In this issue . . .



There are some minerals that have similar chemical formulas and the same crystal form. Because of these obvious similarities, they are put together in "groups." Some examples are the mica group, the tourmaline group, the aragonite group and the calcite group. In this issue of *Mini Miners Monthly* you will discover mineral groups. You learned about one of these groups last month: the calcite group. It is presented again here, along with pictures and information about the other groups listed above.

We have added some activities for you as well including crossword puzzle and another word game. Just for the fun of it, there is a little something called, "Everything I Need to Know I Learned From Collecting Minerals."



There are a lot of mineral drawings for you to color in this issue. There are also some specimens that we challenge you to draw, or at least to draw your own made-up version of the specimen. Here at Mini Miners Monthly we still believe that one of the best ways to learn about mineral shapes and the relationships of minerals is to draw them. Drawing a picture of minerals (or anything for that matter) makes you look carefully and closely at the object. When you study something that closely you will learn a lot about it. Give it a try!

Lastly, for your use throughout the year is a colorful mineral calendar. Print it out and enjoy it. Print it out for your family and friends, too.

Vol. 9 No. 1

365 DAYS OF MINERALS

BY EMMA FAJCZ

As a new year begins, people often start looking for the perfect calendar that reflects their hobbies and tastes. It's easy to walk into a store and find calendars on landscapes, flowers, birds, and cars—but not about minerals!

Feel free to print off this mineral calendar, and be creative with it! Cut out each month and glue the top of the pages together to make a tear-off calendar to put on your desk, or fasten it together with a magnetic clip and stick it to your fridge. Punch a whole in the top of each page and display it on a wall or cork board in your house. Staple the top together and put it in the family vehicle's glove compartment, or the left side to make a book that can fit in your book bag or purse. The possibilities are many.

You're probably curious what minerals I've featured in the calendar. All these minerals—and one element—are from my personal collection. Also, the red numbers signify national holidays.

January: Copper (This is the element! Look for copper's abbreviation "Cu" on the Periodic Table of Elements.)

February: Agate

March: Bumble Bee Jasper

April: Spectralite

May: Mica

June: Apatite

July: Quartz

August: Cactus Quartz

September: Blue Lace Agate

October: Tiger Eye

November: Red Calcite

December: Boulder Chrysoprase

Photo Credits: Emma Fajcz

JANUARY 2015

SU	MO	TUE	WE	TH	FRI	SAT
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FEBRUARY 2015

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MARCH 2015

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JUNE 2015

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NOVEMBER 2015

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DECEMBER 2015

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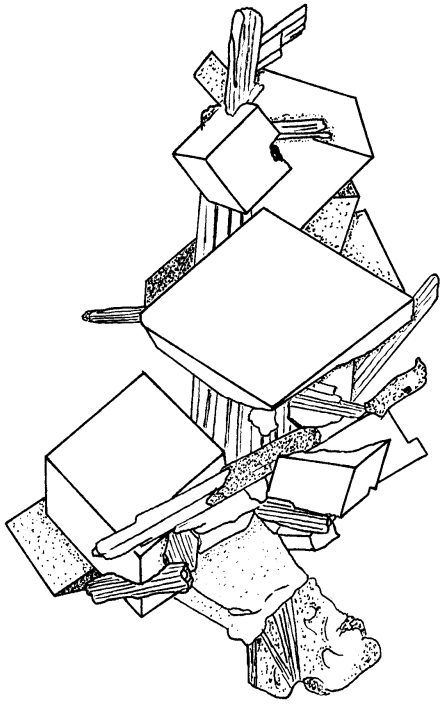
Mini Miners Monthly



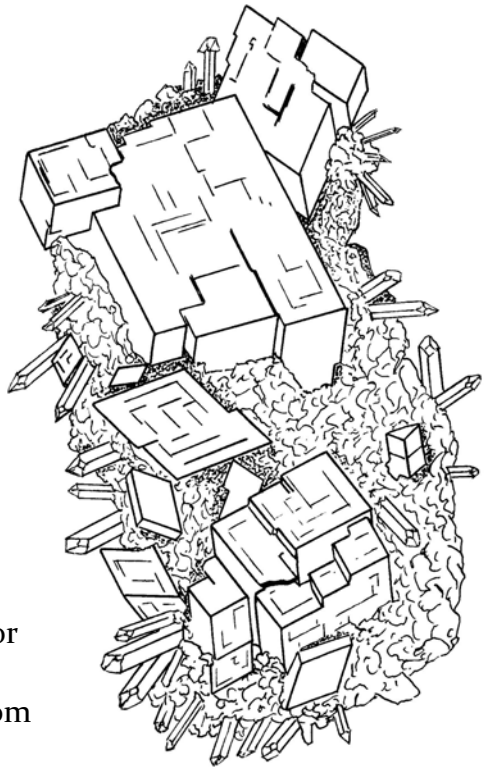
The Calcite Group of Minerals

The calcite group of minerals all have CO_3 in their chemical formula. The minerals in the calcite group include calcite, rhodochrosite, smithsonite, siderite and magnesite. All calcite group minerals crystallize in the *trigonal* crystal system (which is a category of the *hexagonal* crystal system). They all have rhombohedral cleavage and all have similar chemical formulas.

Look at the drawings of these three different calcite group minerals, calcite, siderite and rhodochrosite. Compare the shape of their crystals. They all look like boxes that have been bent to an angle. Mineralogists call this shape a *rhombohedron*.

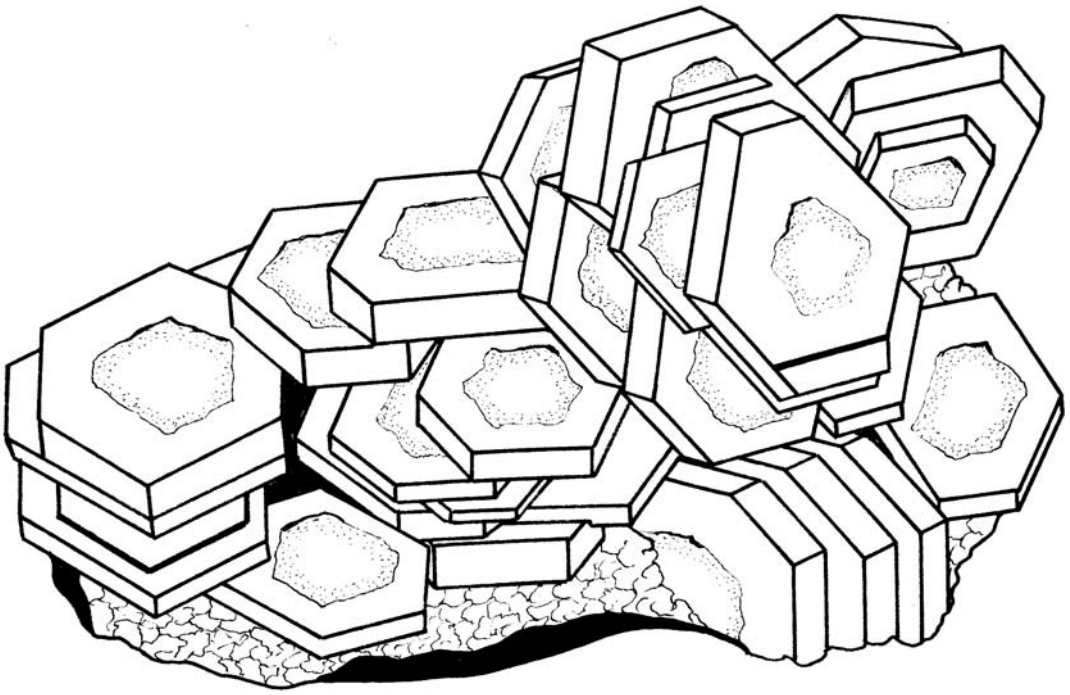
For the chemists out there, here is a comparison of the chemical formulas of the different calcite group minerals. Right away you will see why they are so similar.

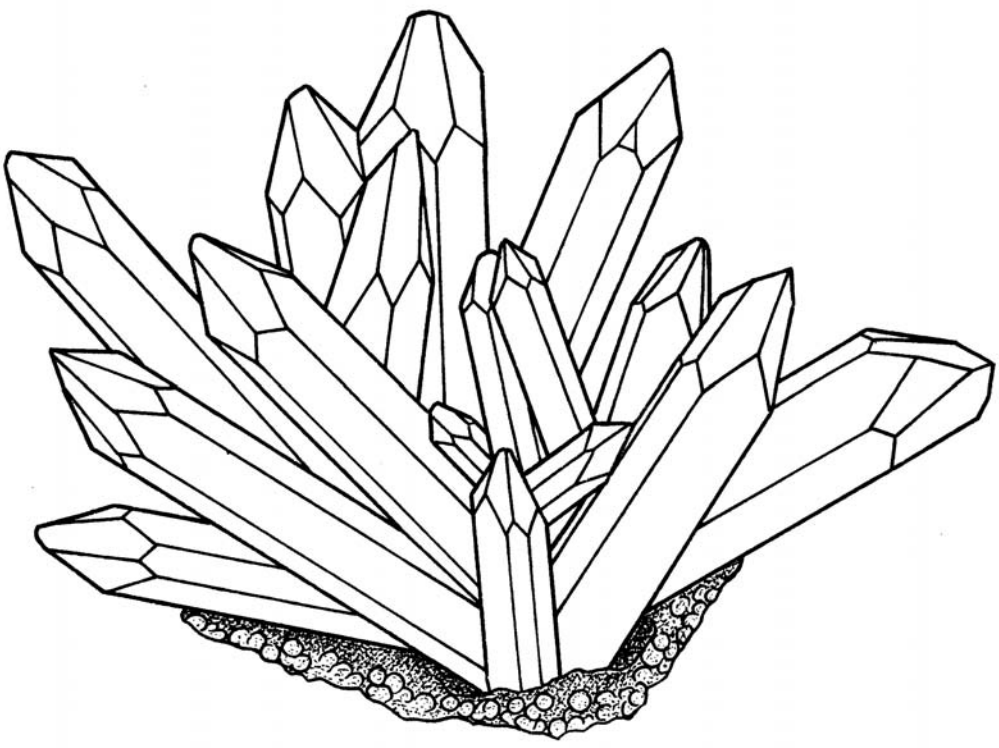
Calcite	$CaCO_3$
Rhodochrosite	$MnCO_3$
Smithsonite	$ZnCO_3$
Magnesite	$MgCO_3$
Siderite	$FeCO_3$



Top: Calcite on Stibnite from Romania
Above: Green-brown siderite crystals covered with color less quartz needles from France.
Right: Bright red rhodochrosite crystals with quartz from Peru.

Calcite Crystals to Color

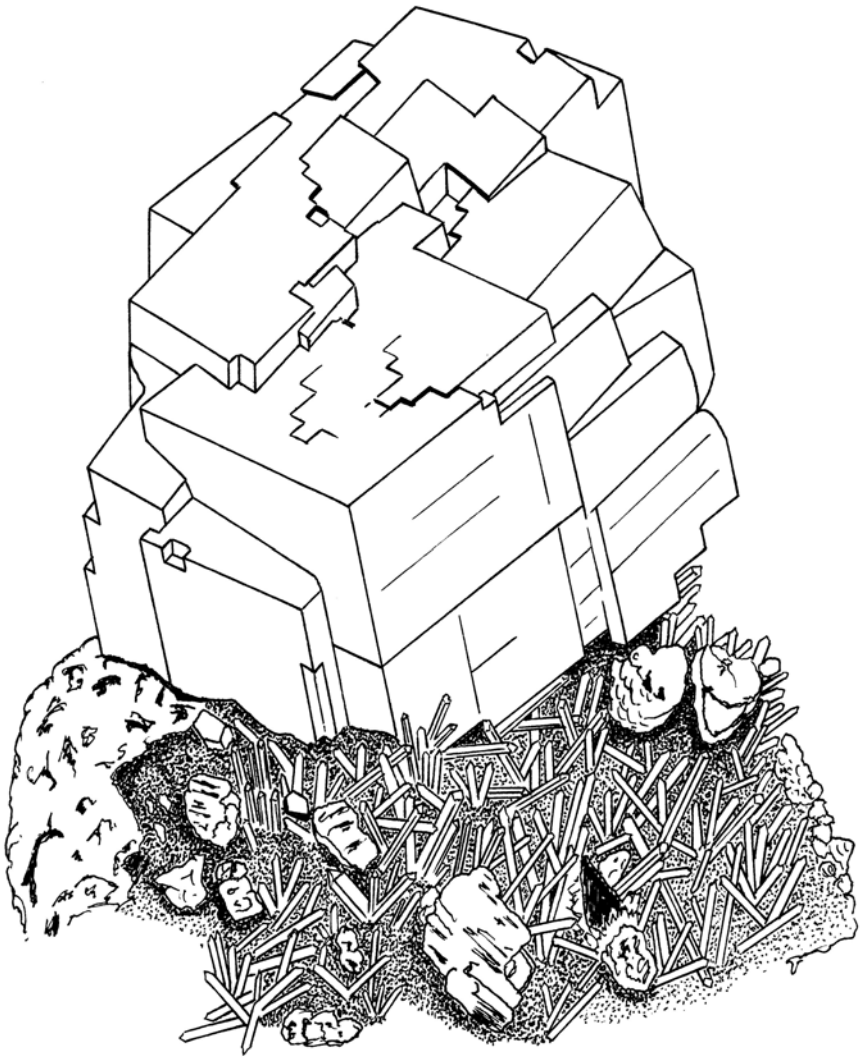




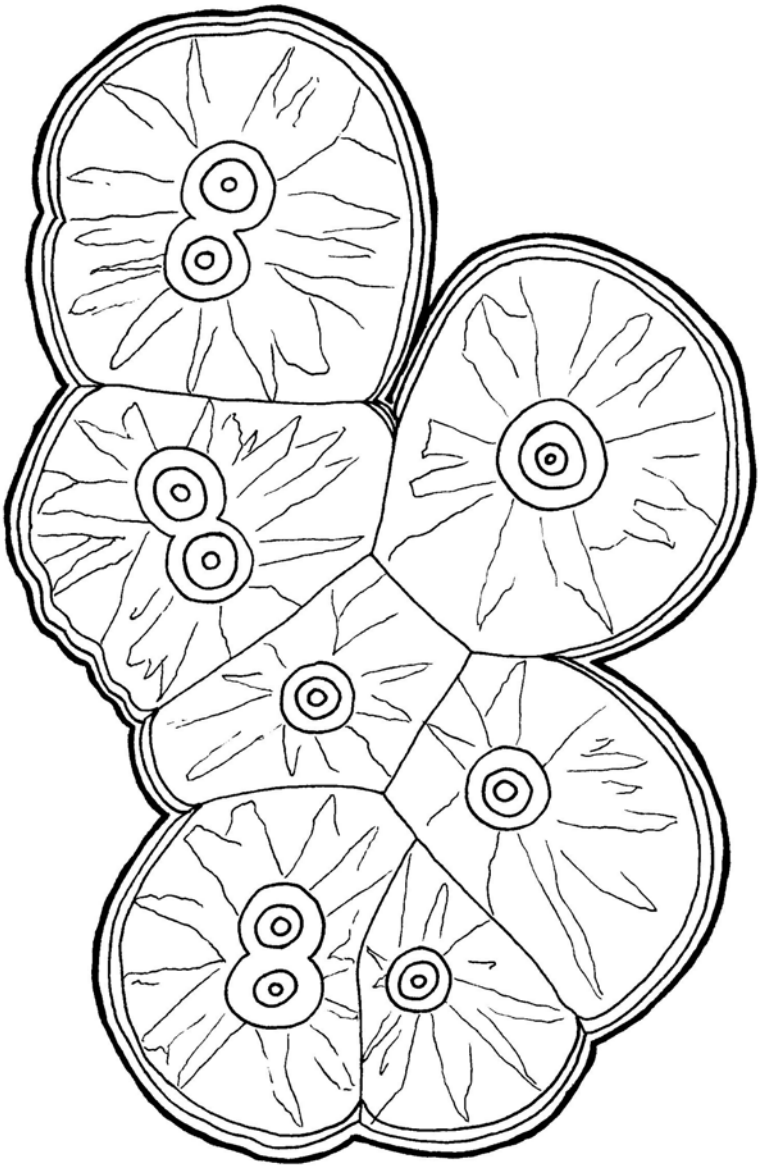
Rhodochrosite Crystals to Color

Right: "The Alma Queen" This is a very famous, deep red rhodochrosite from the Sweet Home Mine near Alma, Colorado.

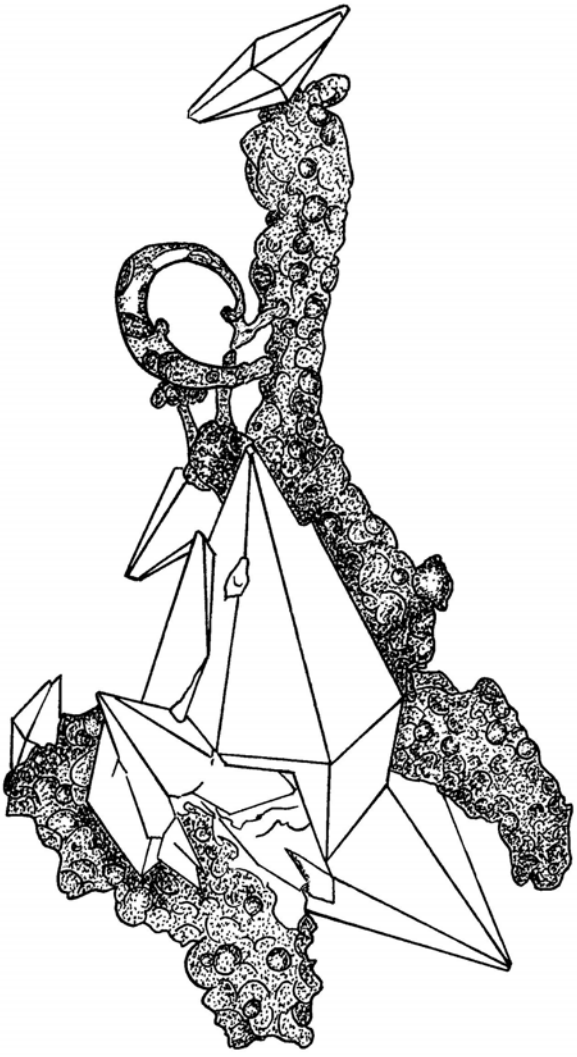
Below: A pocket of deep red rhodochrosite crystals with colorless quartz "needles". There are also purple fluorite crystals sitting on the rhodochrosite crystals.



Rhodochrosite Crystals to Color



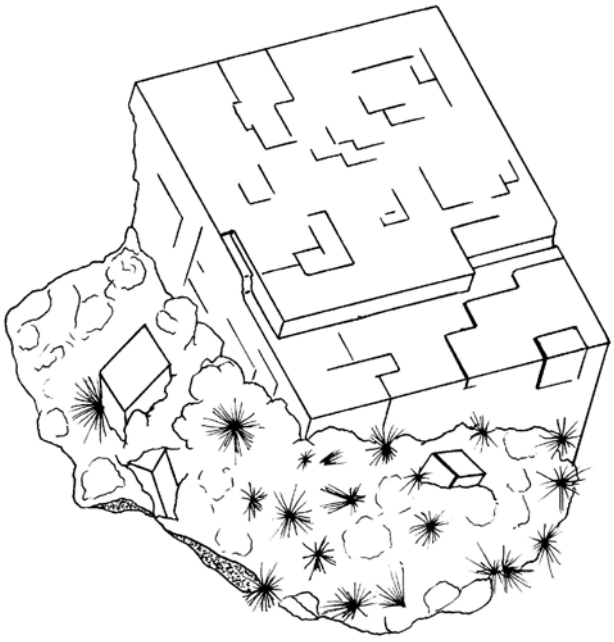
Left: A slice of a group of rhodochrosite stalactites from Argentina. The circles are dark pink and the rest is light pink.



Right: Red rhodochrosite crystals on silver from Peru.

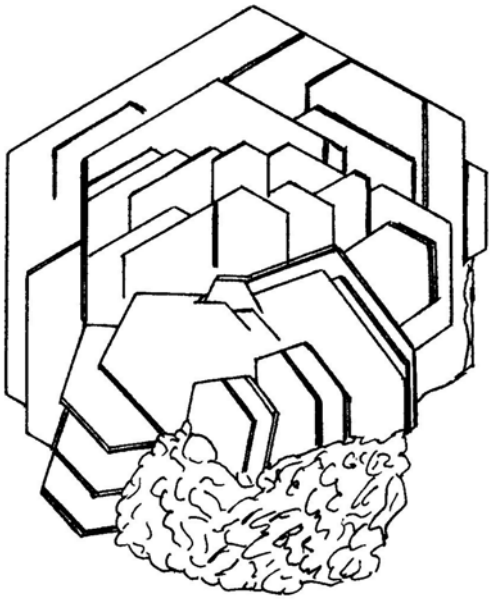
Siderite Crystals to Color

Green-brown crystals of siderite from France. Sitting on the siderite crystals are bunches of long, thin, colorless quartz crystals. Mineral collectors sometimes describe long, thin quartz crystals as “needles.”



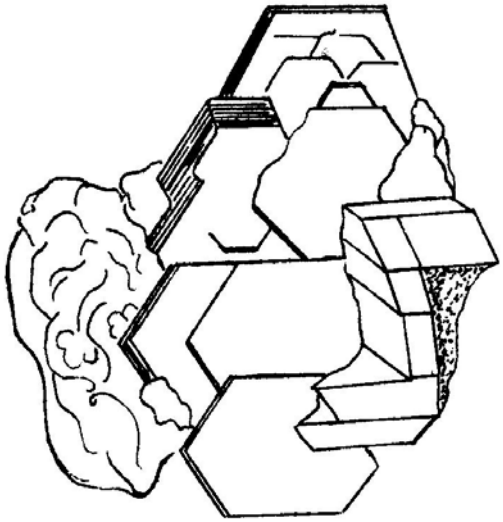
Left: A large, green-brown siderite crystal from Canada.

The Mica Group of Minerals



The mica group of minerals are silicate minerals that have complicated chemical formulas. Their crystals are all six-sided. They appear to form in the hexagonal crystal system. However, studies using x-rays has proven that they all crystallize in the monoclinic crystal system. The minerals that are in the mica group are muscovite, phlogopite, lepidolite, and "biotite."

Biotite is in quotations because in 1999 the Commission on New Minerals and Mineral Names (the CNMMN) recommended that this name should be used for a series of similar minerals and not a single mineral species. Most mineral collectors understand that "biotite" is now a general word for any black mica.



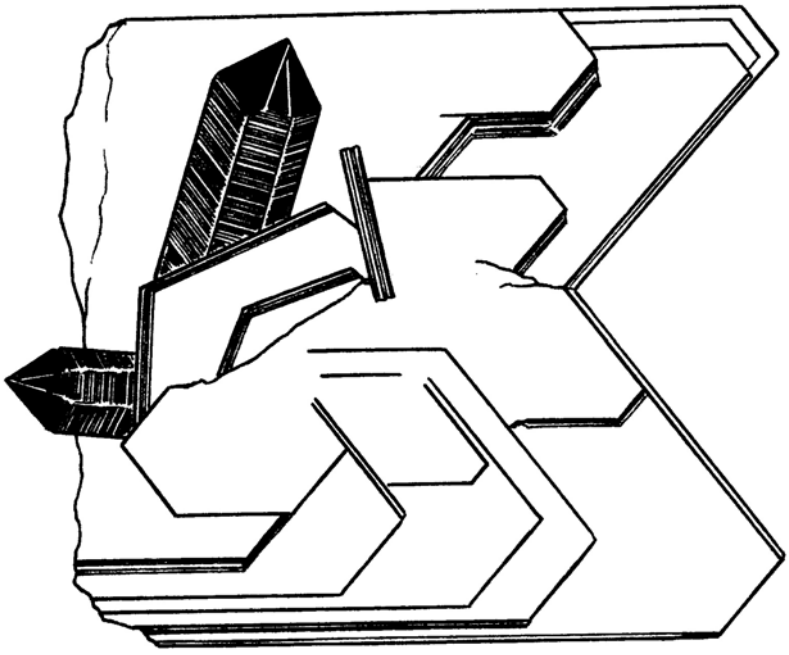
The naming of minerals has become very complicated. Specific mineral species are now named with long names that describe their chemical composition. For example, there is a mica group mineral that is named

Fluorotetraferriphlogopite.

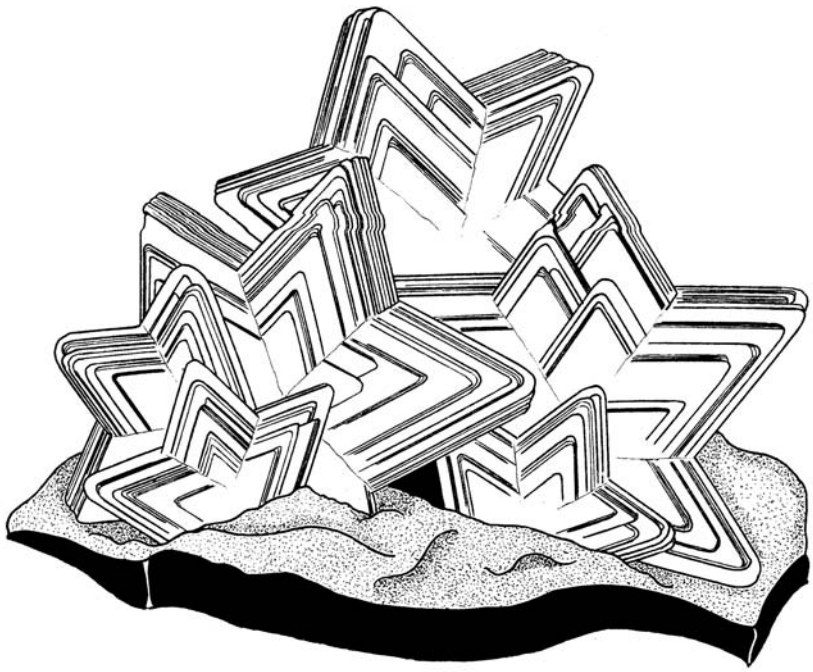
(Say that name 10 times really fast!) It is a variety of phlogopite that has the element fluorine in it and four (tetra) iron atoms (ferri). All new mineral names have to be presented to the CNMMN mentioned above and this group of mineral experts will determine if the proposed mineral truly is a new mineral species and that the proposed name can be used for that mineral species.

Muscovite	$KAl_2(Si_3Al)O_{10}(OH,F)_2$
Phlogopite	$KMg_3(Si_3Al)O_{10}(F,OH)_2$
Lepidolite	$K(Li,Al)_3(Si,Al)_4O_{10}(F,OH)_2$
"Biotite"	$K(Mg,Fe^{++})_3AlSi_3O_{10}(OH,F)_2$

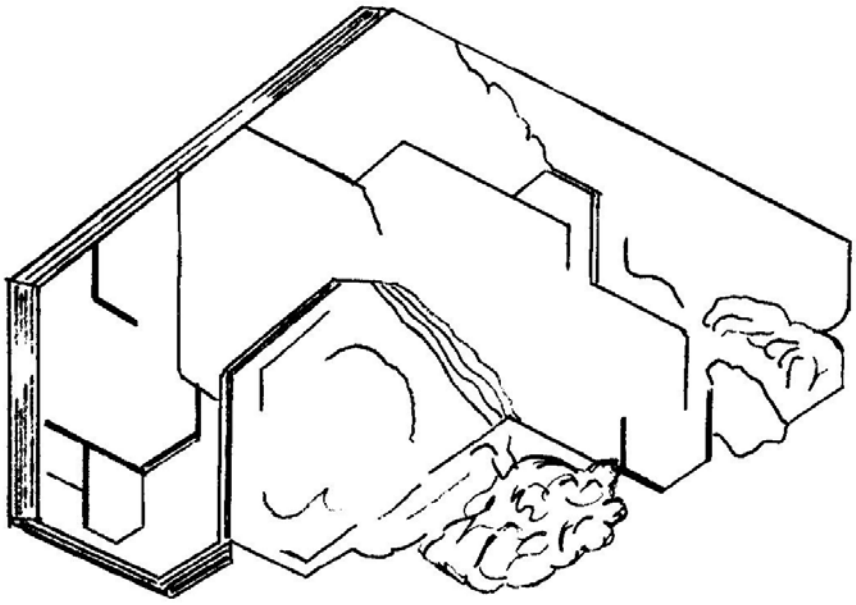
Muscovite Crystals to Color



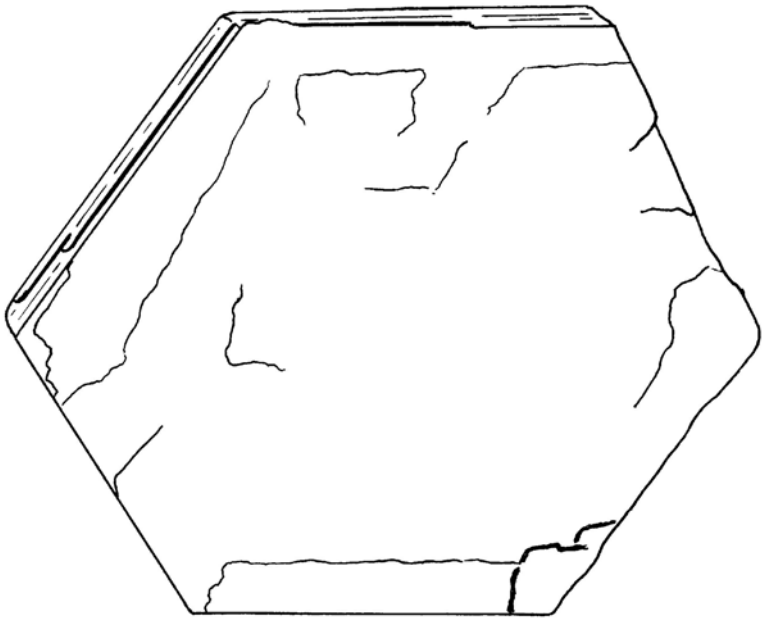
Above: Light yellowish-tan muscovite crystals with black, smoky quartz crystals from California.
Below: When individual mica crystals grow together in a repeating pattern, they can form star shapes. Below is a cluster of "Star Mica" crystals from Brazil. Color them light yellow.



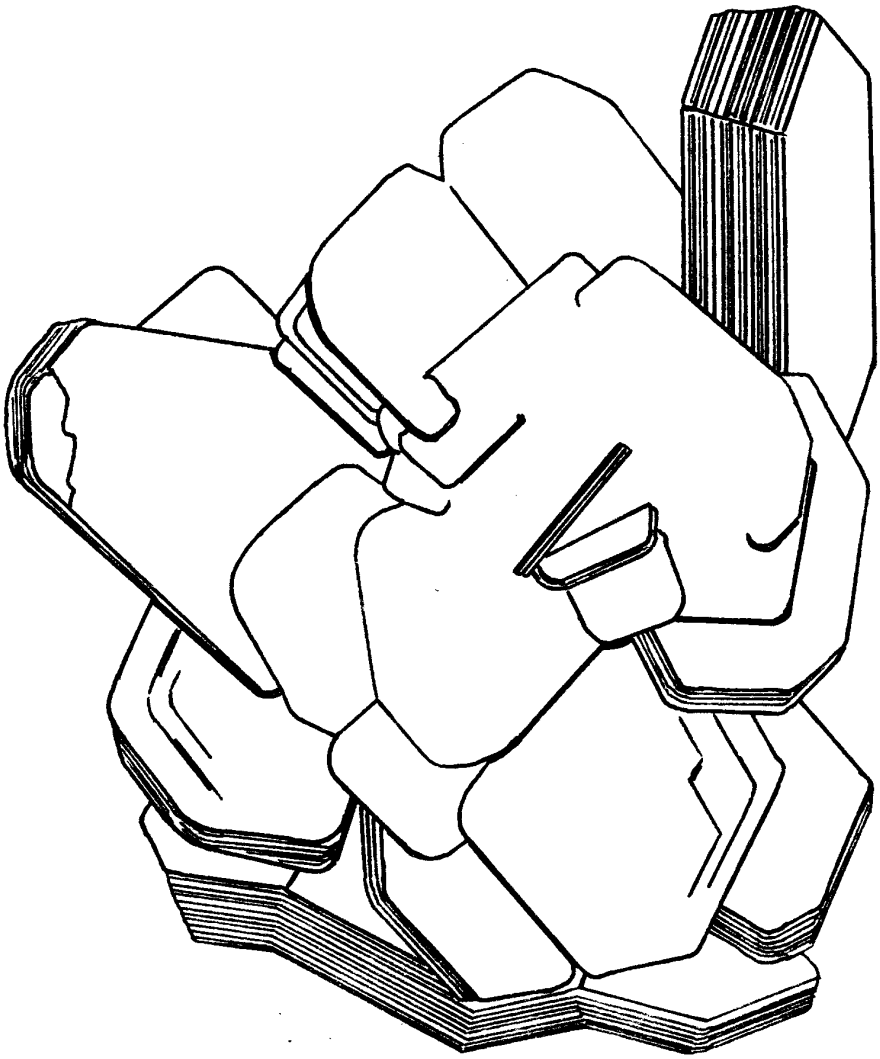
Phlogopite Crystals to Color



Above: A tan phlogopite crystal from Natural Bridge, New York (in the Adirondack Mountains).
Below: A darker brown group of phlogopite crystals from Canada.

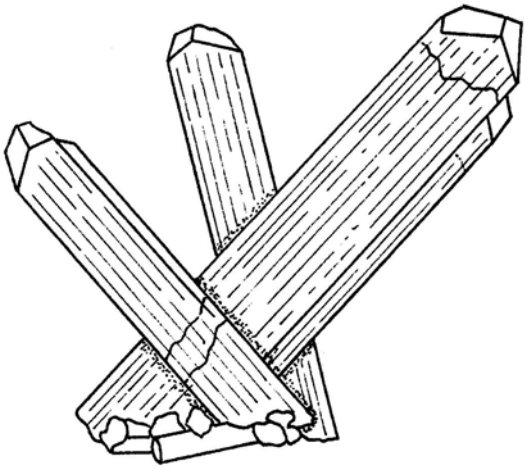


Lepidolite Crystals to Color



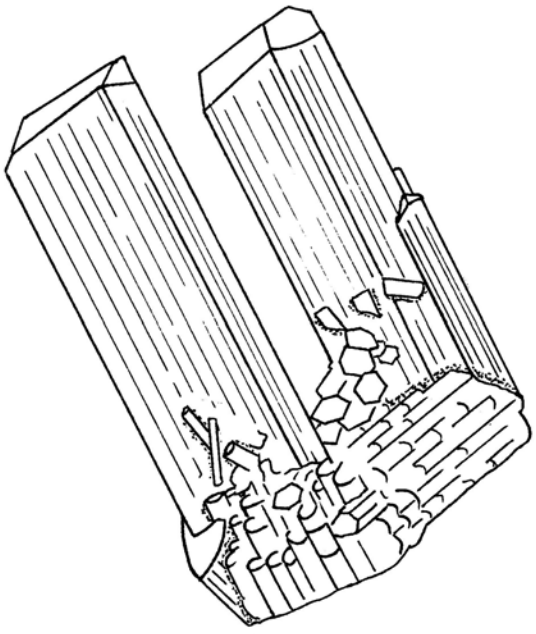
A cluster of light purple lepidolite crystals from California. Look at the "crystal" that is standing up in the back (right) of the specimen. Notice the layers that are usual for all the mica group minerals. Each layer is actually an individual crystal. When they are together like this, mineral collectors call them a "book" of lepidolite (or mica) crystals.

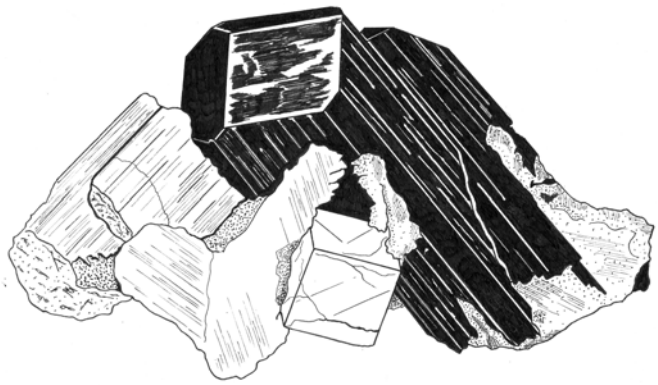
The Tourmaline Group of Minerals



The tourmaline group of minerals, like the mica group of minerals, are silicate minerals that have complicated chemical formulas. The chemical formula for the colorful variety of tourmaline (elbaite) is $Na(Al,Fe,Li,Mg)_3B_3Al_3(Al_3Si_6O_{27})(O,OH,F)_4$. Compare the chemical formulas in the chart below. You can see that they all share $Al_3Si_6O_{27}$ and $(OH)_4$ in their formulas. They are hard and have glassy luster. They all crystallize in the hexagonal crystal system. They commonly form long, prismatic crystals, but they can also form short, fat crystals. Multi-colored crystals are commonly found.

The varieties of tourmaline in the tourmaline group are schorl (black), dravite (garnet-red to brown), uvite (white), colorless (achroite), and elbaite (red, green, blue, yellow and combinations of these colors). The colorful gem varieties of elbaite have their own special names. Red tourmaline is called rubellite, green is called verdelite and blue is called indicolite.

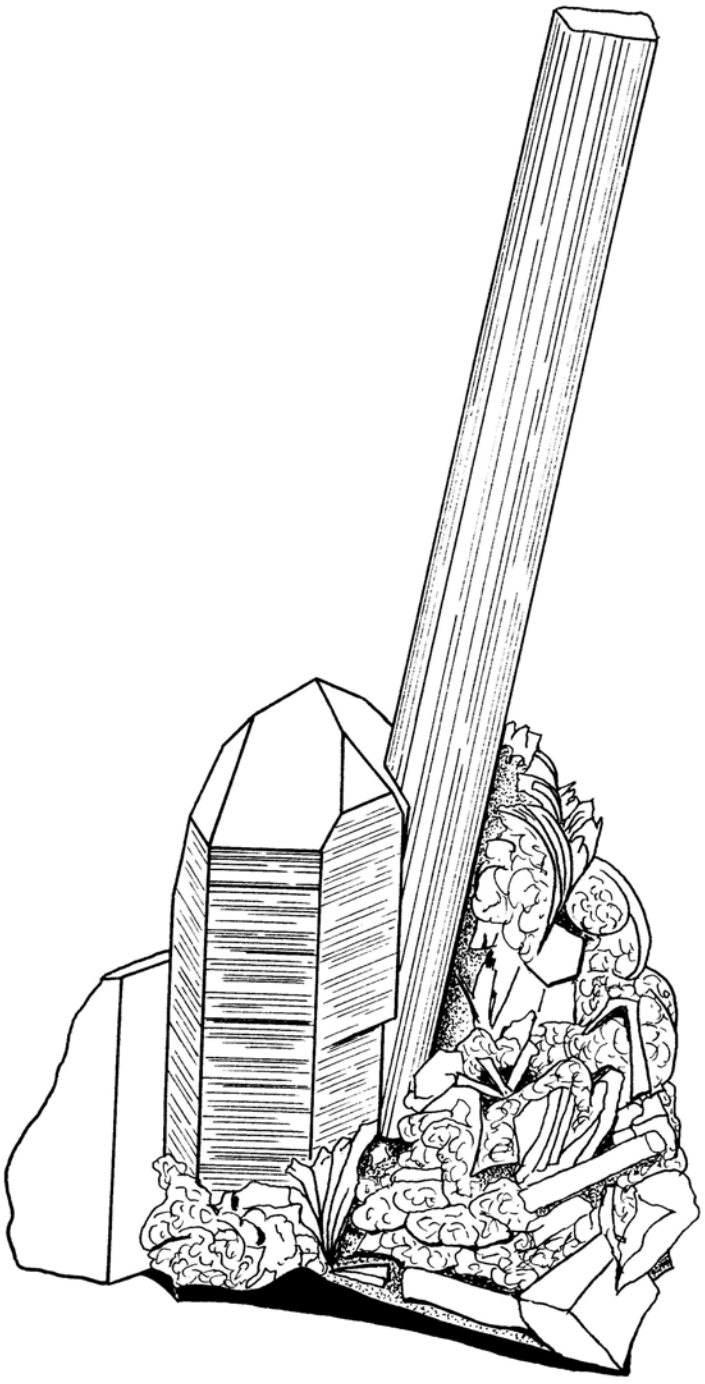




When you study the long, thin tourmaline crystals you will see straight lines the run up and down on the crystal. This part of the crystal is called the prism by mineralogists. The long, straight lines are called striations.

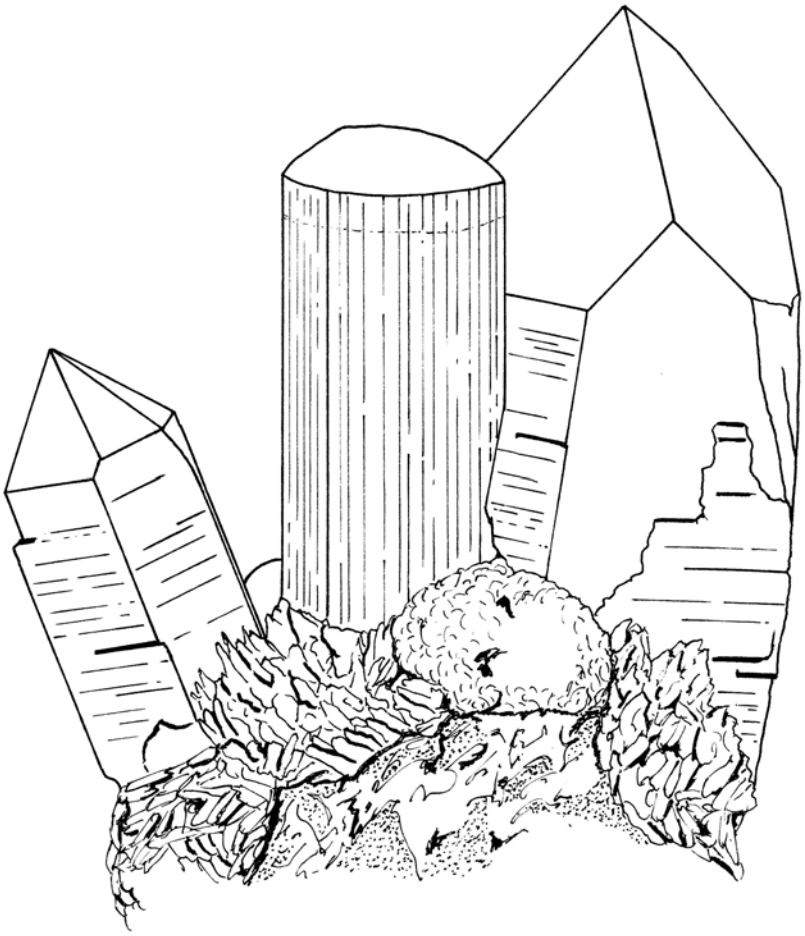
Schorl	$NaFe^{++}{}_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$
Dravite	$NaMg_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$
Elbaite	$Na(Li,Al)_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$

Tourmaline Crystals to Color



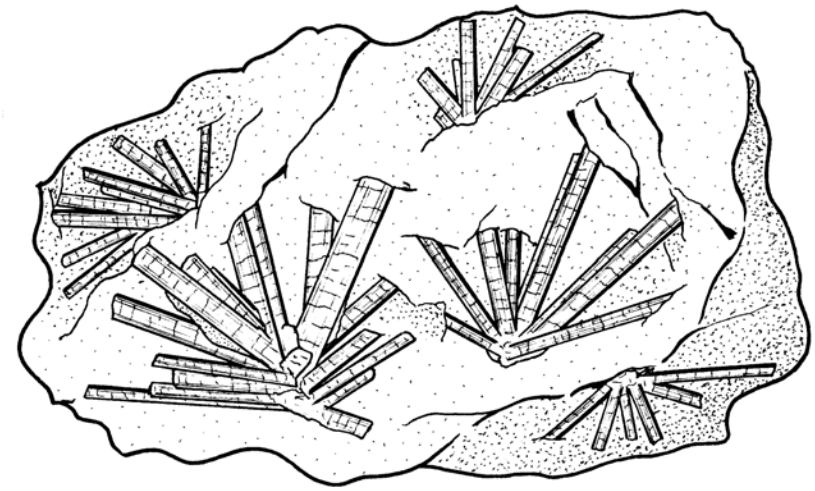
A long, green tourmaline crystal (with a red top) with gray quartz and light purple lepidolite.

Tourmaline Crystals to Color

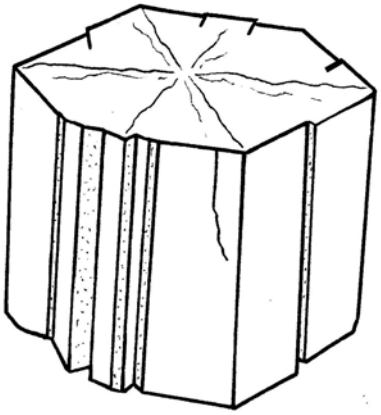


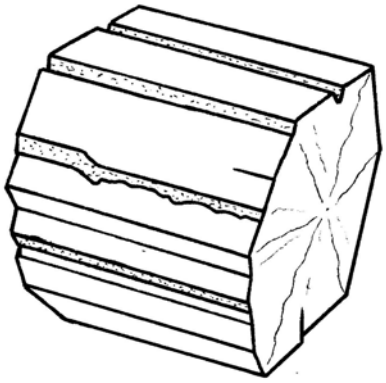
Above: The famous "Postage Stamp" tourmaline specimen. The tourmaline (in the middle) is pink and has a green top. Below it is light purple lepidolite. The two large quartz crystals on either side of the tourmaline are white. This world-famous specimen is from the Tourmaline Queen Mine, Pala, San Diego County, California.

Below: Dark pink tourmaline crystal clusters in light purple lepidolite.



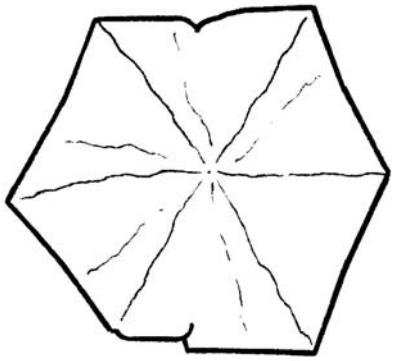
The Aragonite Group of Minerals





The aragonite group of minerals has chemical formulas that are very similar to the calcite group minerals. They all have CO_3 molecules. Each mineral species in this group has a different element in it. Look at the table below. Aragonite has calcium (Ca), witherite has barium (Ba), strontianite has strontium (Sr) and cerussite has lead (Pb).

There is another difference between the aragonite group of minerals and the calcite group: the aragonite group all crystallize in the orthorhombic crystal system (where the calcite group minerals crystallized in the hexagonal (rhombohedral) system). In addition, all of the aragonite group minerals often have three individual crystals that intergrow and form a single crystal that looks like it has six sides. In other words, they look like they crystallize in the hexagonal crystal system when, in reality, they do not.



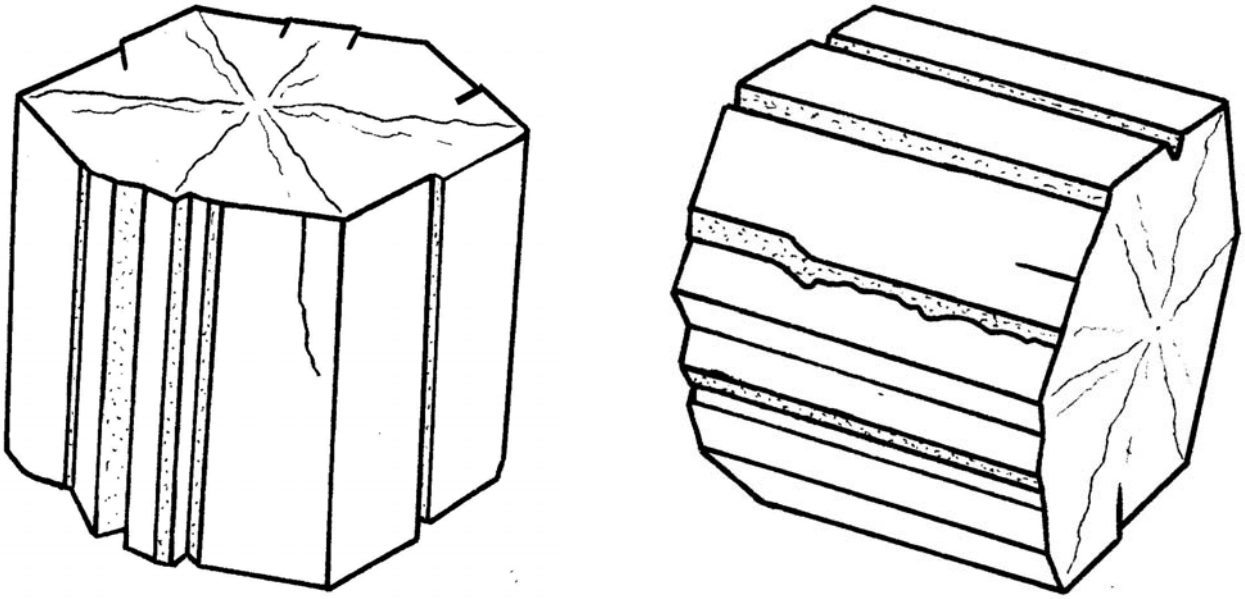
The mineral species that belong to the aragonite group are aragonite, witherite, strontianite, and cerussite.

Pictured above are two views of the same aragonite crystal. This is a very good example of how three individual crystals can grow together to form what is called a trilling. This trilling appears to have 6 sides, which is well seen in the drawing to the right.

Aragonite can be white or gray. Many of the crystals from Aragon, Spain (from where this mineral gets its name) can be white with hints of purple.

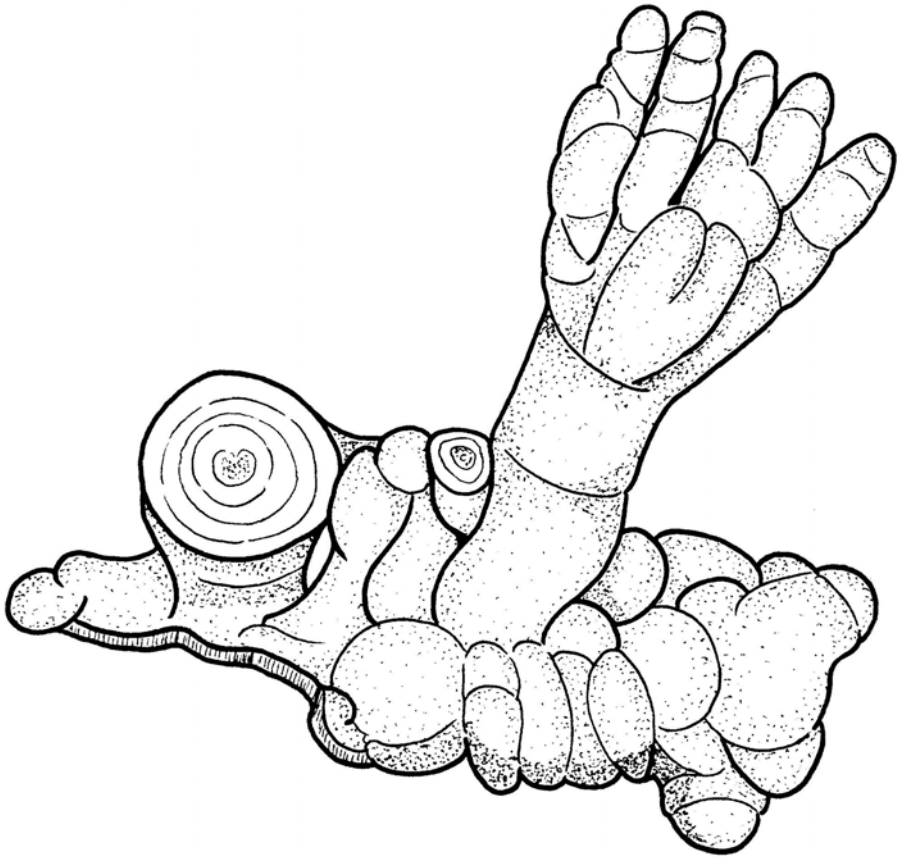
Aragonite	$CaCO_3$
Witherite	$BaCO_3$
Strontianite	$SrCO_3$
Cerussite	$PbCO_3$

Aragonite Crystals to Color



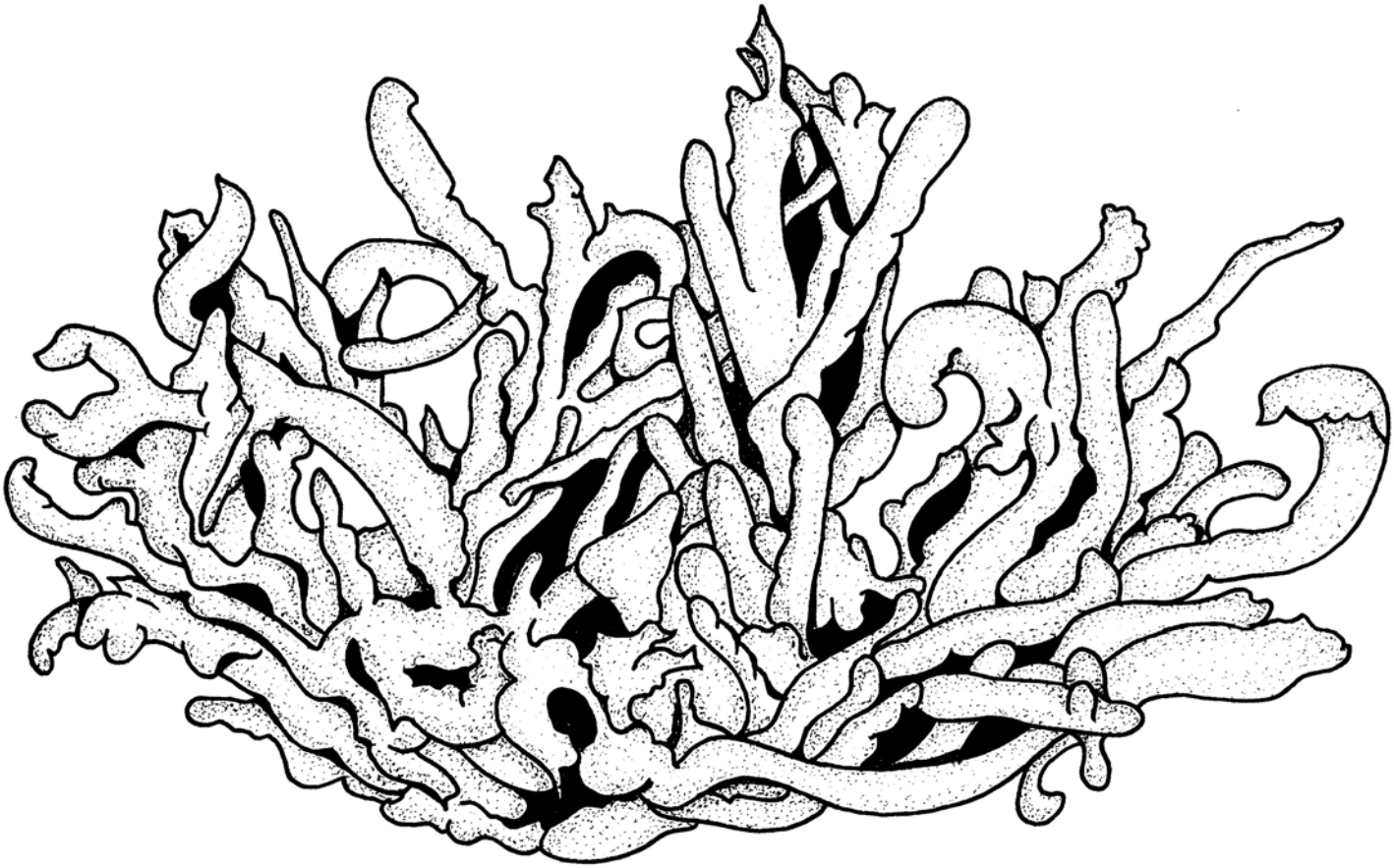
Above: Two light purple aragonite crystals from Aragon, Spain.

Below: Massive aragonite from Italy. This is a drawing of an actual specimen. Anyone who wants to collect minerals, please raise your hand! It is white...but you can color it any color you wish.



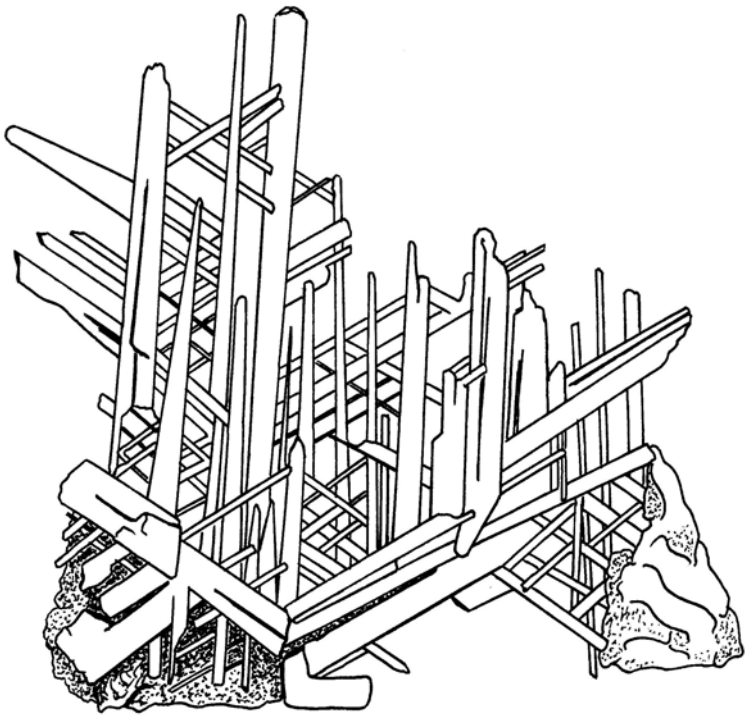
Aragonite Specimen to Draw

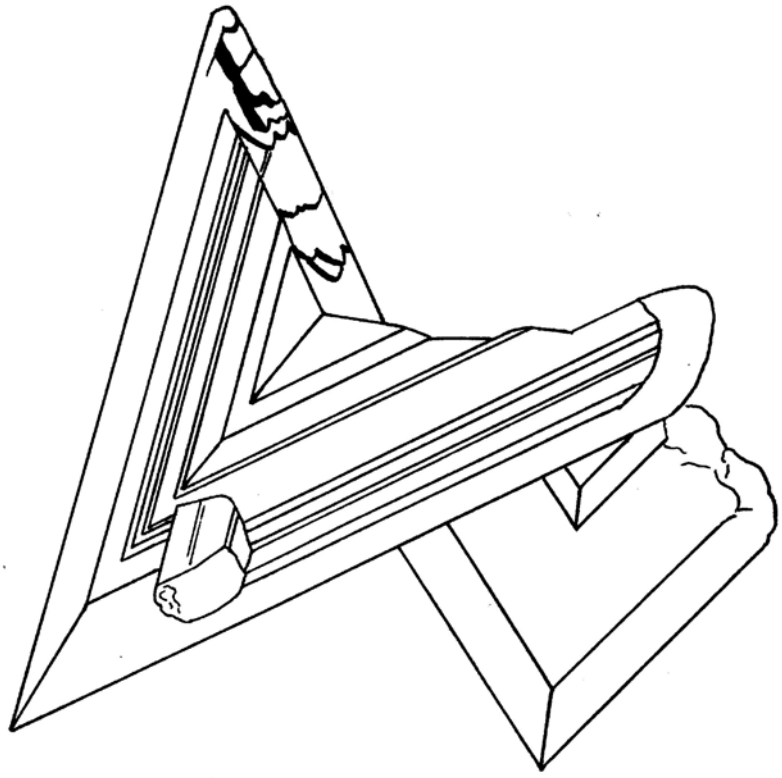
Here is another fun aragonite specimen. It is also white, so you will find it fun to try to draw your own version of this specimen. It was collected in an iron mine in Germany. The miners there call these specimens "Flos Ferri" which means "Flowers of Iron". One of the challenges to drawing a specimen like this is trying to make it look like parts of it are close to you and other parts are further away. We tried to show that by an artistic technique called shading. We did the shading using little dots. Good luck drawing your own specimen.



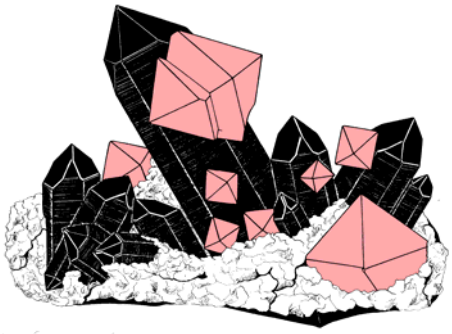
Cerussite Crystals to Draw

Here are a couple cerussite crystals. They are colorless. Instead of coloring them we challenge you to draw them!

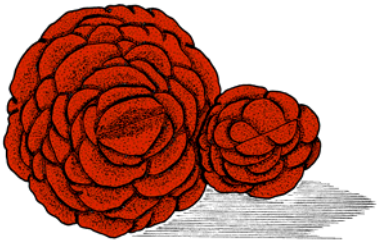


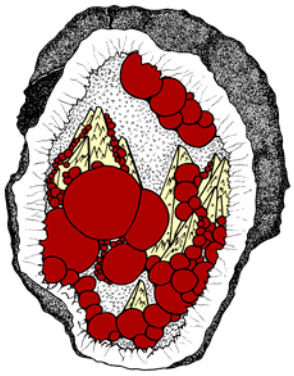


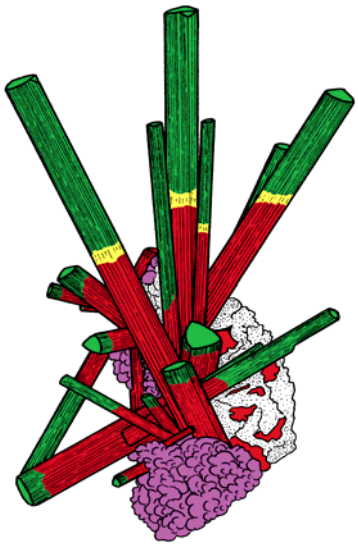
Everything I Need to Know, I Learned from Collecting Minerals



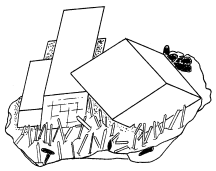
1. There are a lot of beautiful things in nature.
2. Not everything that is beautiful is perfect…there are always "dings" in things.
3. I may want to own one of everything…but I can't afford to buy everything…and that's ok.
4. It's important to look at someone else's collection and say "WOW!"
5. There are enough minerals to go around.
6. I don't know everything so I need to learn from other people who have been collecting longer than I have.
7. Life doesn't need to be boring: There's always something new to be discovered.
8. Things aren't always what they seem: a "hexagonal" crystal just might be monoclinic, a rose just might be a mineral, and a "diamond" might be a really clear quartz crystal.
9. People are different: some like quartz, some like tourmaline, some like pyrite…we don't all have to like the same thing.
10. In February, Tucson is the happiest place on earth.
11. Mineral names can teach me about people, chemistry, history, geography, colors, languages, and more.
12. If I like to collect big specimens, I will quickly run out of space.
13. A mineral collector can always find more space for more minerals.
14. Adults will encourage me if I join a mineral club.
15. Some of my best friends are mineral collectors.
16. Good things do come in small packages: Little specimens can be the most perfect.
17. Be patient: in time you will find the right specimens at the right price for your collection.
18. Be generous: Sharing specimens with other collectors helps them. And they will also help you.
19. Take good care of your things, or they will get broken (or scratched, or dinged, or cleaved, or fractured, or…)
20. The best part of collecting stuff is the really cool people you get to meet in the process of collecting.

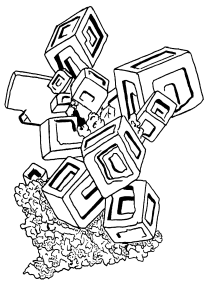






Crossword Puzzle





Across

1. Always has a blood-red streak. An iron ore.
3. Orthoclase _____.
6. No. 9 on the mineral hardness scale.
7. An ore of lead. Lead sulfide.
8. Emerald and aquamarine are varieties of this mineral.
10. Contains the element uranium.
12. Also called "fool's gold." Contains iron and sulfur.
15. A soft, yellow, metal, often found in rivers as rounded nuggets.
16. Pink to red carbonate mineral. Often forms rhombohedral crystals.

Down

2. An iron oxide mineral that is magnetic.
3. Contains the element fluorine which is used to make fluoride for your toothpaste.
4. A fibrous mineral that does not burn.
5. A copper ore that is often found in large, banded masses.
9. A copper mineral that is light to dark blue. It is often found with the similar copper mineral called malachite.
11. The mineral used to make electrical wire and water pipes.
13. Amethyst, citrine, smoky _____.
14. This mineral's chemical symbol is Ag.

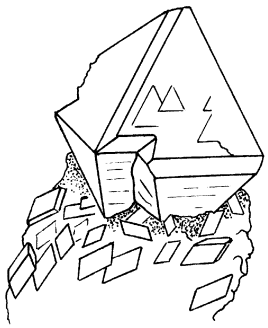
Harmful Minerals

by Darryl Powell

Did you know that there are a small number of minerals that can hurt you if you are not careful? This doesn't mean that you can't collect these minerals. It does mean that you have to know how to properly handle them and care for them. Some of these minerals can be poisonous. Others can lead to an infection. Let's take a look at these minerals.

Splinters. There are a few minerals that can crystallize in radiating groups of very fine crystals. Three examples that you will probably see at mineral shows and in the field are pectolite, some occurrences of Wollastonite, and antlerite. These minerals can have *splintery fracture.* This means that they break off into very thin and *very sharp* splinters. If you don't handle these minerals carefully, you can end up with crystal splinters in your skin. They are painful when they stick into the skin and feel like a wood splinter. Once they are poked under the skin they can be very difficult to remove. A wood splinter can be worked out with a clean needle (a doctor would *sterilize* the needle so you wouldn't get an infection). A mineral splinter, however, will break into little pieces in your skin and cannot be removed. The piece or pieces that stay under your skin can become infected. Handle these minerals very carefully, even with a thin, soft cotton glove. It is also wise to store them behind a glass or in a drawer where visitors will not try to touch them.

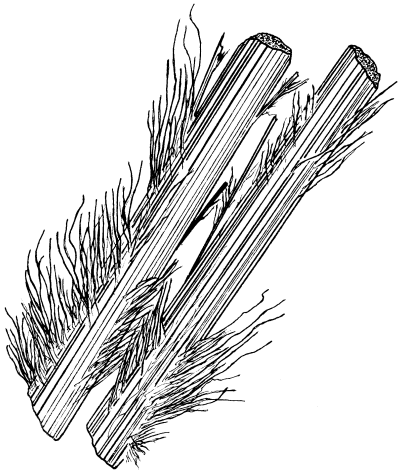
Mercury Poisoning. Mercury is an element. It is a metal. It is the only element (and only metal) that is a liquid at room temperature! It is also a mineral. Mercury is found in nature with the mercury sulfide mineral called *cinnabar* (see picture of Chinese cinnabar to the right). Because the mercury is a liquid, it will be found as small droplets on matrix. It is rare to find at mineral shows and rock shops. When it is found as a specimen, it most likely has been sprayed with acrylic to keep the droplets from falling off! It is probably best not to have a specimen with mercury. But if you ever see one (or want to own one) remember the following lessons.



Mercury is a poison. It can enter your body through the skin. It could also be on the skin and put in the mouth if you put your fingers in your mouth for any reason. Once mercury is in the body *it never leaves!* It is one of the most dangerous poisons to humans and its effects cannot be reversed and will last a lifetime. Mercury can cause damage to the brain, kidneys and lungs.

If a specimen of mercury on matrix has not been sprayed with a clear coating, it should be. Use spray acrylic or lacquer from a hardware store. Handle them with extreme care, being certain to only touch the matrix and never the mercury. Display native mercury under a glass dome or cover. The Carnegie Museum in Pittsburgh, Pennsylvania uses this approach in the display of a very fine native mercury specimen. Place the specimen on a shelf where it does not

Harmful Minerals, Continued



Asbestos. 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 to 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.

It is a good idea not to have asbestos specimens in your collection. If you do, be absolutely sure that they are stored in a sealed container (bottle or box) so that microscopic fibers cannot float around in the air and be breathed in by you and others that come to see your collection. *NEVER, NEVER, NEVER pull an asbestos specimen apart into fibers*. This will create thousands of small fibers that WILL float around in the air and WILL be breathed into your lungs. In short, handle asbestos with great care and as little as possible. Never pull it apart. Store it in a sealed container.

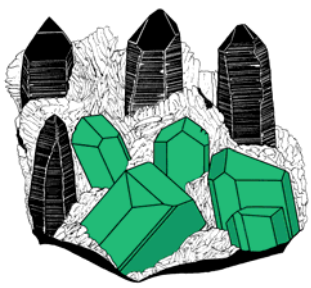
Do You have a Mineral Mentor?

Alex B. from an active mineral club in central New York taught us something cool about being a mineral collector. His mom and dad did some work and found a mentor for Alex that had a special interest, and education, in geology and minerals.

What is a "mineral mentor" you ask? A "mineral mentor" is a person older than yourself who has a lot of knowledge and experience in minerals, mineral collecting, or perhaps geology in general. Alex's mom and dad met a college student at the University of Rochester who was willing to spend time with Alex on a regular basis. She would teach him about geology and minerals, show him the University's collection and laboratories, share her collection with him, help him on digs, show him good printed materials and internet materials about minerals and mineral collecting.

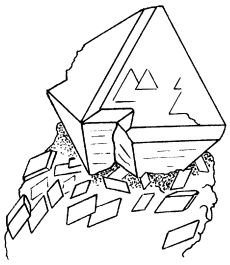
A good mentor is someone who is willing to teach, to spend quality time with someone who wants to learn, is able to meet on a regular basis (at least once a month), is creative and patient and wants to help a young collector grow in the mineral hobby. You can go to mineral shows together. Visits to mineral museums can be fun, too, because you can see high quality specimens.

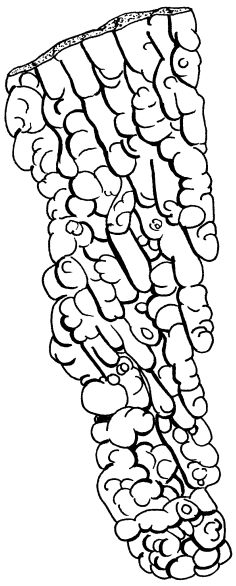
How can you find a mineral mentor? One way is to join a local mineral club or society. You can find a mineral club or society near you by visiting www.amfed.org, the official website of the American Federation of Mineralogical Societies. Once you are involved with the club and have had a chance to know the members, interview some members (with your parents help!) who would be willing to be a mentor, and then choose the person you like and trust. Another option is to visit a local college or university that has a geology program and talk with the Chairman of the Geology Department. Call ahead and make an appointment. The Chairman can recommend teachers, teaching assistants or students that would be good mentors. Before you choose someone, interview that person to make sure you will work well together.

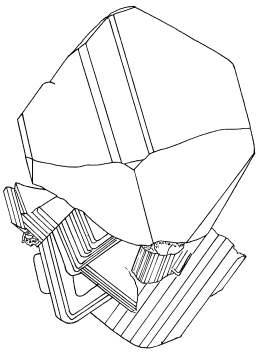


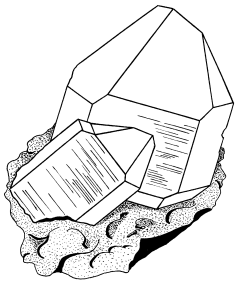
Down & Across Puzzle

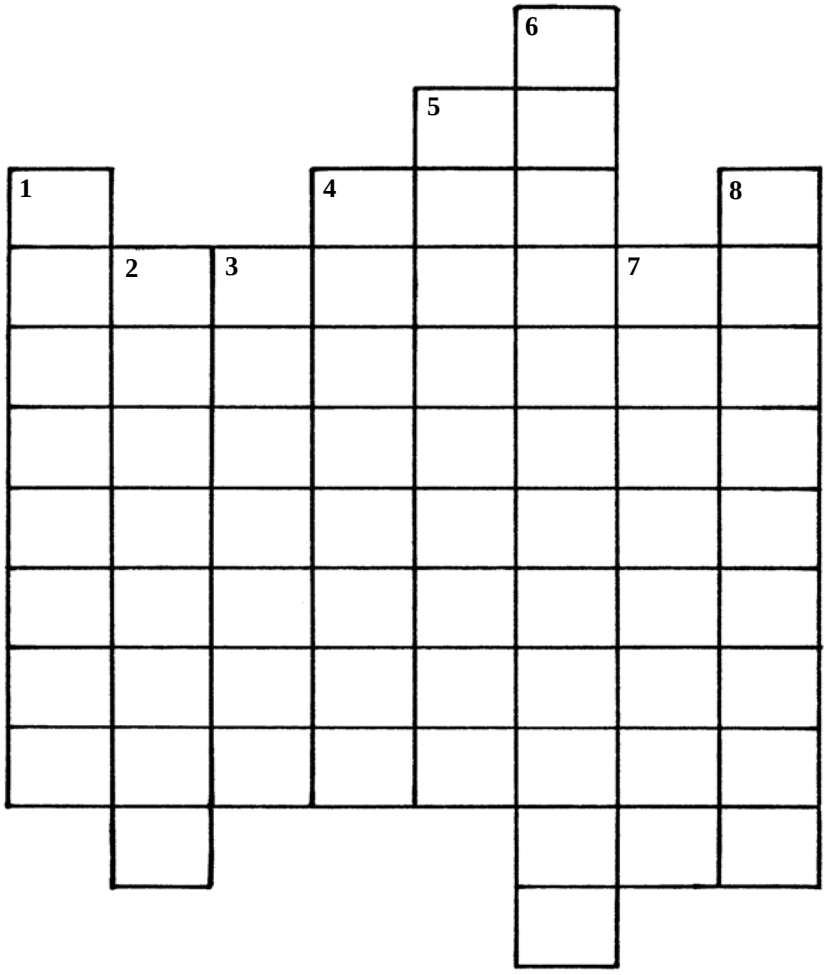
You are familiar with crossword puzzles. This is a "Down & Across" puzzle. Correctly answer the "down" questions and you will discover, in only *one* of the across sections, a familiar mineral name. Here's a hint: The "across" mineral belongs to the oxide group of minerals.











1. The name for the purple variety of quartz.
2. A group name for minerals that break into very fine fibers, like threads.
3. The hardest substance on Earth.
4. A mineral that contains the elements mercury and sulfur (it is mentioned earlier in this issue of *Mini Miners Monthly*).
5. An iron ore mineral that is magnetic.
6. The mineral named after the country of Brazil.
7. A very rare mineral that is rarely found as a native element. It is a metal, but it is not gold, silver or copper.
8. A popular mineral that occurs in red, yellow and orange crystals. The crystals can be thick and blocky or so thin that you can see through them (that is, they are transparent). This mineral contains the elements lead, molybdenum and oxygen.

The "across" mineral is _____.