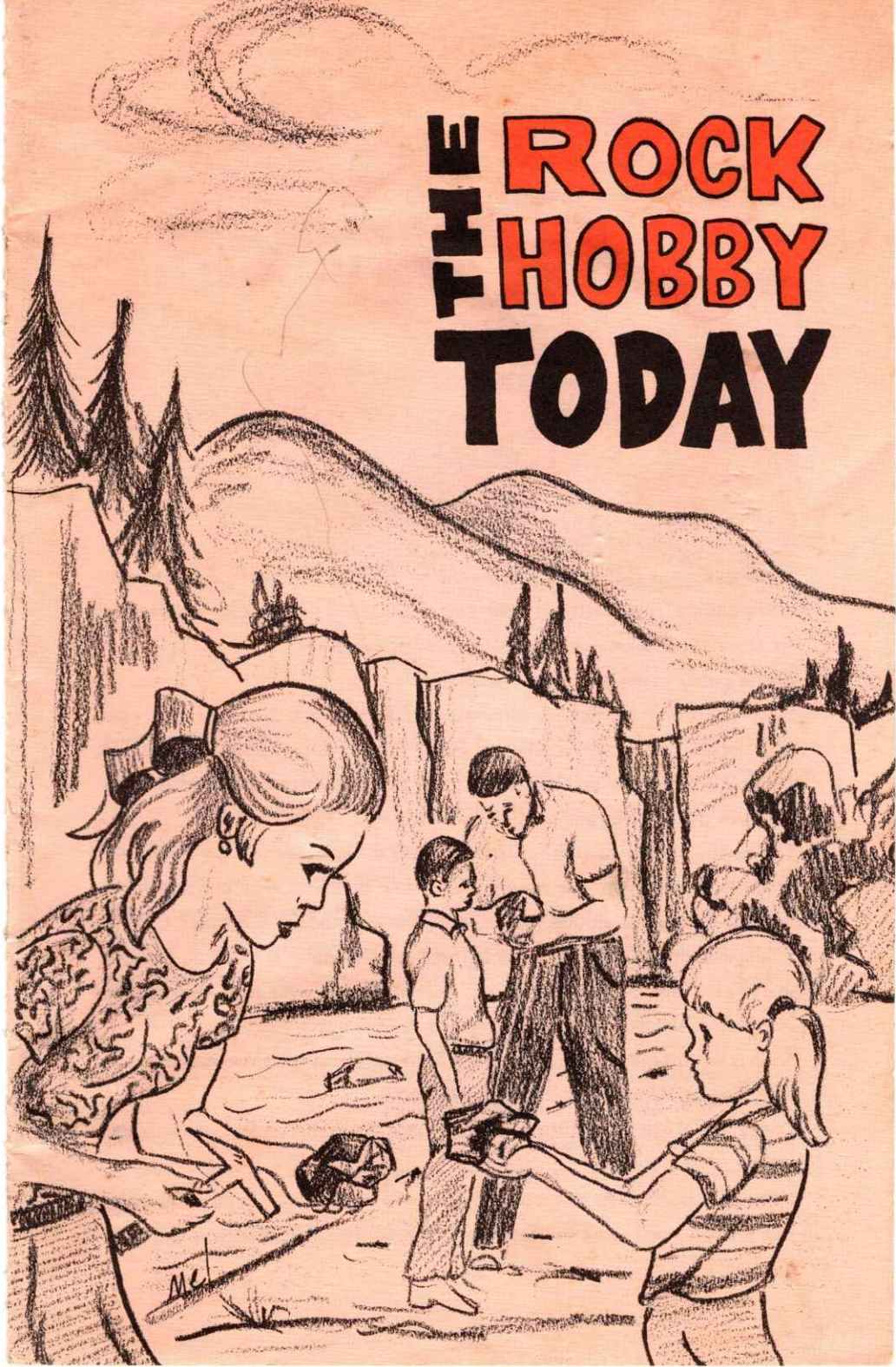
THE ROCK HOBBY TODAY



Forward

One of the most richly rewarding hobbies a family can enjoy is the collecting of Rocks and Minerals.

Surprising? Not really, because according to many sources rock hunting or "Rockhounding" now attracts well over 2,000,000 Americans. The Hobby offers fascination, education and adventure for everyone.

And it's easy to get started in the hobby.

Most collecting of Rocks, Minerals and Fossils can be done the year around. Areas where the weather is severe in the winter many still practice the hobby by cutting and polishing their last summers collection of gem materials or by studying and cataloging their finds.

The hobby touches on many fields of science. Now that our astronauts are so close to landing on the moon, the study of rocks will become most important. Geological studies may reveal how the moon was formed. Careful mineralogical studies will tell us what materials the moon is made of. Perhaps fossil remains will be found and our paleontologists who now study earth fossil remains, will be able to study remains from another world.

Todays new rockhound might be the first geologically trained astronaut to land on Mars or Venus 15 or 20 years from now.

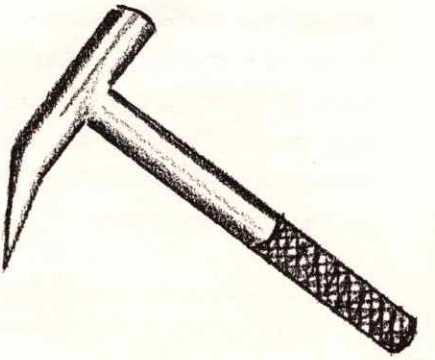
Today the Rock Hobby deals with the world around us and beneath us.. The earth itself.

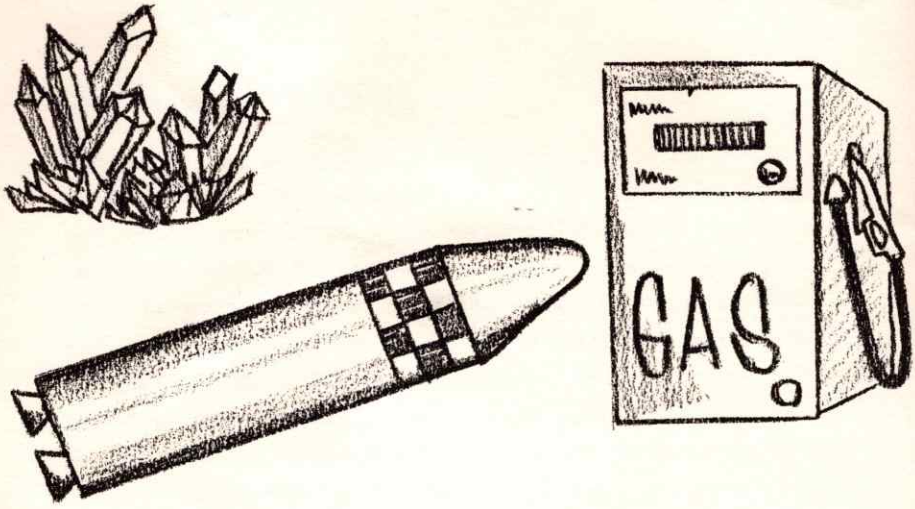
Look at a world map or globe and you will see that the continents make up but a small portion of the total surface area. Yet the small land portions

above sea level supply the world with all its metals like copper, iron, aluminum, lead, gold, silver, platinum and others. Add to that the fuels like oil, natural gas, coal and uranium and elements and compounds such as sulfur, carbon, salt, gypsum, limestone and the hundreds of other minerals that are used in our everyday lives.

The subject of "The Rock Hobby Today" is far larger than can be covered in this booklet. Only basic insights will be presented. Within the hobby lay many areas of both broad and specialized interests, from collecting and cataloging basic rock samples to facet cutting gem stones. The hobby offers any or all phases of interest in the earth sciences, from micro-sized minerals and fossils that must be studied with a microscope, to creating and casting in molten gold or silver your own jewelry pieces.

This, then, is our invitation to you to join in the Rock Hobby. Tomorrow it could lead to a career in geology for the serious student, or it could create a lifetime interest in the great outdoors for the entire family. One thing is certain.. The hobby is richly rewarding, waiting to be discovered by you.





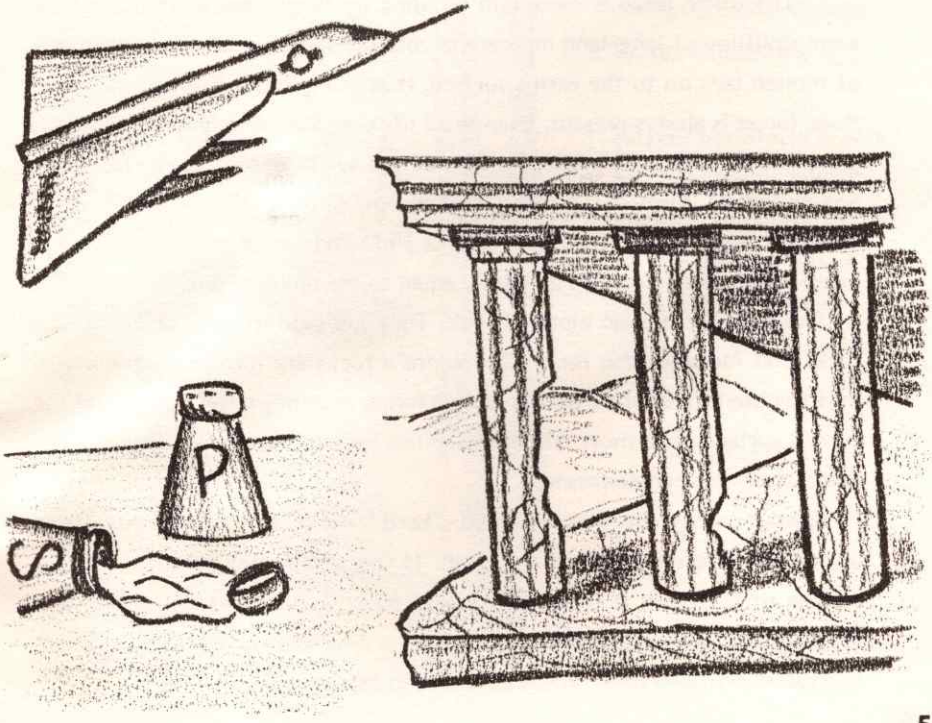
Rocks, Minerals & Metals

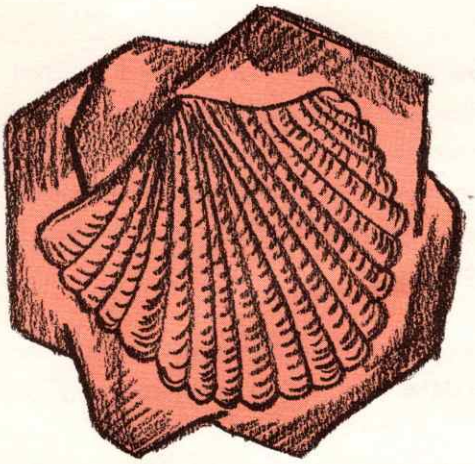
Understanding rock means understanding minerals first. There are over 1,000 minerals, but surprising enough they can be grouped into 3 categories and in many cases each group can be identified by sight. All minerals in each group are either elements or compounds (2 or 3 or more elements) and they all occur in nature. A) The first group are the metallic minerals. Some come as "Native" metals like copper, gold, silver, lead (galena), while others are compounds like iron, tin, aluminum, zinc. Many of the metallic minerals have a metallic luster. B) The second group are loosely termed "non-metallic". Such minerals as salt, asbestos, diamonds, soap-stone common quartz are "non-metallic". Many minerals from this group will appear in any collection. Basically they are important minerals required in great quantity by industry. C) The third group are called the rock-forming minerals. These are the minerals that furnish the building materials for other rocks and minerals. Mica is one, as is plagoclase feldspar and orthoclase feldspar. Mixed with many types of silicates and other basic rock forming minerals of the amphibole type, or garnet type or pyroxenes these basic materials appear as granite or gabbros and even the soil we walk on. These are the minerals that make up our mountains and deserts.

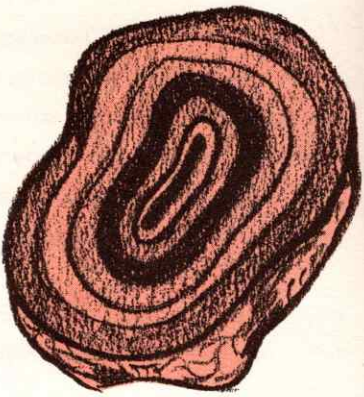
Classifying rocks and minerals goes back before recorded history. Ancient peoples knew from experience which type rock made the strongest building material. They also knew which materials yielded precious copper or gold or silver. The art of stone polishing and then stone cutting began before biblical days. Some ruby and sapphire mines in India have existed so long that there is no record of when they actually started.

So it is easy to see that rock and mineral resources are very important to our every day lives and it is extremely difficult to think of a time when they will not be important.

The Rock Hobby Today deals with not only science and resources of the earth, but history as well. The formal name of course is geology. The subject is vast so only a few points can be touched on. A short glimpse of the field of Geology is necessary, for herein lays the knowledge of the origin of the many rocks you will be collecting.







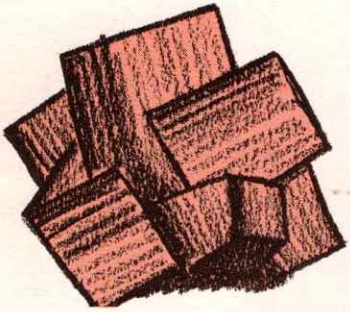
Most geologists agree that the earth and planets were originally formed of matter derived from the sun, although there are many theories as to how this was brought about.

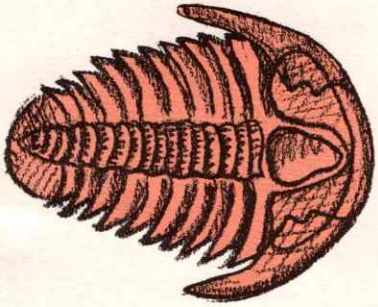
It is generally throught that the earth was formed 4 or 5 billion years ago. During the endless years two geological forces have been constantly at work. One force is erosion. The work of running water, ocean waves, wind, and glacial ice movements tear down and wear away the land.

The other force is mountain building by huge internal thrusts of the earth, uplifting of large land masses, and volcanic action, sprewing huge masses of molten lava on to the earths surface. It appears that a natural balance of these forces is always present. Even fossil life contributes to land building. The great barrier reefs and atolls throughout the warm oceans are in fact coral accumulations formed by living animals over many thousands of years. Constant wave action, earth movements and wind forces erode them and in many cases the erosion rate is exactly equal to the building rate.

There are three basic kinds of rock. They are sedimentary rocks, Igneous rocks and Metamorphic rocks. Sedimentary rocks are formed from material that has been transported by the erosive forces and they cover about ¾ of the earth's surface. The most common sedimentary rocks are sandstones, limestone, shale and conglomerates.

Igneous rocks are the so-called "hard" rocks and are formed from the molten rock deep within the earth. If the molten rock cools below the surface of the earth it is called intrusive rock. Granite and similar types of rock are intrusive rocks. If the molten rock is ejected on to the earth's surface it is called extrusive rock. Volcanic lava is an extrusive rock.





Sometimes sedimentary and igneous rocks are subjected to very heavy pressures and heat if deeply buried by later deposits of rock or earth movements. This may profoundly change the original rock composition and it becomes distorted and may even combine with other rocks to form entirely different minerals and rocks. These changed rocks are called metamorphic rocks. Some common metamorphic rocks are marble. It was originally limestone. Slate for blackboards was originally shale.

Each of the three types--Sedimentary, Igneous and Metamorphic-- is very distinctive and unique. Thus correlations from locality to locality can be made. Fossils found in certain sedimentary deposits help tremendously in correlation work. Rocks in two areas containing fossils of the same species animal or plant life are generally considered to be the same age. Geologists use the relationship of rock formations to others of known age in determining specific mineral resources. Classifying

rocks by type and then by geologic time has pinpointed many oil fields and mineral ore bodies.

Geologic History is divided into great ERAS of change. The eras are subdivided into PERIODS usually covering a long series of events. The periods are in turn divided into EPOCHS. We are now living in the RECENT EPOCH of the QUATERNARY PERIOD during the CENOZOIC ERA. Our present era began about 70 million years ago and the recent epoch, our present time span, began around 20 thousand years ago following the great ice age.

Man's time in the scheme of Geologic History is very small indeed.

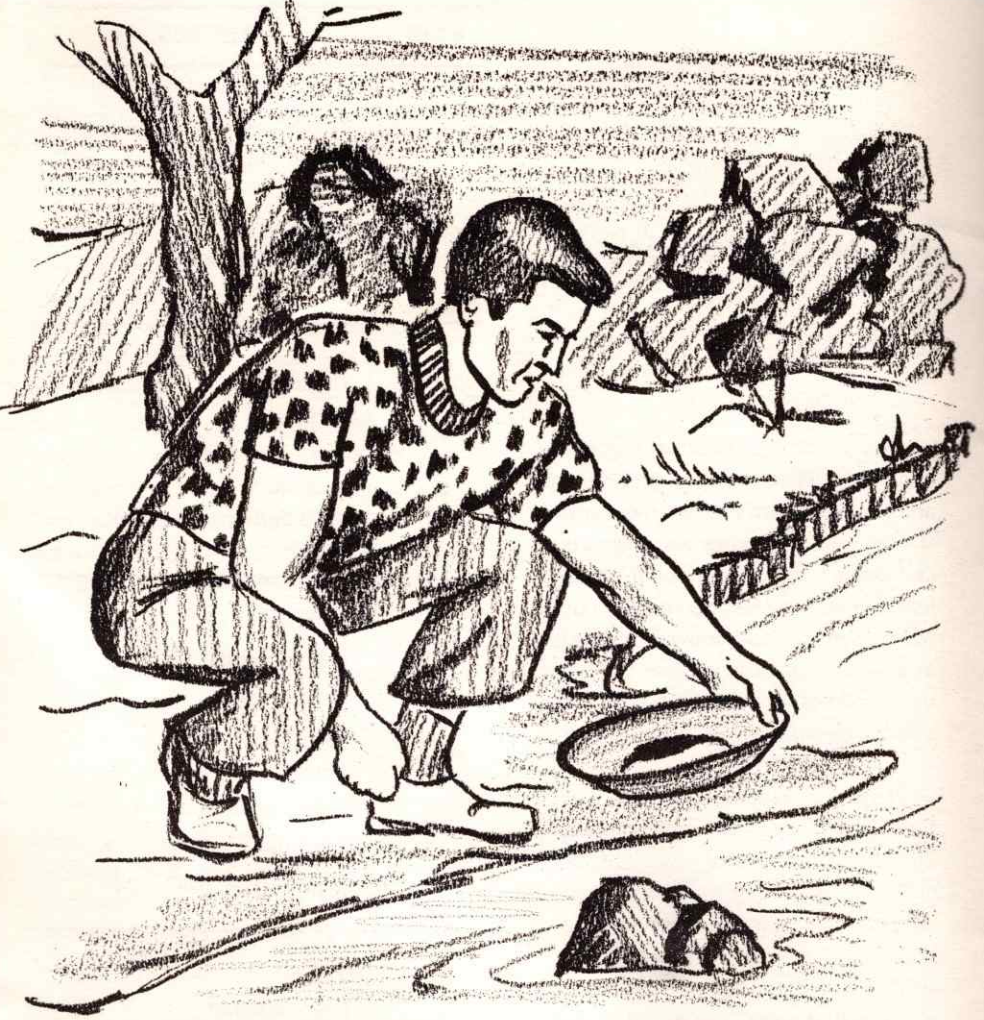
Historical Geology

The study of Historical Geology and the relationship of great Eras and Periods is perhaps the most frustrating yet satisfying ventures you can make. Since the fossil record leaves much to the imagination concerning why certain species of plants or animals suddenly became extinct, the record of all geologic occurances and happenings is also very unclear.

Historical Geology tells us that the Great Ice Age ended about 20,000 years ago, but why did it begin? A bigger question might be... Why did the many species of Dinosaur that had roamed the earth for so many million years...the animals so huge that a man can stand in one footprint...Why did the dinosaur disappear, yet, unbelievably, small rodent like mammals survived.

Of the thousands of varieties of fish in the oceans, why has the shark survived for millions of years with very little change? The study of Historical Geology, fossil study and the related geologic fields are answering these questions. In time, the true course of past events will be written history.

ERAS	PERIODS
Cenozoic	Quaternary (7 million years) Tertiary (60 million years ago)
Mesozoic	Cretaceous Jurassic Triassic (180 million years ago)
Paleozoic	Permian Pennsylvanian Mississippian Devonian Silurian Ordovician Cambrian (550 million years ago)
Proterozoic	Keeweenawan Huronian (1.2 billion years ago)
Archeozoic	Timiskaming Keewatin (4 billion years ago)

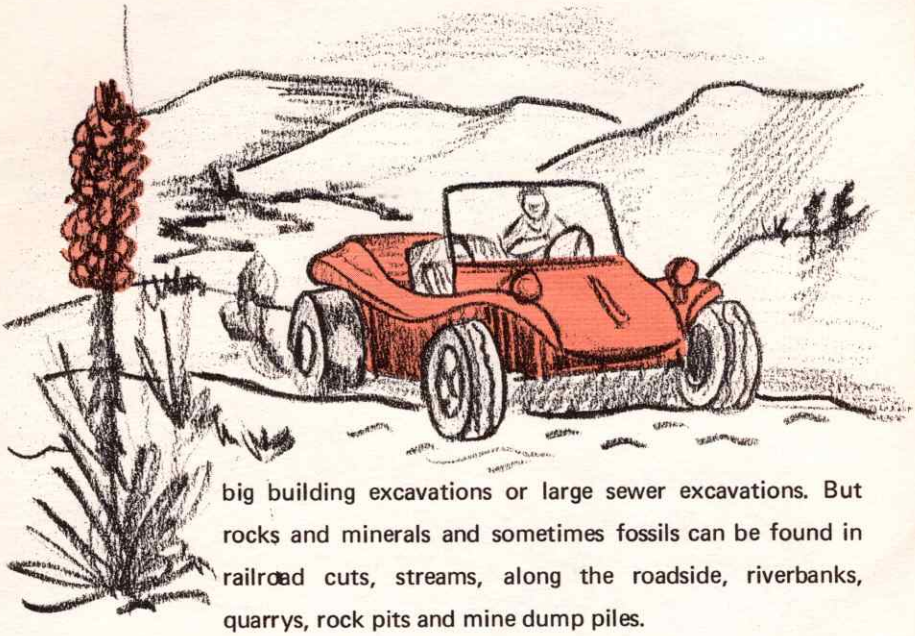


Let's Go Collecting

Some rocks and minerals, especially from other countries are only available from rock shops or lapidary shops. A good specimen could cost from 50c to several hundred dollars.

Of course you can collect many specimens in your own state. These could be swapped with fellow collectors for materials from their areas.

Where do you look for rocks and minerals? Many collectors in cities look in



big building excavations or large sewer excavations. But rocks and minerals and sometimes fossils can be found in railroad cuts, streams, along the roadside, riverbanks, quarrys, rock pits and mine dump piles.

Get several good rock and mineral reference books on your area. Many books list collecting areas for rocks, minerals and fossils. Some States publish their state maps with collecting areas marked right on the map.

Probably the best place to find out where the rocks and minerals are is at your local Rock Club. There are now over 1,000 clubs thru-out the United States and most hold monthly meetings to display new discoveries and talk about collecting areas.

Most Rock and Gem Clubs have monthly field trips to nearby collecting areas, so get to know some club members and go along on a few field trips. Some clubs specialize in semi-precious gem collecting, others in fossil collecting. Many clubs have annual Gem Shows open to the public and others have complete shops outfitted with gem cutting and polishing equipment.

You will be welcome to join a club and among your fellow members will be many collectors willing to trade and swap specimens. If there is no club in your town, band together your own group and form a new club.

The most satisfaction however comes from finding your own specimens. There is something to find in every state. Some areas are better than others, but finding the specimen is perhaps the most fascinating aspect of the Rock Hobby.

Those Fascinating Fossils

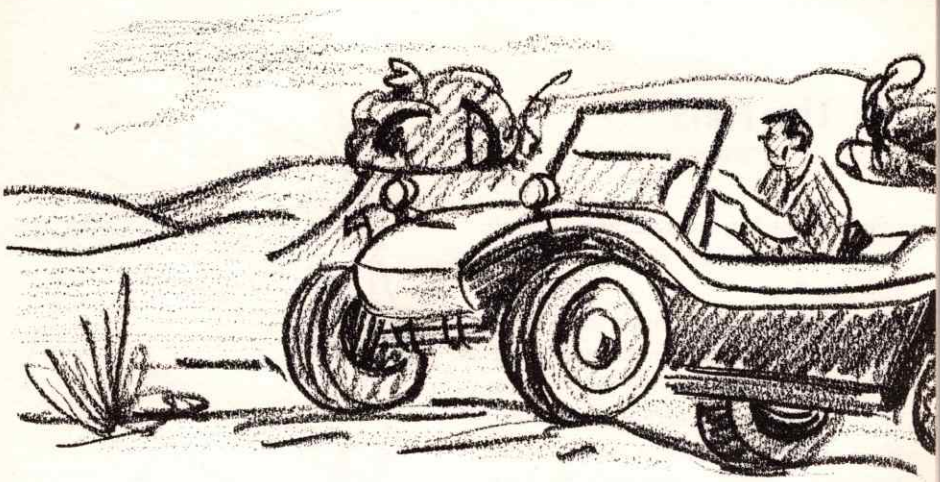
If you live where there is much sedimentary rock, you will probably find fossils. A collection of fossils is very interesting.

Fossils are ususlly "impressions" or "replacements" of the original animal or plant. An impression of a dinosaur's footprint or a piece of petrified wood might be found. Fossils show us what the extinct animals and plants were like and how they lived and where they lived.

Sharks teeth are found in South Dakota, and fossil coral has been found in Greenland. Gastropods or fossil snails have been collected from the Himalaya Mountains. Coal beds are mainly carbonized fossil remains of trees and plants that have been buried. Wouldn't it be amazing to find fossil clams on the moon? Many geologists think they will be found.

The world's most beautiful display of petrified woods is in the Petrified Forest National Park of Arizona. This 94,000 acre park was a living forest about 180-200 million years ago during the Triassic Period. As trees died and the general environment changed the trees were covered with mud and sand carried by the wind and wandering streams. Eventually petrification of the trees started and the wood cells were replaced with silica.

Today because of wind and rain erosion of the top cover the forest is again visible, but instead of living wood the trees are solid rock.



Collecting Tips

There are a few tricks to the trade of collecting rocks and fossils. One of the best is to use water to wet specimens with. Many collectors simply lick a suspect agate to look for color. Since many minerals are poisonous, a safer way is to carry a small spray bottle of water.

Another is to collect early in the morning when the day is cool and the sun is low. Walk with your back to the sun and don't load up early with specimens. Make a cache of collected specimens and pick them up at the end of the day. Are you fossil hunting? That's usually hands and knees work, so make it easy on yourself by wearing knee pads and a broad brim hat to give you plenty of shade.

One of the most abundant rocks in the field is "Leverite". If you suspect that a specimen you have found is second rate or inferior... LEAVE ER' RIGHT where it is.

When collecting in hill country watch where you put your hands. The ledge above you may hold a rattle snake getting his daily sun.

Practice good manners in the field. Don't litter an area with picnic leftovers. The next time you collect there, it may be closed by the owner because people have treated it like a dump.

Do a lot of field trimming on your specimens. Chip away unwanted material and carry home the best part of the specimen.

Remember to close gates. A rancher that has to round up his cattle from two counties will take a pretty dim view of rock collecting from then on.

Use common sense when collecting. If you find five tons of quartz crystals, could you really use them all? No--take what you can use and leave the rest for us.

In The Field

Equipment for "prospecting" is very inexpensive, so buy the best quality you can find.

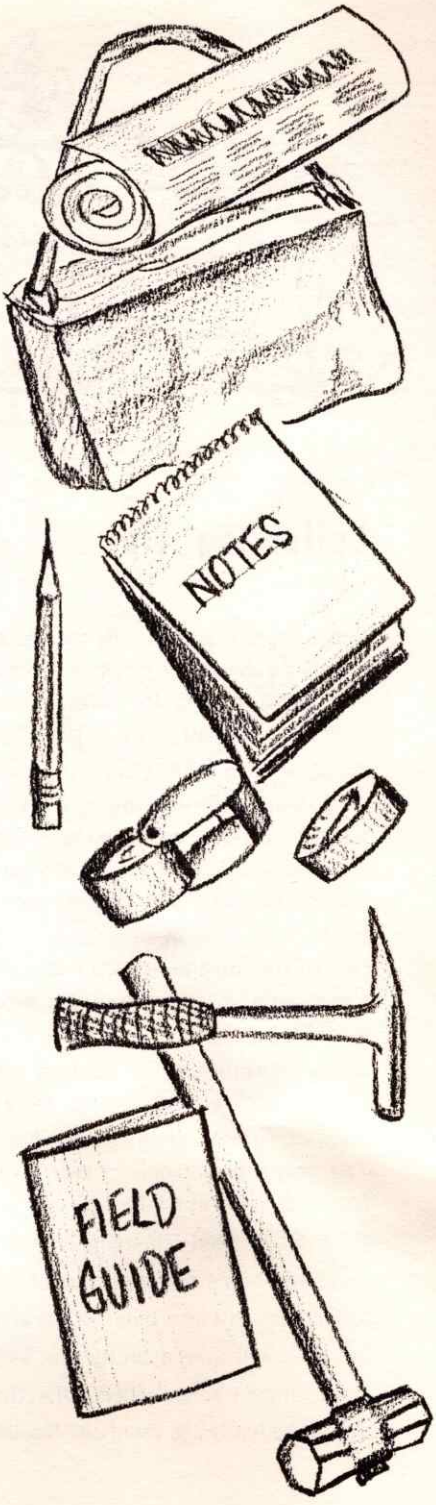
To record your finds use a small ruled notebook to mark down exact locations on all specimens. Carry along some newspaper to carefully wrap the specimens in and use a knapsack or rucksack to carry the days find in.

You will need a geologists hammer. It has a hardened pointed tip for working out small specimens from surrounding rock. An ordinary hammer will work, but the geologists pick is better. A small cold chisel is handy for chipping away waste rock around specimens.

Buy a 10 power magnifying glass. They are inexpensive and will help to identify minerals and fossils in the field. A pocket knife is handy for hardness tests and for cleaning some specimens in the field. A small sledge hammer may come in handy when collecting rock samples.

If you are in an area that has many streams a prospectors gold pan could be used to wash for "color". Chances are you would find the telltale "black sand" and if you were lucky you might wash up a few grains of gold.

A geiger counter can be added to your equipment to help you prospect for radioactive minerals. Some rocks and minerals glow under ultra violet rays. Many thousands of dollars worth of tungsten ore has been found with portable ultra violet lamps. A portable ultra violet lamp would be a welcome addition to your equipment.



Collecting areas are not always on public land and permission to enter a farm field or mining property must be obtained from the owners. Treat the private areas with respect so that the next collector behind you also is allowed to enter.

There are vast areas of public lands in the United States. Although much of this land is rapidly being sold to investors and land speculators, good collecting of rocks and minerals still exist.

Public lands should be conserved for all outdoors activities and many dedicated National and regional groups have struggled for years to keep the lands public. The public lands are a natural resource and should remain open to all. Treat the public lands like you would your own property, because it is partially yours. Enjoy the public lands today, because they may not exist tomorrow.

Remember..Public or Private..always leave a clean collecting area. Don't take more specimens than you can use and take care in collecting so remaining specimens are not broken and bruised. Practice conservation.

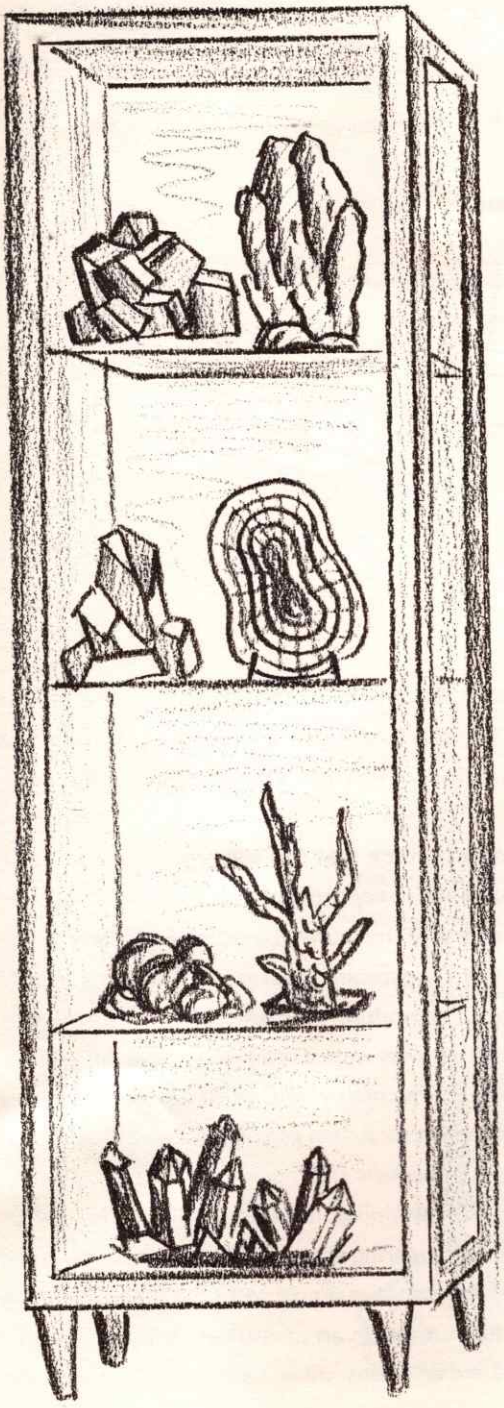
Show Off Your Collection

Clean the specimens well with warm soapy water. If a specimen is soluble in water, wash lightly with alcohol. A spray of lacquer will protect some samples from air and dirt damage. Trim the sample of all surplus matrix or unwanted portions. If the sample is hand sized, see if you can chip a flat area on the bottom so the sample will stand up in a good display position.

Now, on the back of the specimen put a small spot of white fast drying lacquer. When dry, write on the spot with a permanent black marking pen a catalog number and have this number refer to your field card. Keep the field cards in a file showing when the specimen was colletcted, the location and identification of the specimen and any other information you might want about the item.

If you have several specimens of the same material, pick one you want to display. Keep the others for trading stock. Put your collection into groups: Igneous rocks, Sedimentary rocks, Metamorphic rocks, Metallics, Semi-precious gem material, Non-metallic minerals. Fossils can be grouped according to basic types or by fossil classes.

Keep the display interesting and well lighted. Put them on a shelf or buy a standard mineral display case. You can build partitioned drawers and a cabinet for rock samples. Riker mounts with a glass top are very useful for small or precious specimens. They are also very good for small fossils.



Take pride in your collection and when you find a better specimen discard or trade the old one. Upgrade your collection until yours is the finest. Keep the collection clean and neat rotate your "show" pieces on display with the ones in storage so the display is always interesting.

As your knowledge of rocks and minerals increases, become a specialist in one or two mineral fields and concentrate on those minerals until you know them completely.

What Is It?

The first step is to buy a book describing the physical properties of the common rocks and minerals. Go to a local Rock Shop and ask for the best book to learn identification with. Or you can visit the library and bring home identification books.

There are about 4 main features of a rock that can give you its name. Probably the most important is color; is it red, brown, black yellow??? Next in line is hardness. A rock's hardness is measured by what is known as the "Mohs" scale. The scale is: 1) talc 2) gypsum 3) calcite 4) flourite 5) apatite 6) orthoclase 7) quartz 8) topaz 9) corundum 10) diamond. It is based on the fact that a mineral of a higher number can scratch a mineral of a lower number, but not be scratched by it. The next would be streak. Most minerals leave a characteristic color streak when scratched across an unglazed porcelain tile streak plate. This color is very important and many times is the key to the mineral name. The last would be determining the minerals specific gravity on a specific gravity balance (that is comparing the weight of the mineral to an equal volume of water). By conducting these simple tests and then comparing your observations to mineral descriptions in an identification book will give you the name of your find. There are many other tests also. Does it sound

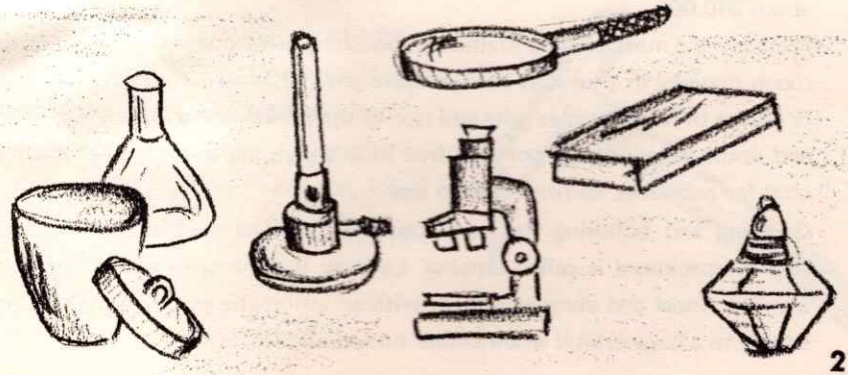
complicated? It isn't because nature is very orderly and if you observe correctly and then compare to known properties, the answer will always be the same.

Equipment for testing is low cost. Most identification books give instructions for testing. To set up a first class mineral laboratory you would need several unglazed procelain tiles for streak tests, a magnet to check magnetic properties, an alcohol lamp, charcoal block and blowpipe to test reduction and oxidation. Hardness sets are also available. They are pieces of Mohs minerals set in metal tubes and each is marked with exact hardness. A handy way to check hardness in the field is to remember this: your fingernail is about 2.5 on Mohs scale, a penny is 3, a knife blade is 5.5 and a good steel file is 6.5. Later on you can build a specific gravity balance and perhaps add a microscope.

Some chemicals are also useful in identification. The one used most is dilute hydrochloricacid to check for calcite. Calcite (Limestone) bubbles when touched with a drop of weak acid.

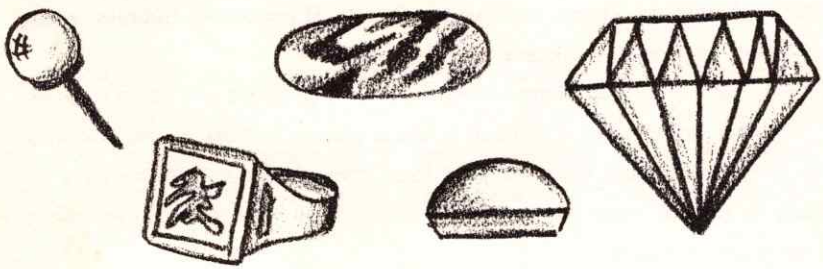
After you have identified many specimens your experience will begin to show up. You will know what a mineral is when you pick it up. If you run into some tough ones take them to your local rock dealer and let him try to identify it. If your town has a museum, study their collection of local rocks and minerals and fossils.

Most gem type material is identified by color and distinctive markings, such as bands in agate or crystal shape in garnet. Collecting gem material is doubly rewarding. Not only are most gem materials interesting in the rough, but they are beautiful when cut, sanded and polished into gleaming gems.



Working With Gems

Not many years ago lapidary work was restricted to the professional gem trade. Today thousands of devoted amateur gem cutters are making cutting and polishing gems the fastest growing facet of the hobby. Precious gems such as rubies, emeralds, sapphires and even some diamonds are available in the rough for cutting in home workshops. Semi-precious stones such as: Black Hills rose quartz, Wyoming jade, Idaho garnets, Washington petrified wood, Lake Superior agates, Beryl and tourmaline from California, Arkansas quartz, Petoskey from Michigan, Montana moss agate, Minnesota Thomsonite, Arizona turquoise, Maine Amethyst crystals and the gem material imported from all over the world give the home cutter today an unlimited choice of material to make into finished gems.

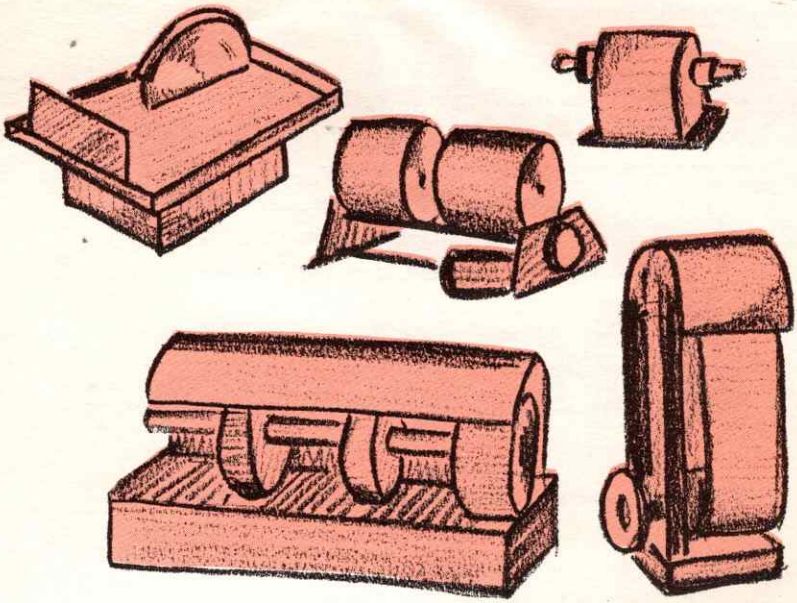


Buying equipment for your lapidary shop is like buying woodworking tools. Simple tools are available in both hobbies. There is a full price range covering low cost manual lapidary units to larger moderately priced automatic equipment.

Generally the first step in cutting any gemstone is sawing to rough size with a diamond saw. Sound expensive? A good diamond saw can be purchased for about $40.00.

Probably the most popular method of polishing gemstones is tumble polishing rough material in a tumbler with abrasive grit and water. Tumbling requires 3 or 4 steps of finer abrasive grits and two to three weeks of tumbling time. The end result is beautifully polished free form stones called broques that can be used for necklaces, earrings or bolo ties.

Grinding and polishing flat gem specimens such as bookends or large flat display specimens is called lapping. Lapping is done with a slowly rotating iron lap wheel and abrasive grit, or with an automatic vibratingmachine very similar to a large orbital wood sander turned upside down.



Small polished stones with rounded or curved surfaces are called cabochons. They are made by mounting rough sawed blanks to a dop stick with sealing wax and then grinding the stone to shape with silicon carbide grinding wheels. Silicon carbide sanding cloth on a drum sander is used to smooth the cabochon and it is polished with polishing compounds.

Many gem cutters prefer faceting gem stones..the technique used with diamonds. Although faceting a gem appears to be a hard job, many find it easier than cabochon work. Faceting is done with a diamond wheel or lap mounted on a powered spindle. The stone is mounted on the dop and presented to the rotating lap at a controlled series of angles by a faceting machine. Faceting requires patience, but the rewards in beauty are great.

Cutting gem stones..be they polished sections of petrified wood, Wyoming jade cabochons or faceted Maine amethyst.. is exciting. Making your own jewelry with standard mountings is not only satisfying, but at times highly profitable.

Welcome to the Rock Hobby Today!!--and good hunting.

Want more information about this exciting hobby? Here are some tips:

Looking for a Rock Dealer?

-Check the Yellow pages under LAPIDARY.

-Ask collectors you meet in the field for the nearest shop.

-Subscribe to one of the Gem magazines:

Gems and Minerals, Box 687, Mentone, Calif. 92359
Lapidary Journal, Box 2369, San Diego, Calif. 92112
Rocks and Minerals, Peekskill, New York 10566

Want some books?

-Check your local dealers book section.

-Visit the library and check out books on Lapidary and Geology.

Would you like to know where your nearest Rock Club is?

- Send your name and address and a stamped envelope along with 10c to:

AMERICAN GEM AND MINERAL SUPPLIERS ASSOCIATION
BOX 274
COSTA MESA, CALIFORNIA 92626

and we will send you a list of clubs in your state showing where, when and whom to contact.

Have you been to a Rock and Gem Show?

-Watch the local newspaper for show announcements. There are now about 500 shows held each year. One may be near you!