GEOLOGIST

Our knowledge of past geological ages is gained from records written in rock. The formidable mountain ranges of antiquity did not vanish into nothingness. After they had been ground down and washed down, their pulverized fragments helped build layer upon layer of sediment in the sea. The quantities of eroded debris are so vast that their total thickness, adding up all separate layers from different periods, exceeds sixty miles. Although the deep sea has been probed with modern coring instruments, no instrument in use today can haul up a sediment column hundreds or thousands of feet long. Perhaps future delving will provide the long-awaited information. But the record beyond the shelves has so far been quite inaccessible.

Geologists do not always have to drill holes into a mountain to study the sequence of events. Like the folds of a bed sheet with which they are often compared, the folds of mountains have a tendency to flop over on their sides. Layers that once were stacked on top of one another are rearranged so that they slant upward or are even lined up on edge **-** a series of stony ribbons, each of which was molded during another age. Dozens of those ribbons next to each other form a graphic picture of the geological events during periods lasting 10, 20, or 50 million years.

Interestingly enough, all records, regardless of their age, revel-almost identical developments. Immediately after a geological revolution, when the mountains are young and high, rainwater tears large pieces from their flanks. After the mountain- s are leveled, rivers carry chiefly mud and silt. There is, in the record of sedimentary rocks, an almost monotonous repetition of coarse material followed by finely ground materials.

To most ten year old boys, the study of geology will not sound too exciting. Rocks, for most boys of this age, are for throwing. But the fact is, geology can be fun. Here's another opportunity for the Webelos leader to present the subject in such a way that the boys will find it not only fun, but they'll learn a good deal, also. This is one of the badges that is oriented toward increasing the boys' awareness of the outdoors. While working on this badge, the boys will learn how the earth is formed, how rocks and minerals are used, and how a geologist works. There are two major areas in the study of geology **-** physical geology and historical geology.

PHYSICAL GEOLOGY deals with the earth's composition, its structure, and the geologic processes by which the earth's surface is, or has been changed. This includes: -

• Mineralogy - the study of minerals
• Petrology **-** the study of rocks
• Structural geology - the study of
• Geomorphology - the study of the origin of surface features
• Economic geology - the study of the earth's economic products and their commercial and industrial uses.

HISTORICAL GEOLOGY is the study of the origin of the earth and its inhabitants.

• Stratigraphy **-** the origin, composition, proper sequence and correlation of rock strata.
• Paleontology **-** the study of ancient organism and fossils.

Importance Of Rocks **-** Some of your boys may not think the study of rocks is either interesting or important. To introduce them to the subject, you can tell them of the importance of rocks and how they can determine the wealth of a nation. The kinds and quantities can determine whether the people of a nation

are poor or wealthy. The importance of rocks can easily be pointed out in four different ways.:

Food - Soil is made up of the fragments of rocks with their minerals and many other substances. Soil is a direct result of the weathering of rock of which it is composed. - Except for the products of the sea, all animals and people are directly dependent upon food grown in the soil. We, therefore see that rocks are important for life itself.

Fuel **-** Fuel comes from rocks. Coal is a rock composed of organic material. Hard coal is called anthracite, soft coal is called bituminous Oil is found in rocks such as sandstone and shall. Our economy couldn't exist as it presently does without a good supply of fuel.

Mining **-** Many metallic and non-metallic ores such are iron, copper, zinc, aluminum, lead, sulfur, borax and others really are rocklike. Without these ores, manufacturing as we know it would be impossible. We all know the importance of uranium for making electricity and creating other kinds of power that will eventually propel vehicles on land and in space.

Construction **- Think** of the tons and tons of crushed rock, gravel and sand that are used in making roads and buildings. There are the various kinds of cut stone sued for building blocks and monuments, and the materials used in the building of your home and the many things that are in it.

Let's Go Rock Collecting

Wear the type of clothes you would wear hiking or hunting. Old clothes that are comfortable and serviceable are best. Ankle high hiking shoes will help prevent bruises from contact with sharp stones. A knapsack type of collecting bag is ideal. Use one with pockets to hold maps, notebooks, small tools, and labels. Use lunch size brown paper bags or plastic sandwich bags to hold specimens. Take along newspaper to wrap the rocks in first. As you collect each specimens, give it a number P put the number on the rock before you wrap it up. In a small notebook, list the number, location, and the date. Later at home you can enter the information in your permanent records.

Almost every boy, at one time or another, has a rock collection of some sort. This interest in rocks and the earth from which they come makes the Geologist activity pin a "natural" for most boys. You'll find that the Webelos Scout handbook contains enough information on volcanoes, geysers, and mountains for the boys to acquire a fairly good understanding.

The chart below should be of some advantage in identifying rocks

HARDNESS MINERAL SCRATCH TEST USES, IMPORTANCE, ETC.

1. TALC - Easily with fingernail. The softest of minerals; has a slippery, soapy feel. Used in powdered form for manufacture of paint, paper roofing material. rubber, face powder and talcum powder. Small parts fired in furnace used in electrical appliances. Occurs must abundantly in metamorphic rocks.
2. GYPSUM - Barely with fingernail. Of considerable commercial importance because of its use in production of plaster of Paris. Used for gypsum lath, wallboard and interior plaster. "Alabaster" is fine-grained, massive variety of gypsum that is cut and polished for ornamental purposes. Most commonly found as a sedimentary rock.
3. CALCITE -Barely with copper penny. Calcite has more varieties than any other mineral except quartz. One type of clear, colorless calcite is used for optical prisms because of its power of dividing a ray of light passing through it into two separate rays. Limestone and marble are varieties to calcite. Limestone is used in the manufacture of cement and mortar, also used as a building

stone.
4. FLUORITE - Easily with knife blade. Fluorite is one of the most beautiful minerals occurring in many different colors. The chief use is in making steel. It also is used in making opalescent glass, in enameling cooking utensils, and in making hydrofluoric acid. Small amounts are used in making prisms and lenses. The phenomenon of fluorescence was first observed in fluorite and takes its name from this mineral. Commonly found with metallic ore minerals.
5. APATITE -Barely with knife blade. Among the large group of phosphates, apatite is the only one considered a common mineral. Commercially, its greatest use is the source of phosphorus for most commercial fertilizers. After being mined, both apathy and rock phosphate are treated with sulfuric acid to make superphosphate, for in this form they are much more soluble in the diluted acid of the soil.
6. FELDSPAN - Not by blade. Easily with window glass. The feldspars, all of them silicates of aluminum with potassium, sodium, and calcium and rarely barium, form one of the most important groups of all minerals. Found in most igneous rocks, as essential constituents of lost crystalline rocks, such as granite syenite, gabbro, basalt, gneiss and thus make up a large percentage of the earth's crust. Used in manufacture of porcelain and as a source of aluminum in glass.
7. QUARTZ - Easily marks steel and hard glass. Quartz is the most common mineral, and in some of its varieties, one of the most beautiful. Makes up most of the sand on the seashore; occurs as a rock in the form of sandstone and quartzite and is an important constituent of other rocks such as granite and gneiss. Some varieties used as gemstones, as prisms, and cut into plates for control of radio frequency. Varieties; crystal, amethyst, agate, onyx, bloodstone, jasper, flint.
8. TOPAZ - Harder than other common minerals. Topaz is highly prized as a gem. Those from Brazil are the most valuable. The pink color of some gem Topaz is obtained by gently heating the dark yellow stones. It has a mineral hardness greater than any other common mineral except corundum.
9. CORUNDUM - Scratches Topaz. Clear blue varieties make "sapphire" and clear red the "Ruby." Hardest mineral next to diamond. Long been used as an abrasive. "Emery" was the first type used in this manner. The ruby is used in the laser beam.
10. DIAMOND - Scratches Corundum; hardest mineral. Hardness of diamond is greater than any other known substance, natural or artificial. Many times harder than corundum. Diamond is pure carbon and has same composition as charcoal, but does not burn readily. Highly prized as gemstone. Only 20% of diamonds are gemstones ..the other flawed stones have industrial uses, drills, saws, cutting glass, etc.
Identifying Rocks By Luster (appearance of the surface, independent of the color, due to the way light is reflected)
Metallic: The luster of a metallic surface like steel, tin, lead, copper, gold, etc. Luster not called metallic unless the mineral is quite opaque, so that no light passes through even very thin edges.
Sub metallic~. The luster of some minerals is said to be sub metallic when it lacks the full luster of the metals.
Adamantine: The luster of the Diamond - the brilliant, almost oily luster shown by some very hard minerals, like Diamond and Corundum - refract light

strongly (have a high “refractive index”).
Vitreous: Glassy luster. That of a piece of broken glass - this is the luster of most quartz and a large part of the non-metallic minerals.
Resinous: Waxy, the luster of a piece of resin, as shown by most kinds of sphalern.
Greasy: Nearly resinous, but often quite distinct, shown by some specimens of milky quartz and nepheline.
Pearly: Luster of Mother of Pearl - common when a mineral has very perfect cleavage and has practically separated into thin plates.
Silky: The luster of a skein of silk or a piece of satin - characteristic of some minerals in fibrous aggregates, such as Satin Spar gypsum and most asbestos.
Some common examples of three main types of rocks are:
Igneous - Granite pegmatite, granite, diorite, gabbro, felsite, basalt, obsidian, pumice
Metamorphic - Slate, phyllite, mica schist, gneiss, marble, quartzite
Sedimentary - Mudstone, and shale, sandstone, conglomerate, gypsum, rock salt, limestone, chalk, coal