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SOME HAWAIIAN ROCKS AND MINERALS, AND HOW TO SPOT THEM

By Frances M. Lowry

Semantically the hobbies of birds and rocks are both stepchildren. A person who raises birds may be an aviculturist; if he is interested in everything that flies, he is a naturalist; but one who just likes to look for birds, or perhaps has a feeder in the yard is undignified by the term "bird watcher." So too with the person who collects stones. If he cuts, polishes, and mounts gems, he is a lapidarist; if he is interested in rocks in masses, he is a geologist; but if he just wishes to collect pretty or interesting stones, and perhaps polish a few, he is a lowly "rock hound."

The two hobbies have another similarity. Both - if one wishes to branch out beyond what can be found in the back yard - require reasonably stout legs, fairly sharp eyesight, an inquiring mind, and an interest in nature.

This article makes no pretense of being either scholarly or comprehensive; those who wish to dig deeper (no pun intended) should consult the Library of Hawaii for books on geology, mineralogy, or lapidary. Instead we shall try to give you a sort of simplified "Field Guide to the Rocks" - what to look for, likely locations for finding stones or minerals, and how to recognize them, or discover their identities.

While the Hawaiian Islands are not the best place in the world for rock hunting, they are not the worst either. For land so geologically new, there are a surprising number of different things to be found.

This might be a good place to mention that no exhaustive geological survey has ever been made of the Islands. It is the earnest desire of Mr. E. H. Bryan, Jr. of the Bishop Museum, that a project be undertaken to thoroughly catalog all the Island's rocks and minerals, and bring together all the information in some central reference source. The Museum has on display the A. H. Cornelison collection of minerals and semi-precious stones, all of which are from Oahu and Molokai. He also has three or four pamphlets and articles, which are the sum total of material on the subject. Any additions to either the collection, or the printed matter would be doing Mr. Bryan, the Museum, and the amateur geologist a great service.

In the list of rocks and minerals which follows, these properties are given to aid in identification:

Color: in metallic ores, color is a fairly safe clue; however, there are relatively few metallic ores present in Island geology. In most other cases, color is usually due to impurities, and varies greatly from specimen to specimen, or locality to locality. So use this guide cautiously, and then only from a freshly broken surface.

Luster: This depends upon light absorption, reflection, or refraction. Most of the terms are self-explanatory, such as adamantine (brilliant, like a diamond), vitreous

(glassy), silky, pearly, etc.

Streak: this test consists of rubbing a mineral upon a piece of white unglazed tile and noting its color.

Cleavage: the way some minerals split along certain planes.

Fracture: the breakage of a specimen other than along cleavage planes. These may be conchoidal (shell-like), uneven, earthy, etc.

Hardness: this method of identification is based upon Moh's scale giving talc, the softest mineral, a value of 1 - to diamond, the hardest, 10. A simple field guide to hardness uses the fingernail, 2.5; copper penny, 3; knife blade or window glass, 5.5; steel file, 6.5. Be sure there is a definite scratch, and do it somewhere other than on the best face of your specimen.

Specific Gravity: this is not exactly a field guide, but requires only a scale of the balance type and a bowl of water. Be sure your specimen is free of dirt which will fall off when immersed; weigh it dry, and suspended in water. The loss of weight in water, divided into the dry weight gives the SG.

If these clues do not serve to identify your find, you might take it to the Museum and compare it with the specimens displayed, or bring it to the Hui Pohaku O'Hawaii, which meets at the Ala Moana Park pavilion each fourth Monday (except December) at 7:30 PM. Some member is pretty sure to be able to identify it for you, and you will be welcomed as a guest, or even a prospective member (the dues are nominal).

As for where and how to collect rocks - the best places are dry stream beds, preferably near the bottom of the mountain. This does not mean you will find nothing of value farther downstream; the main difficulty here is that the farther it has been carried, the more worn it is likely to be, therefore the more difficult to recognize, and the less likely to be without chips and flaws. Washed-out banks of streams are occasionally productive. Better still are the walls of quarries (be sure to get permission to enter), or new road cuts. Your equipment may be of the simplest. Lacking a geologist's hammer, a carpenter's hammer and a cold chisel will usually serve to remove a hand specimen from a large mass of rock. A bag in which to carry your loot, a few pieces of paper which can double for wrapping fragile specimens and notes as to where they were found, the aforementioned sturdy legs and bright eyes, and you're in business.

ANDESITE: a variety of feldspar, also called Hawaiian Topaz. Hardness 6, SG 2.57. Color almost clear to pale yellow. Luster vitreous to pearly. Cleaves in one plane. Has been found in Waianae and Koolaus.

APATITE: crystals of six sided prisms. Hardness 5, SG 3.2. Color white, green or brown. Vitreous. Small crystals transparent, large ones opaque. Imperfect cleavage, conchoidal fracture, white streak.

ARAGONITE: (Pele's Pearls) resemble lizard eggs in their natural state. Hardness 3.5 to 4, SG 2.9. Color honey, caramel, pale green. No cleavage. Effervesces freely when touched with cold dilute hydrochloric acid. Occurs in gas holes in lava.

CALCITE: often forms a white surface covering weathered lava. Hardness 3, SG 2.72. White or colorless when pure, may become pink, yellow or brown with the addition of impurities. Transparent to opaque. White or gray streak. Bubbles when tested with cold dilute HCL.

CHALCEDONY: a crypto-crystalline variety of quartz (crystals discernable only under a microscope). Hardness about 7, SG 2.62 to 2.64. Called Hawaiian Moonstone. Color may range from almost clear through milky to light yellow. All stones appear

orange when held to a strong light - such as a small hole in a piece of cardboard in front of a light bulb. In this same class are also:

CARNELIAN: a pleasing red color.

AGATE: milky white, semi-transparent. (Varieties from other countries are often banded with shades of brown.)

JASPER: opaque, dark red or red mottled with black, occasionally yellow. Found in both the Waianae and Koolaus.

CORAL: (ancient, or "petrified"). Coral that has become dense with age and pressure. We have no authentic hardness or SG figures for this, but it should be fairly obvious to the naked eye. It will react to HCL, being a calcium derivative.

GYPSUM: a form of calcium sulphate. Hardness 1.5 to 2, luster glassy, pearly, or dull. Color ranges from white to buff or even pink. It commonly occurs as clear, rather complex crystals with at least one good line of cleavage. In this form it is known as SELENITE. An interesting type which occurs in the Island is known as a "Desert Rose," wherein the crystals are so joined as to look somewhat like a full blown rose. One spot where these may be found is in the loamy bank of Mailiilii Stream, near Lualualei Road.

HEMATITE: is a ferrous oxide. Hardness about 6, SG 5. It is commonly non-crystalline and may be either massive (non-granular) or granular. Its heaviness, dark brick red color and red streak are usually sufficient to identify it.

LIMONITE: also one of the iron oxides. Usually brown or yellow, often found in concretions (a roughly oval mass with concentric layers, usually in sandstone). Its yellow test streak distinguishes it from the other ferrous oxides.

MAGNETITE: the other of the three iron ores. Its hardness is 5.5 to 6.5, its SG 5.18. Sometimes crystals are observable. Fractures unevenly, black streak. It attracts magnets, or sometimes is magnetized and so will attract small nails, in which case it is often called "lodestone."

OBSIDIAN: is volcanic glass. Also called basaltic glass or tachylite. Hardness 5 to 5.5, SG ranges from 2.3 to 2.7. Black, has a resinous luster, very brittle. Conchoidal fracture. Thin sections, as on the edge, are dark brown. Pele's Hair is a form of obsidian, being drops stretched into threads when blown by the wind.

OLIVINE: also called peridot, chrysolite, or, around Kilauea, Pele's Diamonds. Occurs in lavas on all the Islands, but notably at Kilauea and Mauna Loa. Color bottle green to purplish green, hardness 7, luster glassy. They are very distinctive and easy to identify. Unfortunately one seldom finds any that are very large.

PYRITE: "Fool's Gold" is a compound of iron and sulfur. Generally forms cubic or eight sided crystals whose faces are smooth or crossed by fine straight parallel lines. Hardness 6 to 6.5, SG 5. Opaque, brassy yellow in color, metallic luster, greenish black streak. Uneven or conchoidal fracture.

QUARTZ: silica and oxygen. Comes in many forms and colors. Transparent to translucent, hardness 7. No cleavage, usually conchoidal fracture. Colorless when pure, impurities stain it rose, brown, violet, and many other hues. The crystals are prismatic with pyramids at one or both ends, but it may appear in massive or granular form. ROCK CRYSTAL (also called Hawaiian Diamond) is one form.

OPAL: is another form of quartz which contains water. It has a waxy luster, and is never crystalline. Hawaiian Opal (hyaline opal) runs from green to white to coffee

color. It lacks the inclusions which give gem opals their colorful fire, although a suggestion has been made that soaking Hawaiian opals in glycerine for six months or so may improve their color and durability, as in their natural state all opals fracture easily. Have been found near the top of the Pali.

All of the rocks and minerals known to exist in Hawaii are not covered in the foregoing list, some of them being pretty obscure, and not very aesthetic. Therefore, if you should find something that looks interesting, which does not match any description given here, do not throw it away as worthless; bring it to the Rock Hound Club for identification. Who knows, you may have discovered something new under the Hawaiian sun.

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Editor's Note: The above article by Mrs. Lowry brings us sidelights upon another outdoor activity on Oahu. We appreciate the cooperation of our fellow naturalists.

FIELD NOTES:

Field Trip, October 26, 1958.

Our bird trip on Sunday, October 26, was different than we had originally planned. We had received reports from two sources of Bristle-thighed Curlew at Kahuku and a Snow Goose at Haleiwa, so we decided to investigate. It was a beautiful day after a few days of rain and our spirits were high. The group was made up of 10 adults and 1 child.

Our first stop was at Haleiwa Pond where we saw 4 Gallinule, 2 Coots, 1 Night Heron and 2 unidentified ducks. We were about ready to leave when someone spotted the Snow Goose. We all enjoyed a good look at this rare immature visitor.

We then proceeded to Kahuku to see what we could find there. There was a lot of water and many varieties of shorebirds and ducks. Among those seen were Gray-backed Tern, Golden Plover (including one albino), Ruddy Turnstone, Sanderling, Stilt, 1 Snowy Plover (Rare), 1 Semipalmated Plover, 1 Western Sandpiper (Rare), Coots, Pintails, Shovellers and Baldpates.

Although we were unable to find the Curlew either at the dunes by the mill or by the airstrip we felt that the day was really a wonderful success.

Chuck Hanson

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Field Trip, November 9, 1958 - A REPREHENSIBLE TREND

On Sunday morning, November 9, ten members and guests met at the Library to begin our trip for the day to Puuloa Rifle Range. Rex Elliot, the photographer, met us at the gate thus making our group eleven.

Just inside the gate we stopped and were rewarded with an excellent view of three Skylarks. We were also able to hear snatches of the song as they flew.

We then proceeded to the area of the ponds and received a shock that ruined our day. In a place that had been grown over with brush and Keawe trees we were met with the horrible sight of bare land. In a place where last year we had seen Stilts, many

kinds of shorebirds, different species of ducks and even a White-fronted Goose, we were able only to see 3 Stilt some distance away, 1 Wandering Tattler and two Golden Plover, both of which had broken wings. We were able to catch one and discovered fresh blood from a wound on its wing. (We placed this bird in the zoo later in the day.)

It seems to me that someone has to go on record against the type of thing that is going on over there. Are we going to stand idly by and let every one of our possible bird sanctuaries slip from our grasp? I for one am willing to do my part in telling responsible people of how I feel. How about you?

We later stopped at West Loch and found that the Mangrove has grown quickly and has almost cut off our view of the mud flats there. We were able to see Pintails and Shoveler Ducks, Coots, Night Heron and Wandering Tattler.

We stopped at Salt Lake on the way home but aside from many coot, there were only a few Pintails to greet us.

Chuck Hanson

A revised edition of the "Check List and Summary of Hawaiian Birds" by E.H. Bryan, Jr., is now available. This is a "systematic check list of the birds which have been found along the Hawaiian chain from beyond Midway to Hawaii." Scientific and common names, region of origin, dates and areas where found in Hawaii are given. The foreword has an excellent brief discussion of the birds of Hawaii, and the causes of the extinction of many species. This publication is of great value to all of us, and is a welcome addition to our aids. It is available from the author; the Bishop Museum and other book shops. Price fifty cents.

THE CHRISTMAS COUNT will be held on December 28th, and will cover the same areas taken the last few years. At least four parties will go out to count birds in residential areas and in the following places:

- 1) Moku Manu, Ulupau Head, Kaelepulu Pond.
- 2) Manoa Falls, Kulioou Beach Park, Kuapa Pond, Bellows Field.
- 3) Tantalus Trail, Upper Nuuanu Valley, Punchbowl Cemetery.
- 4) Aiea Trail, Sand Island, Damon Pond, Salt Lake.

All members, or visitors, who would like to participate in the count are asked to come to the December meeting for further information, or to call Joseph King at 904-412 or Grenville Hatch at 727-251.

DECEMBER ACTIVITIES:

MEETING: December 15 - At the Aquarium auditorium at 7:30 p.m.

This is the annual meeting at which officers will be elected for 1959. Details of the Christmas count will be discussed.

CHRISTMAS COUNT: December 28 - Meeting place and time to be set by each group.

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